

THE ENGINEERING TRADES.

Contents.	Page
INTRODUCTORY	225
Summary of results	225
Qualifications affecting comparisons	226
Value of output and cost of materials	227
PRODUCTION	227
Total value of output	227
Divisions of the industry	228
Mechanical engineering :—	
Quantity of output	229
Complete machines and replacement parts	230
Sectional results	230
Summary comparison with 1907	231
Agricultural machinery : Output	232
Exports and imports	233
Engine and boiler building : Output	233
Comparison with 1907	236
Exports and imports	237
Machine tools : Output	239
Exports and imports	240
Marine engineering : Output	241
Capacity of engines constructed	242
Exports and imports	242
Printing, bookbinding, etc., machinery : Output	243
Exports and imports	244
Textile machinery : Output	244
Exports and imports	246
Other machinery and plant : Output	246
Exports and imports	251
Constructional engineering	252
Jobbing and repair work	253
Work in progress	253
Electrical engineering :—	
Sectional results	254
Summary comparison with 1907	255
Electrical machinery : Output	255
Exports and imports	257
Insulated cables : Output	257
Exports and imports	258
Accumulators : Output	259
Exports and imports	259
Other electrical apparatus and plant : Output	259
Exports and imports	261
Contract work	262
Repair and maintenance work	262
Other products	263
Output of steel in engineering works	263
Value of output free from duplication	263
Cost of materials and work given out	266
Net output	266
Kinds of materials used	266
WAGES IN 1924	267
EMPLOYMENT	268
MECHANICAL POWER	268
TABLES : Mechanical engineering	270
Electrical engineering	280

Introductory.*

The tables on pages 270 to 286 are based on returns received from firms in Great Britain and Northern Ireland whose business in 1924 consisted wholly or mainly in the construction and repair of mechanical and electrical plant and apparatus. They do not cover the construction of motor vehicles, cycles, or aircraft†, nor that of heating, lighting, ventilating, and sanitary appliances‡. They also exclude all engineering work carried out by Government Departments, Local Authorities, railway companies, and other public utility undertakings, the reports on which are contained in a separate volume.

The Engineering Trades, as defined above, form one of the major industries of the United Kingdom, ranking second in importance to the mining industry in respect of the numbers employed. The industry comprises a group of trades, some of which are of considerable magnitude and, to a great extent, self-contained. The most important of these divisions are discussed separately on pages 232 to 246 and 255 to 259.

For the Census of 1924, the Engineering Trades were, for convenience, covered by two schedules only, viz., that for the Mechanical Engineering Trade, which comprised engine building and the construction of machinery and mechanical plant, and that for the Electrical Engineering Trade, which covered the construction of generators, motors, cables and other electrical machinery and apparatus. For the Census of 1907 also, these trades were covered by two schedules of approximately the same range; owing, however, to the extensive overlapping that existed in that year between these two main divisions, it was found necessary to combine them for the purposes of the Final Report. In order, therefore, to compare the general results of the 1924 Census with those relating to 1907, the Engineering Trades must be taken as a whole and in the paragraphs which follow the particulars relating to each of the years 1924 and 1907 are inclusive of both the Mechanical and the Electrical Engineering Trades.

At the Census of 1924, the number of separate returns received on schedules for these trades was 8,080. About 3,200 firms to which schedules were sent did not furnish returns, but these firms for the most part had very small establishments and many of them had ceased operations before the close of the censal year. On the basis of the information available it is estimated that they did not employ more than about 5,000 persons in all and that their total net output probably did not exceed £500,000.

Summary of results.—The following table shows the main results of the Censuses of 1924 and 1907, comparisons between the figures for the two years being subject to the qualifications mentioned in the next paragraph. At the 1912 Census detailed returns were not

* See also the notes on pages vii–xv.

† See the report on the Motor, Cycle and Aircraft Trades, pages 307–325.

‡ See the report on the Light Castings Trade, pages 76–88.

required from firms employing five persons or less and the outbreak of war interrupted the task of dealing with incomplete or incorrect returns. For these reasons the information obtained in connexion with the Census of 1912 was not sufficiently complete to warrant its being used for purposes of comparison.

Particulars.	Unit.	1924.		1907.
		Including marine engineering work done by shipbuilding firms.	Excluding marine engineering work done by shipbuilding firms.	
Value of goods made and work done (Gross output)	£'000	226,675	211,785	102,952
Cost of materials used	"	103,031	95,972	48,535
Paid for work given out to other firms	"	5,565	4,879	3,922
Net output	"	118,079	110,934	50,495
Average number of persons employed	No.	597,621	552,038	461,703
Net output per person employed	£	198	201	109
Mechanical power available :—				
Prime movers	H.P.	372,231	285,417	331,251
Electric motors driven by purchased electricity	"	744,399	630,982	(not recorded)

Qualifications affecting comparisons.—In considering the above table and the other tables in this report which show figures for different censal years, the following qualifications should be borne in mind :—

(1) The comparability of figures relating to value or cost is affected by the changes which have taken place in the general purchasing power of money.

(2) The Census of 1907 covered Great Britain and the whole of Ireland, but that of 1924 applied only to Great Britain and Northern Ireland. The exclusion of Southern Ireland in 1924 does not seriously affect the comparability of the figures since, according to the Census of Production taken by the Government of the Irish Free State in respect of the year 1926, the total output of the Engineering and Implements Trade in that year amounted to £248,000, and the numbers employed to 1,035.

(3) In the Census of 1924, shipbuilding firms owning marine engine works were required to furnish separate returns in respect of the latter, and the particulars recorded in those returns are included in the 1924 aggregates for the Engineering Trades shown above. In 1907 the marine engine works of shipbuilding firms were not dealt with as separate undertakings but as part of the general shipbuilding establishments operated by these firms; consequently, particulars relating to those works were not included in the aggregates for the Engineering Trades but in those for the Shipbuilding Trade (see page 297). In order to show the results for the two years on a common basis, it is necessary to omit from the 1924 figures the particulars recorded in respect of the works in question, and the results are shown in the second column for 1924 in the above table.

Value of output and cost of materials.—The figures in the above table representing the value of goods made and work done and the cost of materials used, are the aggregates of the figures recorded by the firms that made returns, and, for the reasons explained in paragraphs (i) and (ii) on pages xii and xiii, they overstate the value of, and the cost of the materials used by, the Engineering Trades considered as a whole. The matter is discussed on pages 263 to 266, where it is estimated that the value, free from duplication, of the output of the Engineering Trades in 1924 lay between £217 millions and £222 millions, and the cost of the materials purchased from sources outside these trades and worked up into their products lay between £95 millions and £100 millions.

Production.

Detailed information relating to the output of the Engineering Trades in 1924 will be found, for Mechanical Engineering, in Table II on pages 270 to 276, and, for Electrical Engineering, in Table II on pages 281 to 283.

As stated above, the present report does not deal with the engineering work carried out by Government Departments, Local Authorities, Railway Companies, etc.; the total engineering output of such establishments in 1924 was valued, on a cost basis, at £44,810,000, of which £23,089,000 was in respect of mechanical engineering and £21,721,000 in respect of electrical engineering.* The corresponding total for 1907 was £9,619,000.

Total value of output.—The following statement furnishes, in summary form, a broad comparison between the output of the Engineering Trades in 1924 and 1907 :—

Class of engineering work.	Returned on schedules for			
	The Engineering Trades.		All trades.	
	1924.	1907.	1924.	1907.
Mechanical engineering :—	£'000.	£'000.	£'000.	£'000.
Excluding engineering products of shipbuilding firms	128,050	76,497	132,775†	77,828
Including engineering products of shipbuilding firms	141,784	—	146,509†	86,589
Electrical engineering	68,048	13,897	70,653	14,098
TOTAL { Excluding engineering products of shipbuilding firms	196,098	90,394	203,428†	91,926
{ Including engineering products of shipbuilding firms	209,832	—	217,162†	100,687

† Not including the output of firms mainly engaged in the manufacture of engines for motor cars, motor cycles or aeroplanes, for which see the report on the Motor, Cycle and Aircraft Trades, page 312.

* Such production falls within the scope of the report on Public Utility Services which forms part of a separate volume.

In addition to the output of machinery, etc., and work done represented by the figures given above, firms that made their returns on schedules for the Engineering Trades reported the production of other goods such as are ordinarily produced by firms in other trades, and of waste products, to a total value of £16,843,000 (of which £1,156,000 was returned in respect of marine engineering departments of shipbuilders) in 1924 and £12,558,000 in 1907, the latter figure being exclusive of such other goods produced by marine engineering firms. The figure of £86,589,000 and the total of £100,687,000, shown for 1907 in the final column of the table, are the result of adding the total value returned for ships' machinery and fittings, including machinery made in the engineering shops of shipbuilding firms and fitted into ships built by them, to the totals reported in respect of other products of the Engineering Trades.

The engineering industry is here divided into two main branches, though the same firm may carry on both branches in different departments. It will be convenient to examine separately the data relating to Mechanical Engineering, then those relating to Electrical Engineering, and finally those relating to the *Other products* (largely semi-finished goods) of both branches.

The lack of information in many of the returns regarding the quantity of output in 1907, and, to a lesser degree, in 1924, precludes any accurate comparison between the magnitude of the output in 1924 and 1907. The aggregate value of the output classified as mechanical engineering was about two-thirds greater in 1924 than in 1907, and the value of the output classified as electrical engineering was, in 1924, practically five times the value returned in 1907. It is quite clear that in the course of these seventeen years there was a very large increase in the output of the electrical branch of the industry, and there is little doubt that some of this increase was at the expense of the mechanical engineering branch. With regard to the latter branch as a whole, it is less easy to express an opinion, for there is no unit of quantity which can reduce the heterogeneous output to a common basis. It seems not unreasonable, however, to conclude that in the aggregate the volume of output in mechanical engineering was not greater in 1924 than in 1907, and may well have been less.

Divisions of the industry.—A large proportion of the output of the Engineering Trades falls into certain well-defined groups of products, of which the production is, to a large extent, in the hands of firms that specialise in the manufacture of such products. The following statement shows the value of the output of the more important of these groups together with the value of the gross output of the specialist firms.

Group.	Gross output of the firms in the group.		Total value of characteristic products of the group returned		
	Total.	Of which specified as engines, machinery and parts.	By firms in the group.	On all schedules for the Engineering Trades.	On schedules for all trades.
	£'000.	£'000.	£'000.	£'000.	£'000.
MECHANICAL ENGINEERING.					
Agricultural machinery	3,356	2,700	1,837	3,279	3,380
Engine and boiler building	29,637	25,175	18,498	24,180	24,368*
Machine tools	3,017	2,500	2,322	3,495	3,647
Marine engineering	22,246	16,965	13,896	14,936	15,088
Printing, bookbinding, etc., machinery	2,439	2,321	2,269	2,586	2,633
Textile machinery	19,589	18,130	17,712	18,897	19,614
ELECTRICAL ENGINEERING.					
Electrical machinery	18,230	17,141	14,667	15,729	16,120
Insulated cables	24,097	21,181	18,427	18,583	18,663
Accumulators	3,247	3,191	3,139	3,530	3,530

* Not including internal combustion engines for motor cars, motor cycles or aeroplanes manufactured by firms mainly engaged in making such engines, for which see the report on the Motor, Cycle and Aircraft Trades, page 312.

I.—Mechanical Engineering.

Quantity of output.—At the Census of 1907 the products of mechanical engineering were classified under 43 headings; complete machines and parts were not recorded separately and particulars of quantity were not required, although some voluntary particulars were furnished. The results of the Census of 1924 were classified under 158 headings, not including separate headings for the parts of each specified class of production, and particulars of quantity were required for most of them. The total value of the machinery and parts returned on schedules for the Mechanical Engineering Trade against headings in respect of which particulars of quantities were required, was £96,312,000, but, as shown in the following table, such particulars could be supplied in respect of only 76·3 per cent. of this total.

Complete machines and parts.	Returned by quantity.	Not returned by quantity.	Proportion returned by quantity.
	Value.	Value.	
	£'000.	£'000.	per cent.
Complete machines	58,930	13,978	80·8
Replacement parts*	8,436	4,913	63·2
Complete and parts, not separately distinguished	6,073	3,982	60·4
TOTAL	73,439	22,873	76·3

* The term *replacement parts*, as used in this report, does not include the various components of a complete machine packed separately for convenience of transport. In order to save shipping space this method of packing is frequently adopted for export purposes and, to avoid confusion, replacement parts are not separately specified in the Import and Export List.

Complete machines and replacement parts.—The total value of the output returned on schedules for the Mechanical Engineering Trade against those headings for which separate particulars were required in respect of complete machines and replacement parts was £100,579,000, of which £75,778,000 was the value of complete machines, £14,747,000 of replacement parts and £10,054,000 of machines and parts the separate values of which could not be stated. The following table shows the distribution of these totals among the various branches of the trade :—

Branch of engineering.	Complete machines.	Replacement parts.	Machines and parts not separately distinguished.	Total.
	Value.	Value.	Value.	Value.
	£'000.	£'000.	£'000.	£'000.
Agricultural machinery	1,978	542	759	3,279
Engine and boiler building ..	17,171	4,223	864	22,258
Machine tools	2,794	185	515	3,494
Marine engineering	13,880	774	277	14,931
Printing, bookbinding, etc., machinery	2,072	379	135	2,586
Textile machinery	10,367	3,668	563	14,598
Other machinery (mechanical) ..	27,516	4,976	6,941	39,433
TOTAL	75,778	14,747	10,054	100,579

Sectional results.—For 1924 it has been found possible to segregate the main particulars relating to agricultural machinery, engine and boiler building, machine tools, marine engineering, printing and bookbinding machinery and textile machinery. These leading particulars are set out in the table which follows, but it should be understood that they relate only to the firms that were *mainly* engaged in the several branches. For convenience, similar particulars relating to the Mechanical Engineering Trade as a whole are added to the table.

Branch of engineering.	Gross output.	Net output.	Average number of persons employed.	Net output per person employed.	Mechanical power available.	
					Prime movers.	Electric motors driven by purchased electricity.
	£'000.	£'000.	No.	£	Th. H.P.	Th. H.P.
Agricultural machinery	3,356	1,989	10,830	184	4·8	6·8
Engine and boiler building	29,637	15,418	79,677	194	57·5	134·9
Machine tools	3,017	1,880	10,105	186	3·7	24·4
Marine engineering	22,246	10,623	65,963	161	88·1	168·9
Printing, bookbinding, etc., machinery	2,439	1,787	7,582	236	3·9	6·8
Textile machinery	19,589	11,743	64,345	183	37·0	45·8
All other	76,085	41,069	205,023	200	128·5	242·7
Mechanical Engineering Trade	156,369	84,509	443,525	191	323·5	630·3

The groups of firms distinguished were responsible in the aggregate for about 51·4 per cent. of the net output returned on schedules for the Mechanical Engineering Trade and 53·8 per cent. of the persons and 61·1 per cent. of the mechanical power employed in that trade.

Summary comparison with 1907.—It follows from what has been said that comparisons between 1924 and 1907 can only be made on very broad lines. In the following table the principal products returned for the Census of 1924 are grouped together so as to facilitate comparison with the most nearly corresponding groups for 1907.

Kind of products.	1924.		1907.	
	Returned on schedules for		Returned on schedules for	
	The Engineering Trades.	All trades.	The Engineering Trades.	All trades.
	£'000.	£'000.	£'000.	£'000.
Prime movers and parts :—				
Internal combustion engines ..	5,548	5,611*	2,118	2,130
Steam engines	3,973	3,973	7,612	7,726
Water engines	245	245	110	110
Locomotives (rail) and parts†† ..	4,265	4,266	4,406	4,529
Tractors and parts	1,459	1,537	436†	453†
Boilers and boiler-house plant and parts	7,710	7,756	4,007‡	4,085‡
Machinery and parts :—				
Agricultural	3,279	3,380	1,144	1,151
Hydraulic	590	590	1,243	1,263
Machine tools	3,495	3,647	2,763	2,936
Marine	14,936	15,088	§	8,855
Mining	2,472	2,527	1,202	1,275
Textile	18,897	19,614	13,028	13,099
Cranes, lifts, etc.	4,310	4,343	812	812
Other sorts	34,418	35,029	11,466	11,722
Machinery accessories and parts ..	4,674||	5,748||	3,650	3,739
Ordnance**	931	931	2,763	2,771
Railway and tramway equipment††	2,609	2,609	1,380	1,387
Iron and steel structural work ..	10,126	10,126	5,501	5,501
Jobbing and repairs	14,687	16,329	6,503	6,692
Work in progress (additional)¶¶ ..	3,160	3,160	6,353	6,353
TOTAL—PRINCIPAL PRODUCTS	141,784	146,509	76,497	86,589

* Exclusive of engines for motor cars, motor cycles and aeroplanes made in the Motor, Cycle and Aircraft Trades (see page 312).

† Road locomotives and road rollers.

‡ Boilers only.

§ In Shipbuilding Trade.

|| Including ball bearings, etc.

** Excluding output of Government factories.

†† Excluding locomotives and equipment produced in Railway Companies' workshops.

¶¶ i.e., excess value at end of year over value at beginning.

More detailed particulars regarding the output of the Mechanical Engineering Trade in 1924 are given in the sections which follow.

Agricultural Machinery.

Output.—The output in 1924 of firms mainly engaged in making agricultural machinery was as follows:—

	£'000.
Agricultural machinery	1,837
Other machinery and parts	863
Iron and steel structural work	34
Jobbing and repair work	335
Work in progress (additional)	4
Other products	283
Total	3,356

The degree of specialisation in the agricultural branch of the Engineering Trades was not conspicuously high.

The following statement gives particulars of the output of agricultural machinery in 1924, distinguishing the output of firms that were mainly agricultural engineers from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which particulars of the tonnage of machines and parts made were supplied is shown separately in the table.

Agricultural Machinery.

	Value of output returned			Output for which particulars of quantity were supplied.			
	By firms mainly makers of agricultural machinery.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.		
						£'000.	£'000.
(a) Complete. (b) Replacement parts. (c) Machines and parts, not separately distinguished.							
Ploughs:—							
Mechanical power ..	(a) 29 (b) 7 (c) —	36 16 15	36 16 15	960	63		
Animal power ..	(a) 45 (b) 89 (c) —	49 103 262	49 103 268				
Grass and lawn mowers.	(a) 554 (b) 88 (c) —	652 101 191	652 101 240			10,910	900
Planters and seeders	(a) 24 (b) 6 (c) —	32 8 4	32 8 4				
Reapers and binders	(a) 57 (b) 29 (c) —	59 31 238	59 31 238	1,370	88		
Threshers	(a) 54 (b) 5 (c) —	63 63 75	63 63 75				
Other agricultural machinery.	(a) 659 (b) 191 (c) —	912 220 212	912 220 258			21,880	1,158
TOTALS—							
AGRICULTURAL MACHINERY AND PARTS.	(a) 1,422 (b) 415 (c) —	1,978 542 759	1,978 542 860	49,030	2,954		
	1,837	3,279	3,380				

Of the total output of agricultural machinery, 54·3 per cent. by value was produced by firms that were engaged mainly in agricultural engineering.

For most of the specified classes of agricultural machinery, statements of tonnage were furnished for the great bulk of the total recorded value. If the relation of weight to value were the same for the machinery not returned by weight as for that so returned in each class, the aggregate weight would have been about 56,000 tons. From information covering about 75 per cent. of the total value, the weight of agricultural machinery produced in 1907 may be estimated at a minimum of 43,000 tons.

Exports and imports.—The following table sets out the estimated weights of the machinery produced in 1924 together with the recorded weights of exports and of net imports of each class in the same year, but the comparisons should not be pressed to too high a degree of precision.

Agricultural machines and parts.	Production.	Exports	Net imports.	Available for use in United Kingdom.	Share of home market held by British-made goods.
	Tons.	Tons.	Tons.	Tons.	per cent.
Ploughs:—					
Mechanical power ..	1,000	1,848	170	..	..
Animal power ..	9,000	4,358	489	5,131	90·5
Grass and lawn mowers	12,000	1,468	1,717	12,249	86·0
Planters and seeders ..	700	40	23	683	96·6
Reapers and binders ..	1,400	1,175	1,740	1,965	11·5
Threshers	5,900	3,297	10	2,613	99·6
Other descriptions ..	26,000	5,785	1,353	21,568	93·7
TOTAL	56,000	17,971	5,502	..	..

In no class of these goods except reapers and binders do imports form a large percentage of the supply available for use. In 1907 retained imports of agricultural machinery amounted to 8,379 tons, and British exports to 30,738 tons. Changes in classification may impair the validity of the comparison, but both retained imports and British exports were smaller in 1924 than in 1907, while production apparently increased.

Engine and Boiler Building.

Output.—The output in 1924 of firms that were mainly engaged in engine and boiler building was as follows:—

	£'000.
Engines and boilers	17,789
Engines for motor cars, motor cycles and aircraft	709
Other machinery and parts	6,677
Iron and steel structural work	453
Jobbing and repair work	1,346
Work in progress (additional)	376
Other products	2,287
Total	29,637

The following statement gives particulars of the output of engines, boilers, etc. (except marine engines and boilers) in 1924, distinguishing the output of firms whose products consisted mainly of engines and boilers from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which particulars of quantity as well as of value were supplied is shown separately in the table.

Engines, Boilers and Boiler-house Plant (except marine engines and boilers).

(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned			Output for which particulars of quantity were supplied.	
	By firms mainly engine and boiler builders.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
				Tons.	£'000.
Prime movers, not electrical or marine or included in complete vehicles:—	£'000.	£'000.	£'000.	Tons.	£'000.
1. Hydraulic	{ (a) 11 (b) 8	{ 28 9	{ 28 9	{ 340	{ 24
2. Internal combustion:—					
(i) Gas engines ..	{ (a) 274 (b) 156	{ 281 157	{ 281 157	{ 5,360	{ 419
(ii) Heavy oil (including Diesel) engines.	{ (a) 2,099 (b) 256 (c) —	{ 2,163 261 40	{ 2,163 261 40	{ 24,890	{ 2,146
(iii) Petrol and light oil engines (except for vehicles).	{ (a) 156 (b) 15 (c) —	{ 198 34 214	{ 198 34 266	{ 3,460	{ 397
(iv) Fuel not distinguished.	{ (a) 596 (b) 185 (c) 32	{ 624 699 39	{ 624 699 50	{ 610 No. 2,471	{ 106 558
TOTAL—INTERNAL COMBUSTION.	{ (a) 3,125 (b) 612 (c) 32	{ 3,266 1,151 297	{ 3,266 1,151 360	{ Tons 34,320 No. 2,471	{ 3,068 558
3. Steam, reciprocating:—				Tons.	
(i) Pumping engines.	{ (a) 439 (b) 50	{ 463 54	{ 463 54	{ 5,130	{ 512
(ii) Winding engines.	{ (a) 147 (b) 35 (c) 875	{ 237 61 1,009	{ 237 61 1,009	{ 4,420	{ 287
(iii) Other sorts	{ (a) 207 (b) — (c) —	{ 229 278	{ 229 278	{ 18,540	{ 832
TOTAL—STEAM RECIPROCATING.	{ (a) 1,461 (b) 292 (c) —	{ 1,709 344 278	{ 1,709 344 278	{ 28,090	{ 1,631
4. Steam turbine and other rotary engines	{ (a) 988 (b) 117 (c) —	{ 1,440 117 85	{ 1,440 117 85	{ 6,240	{ 1,101

Engines, Boilers and Boiler-house Plant, &c.—continued.

(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned			Output for which particulars of quantity were supplied.	
	By firms mainly engine and boiler builders.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
				Tons.	£'000.
5. Water turbines and other water engines (not hydraulic).	{ (a) 43 (b) 6	{ 195 13	{ 195 13	{ 1,430	{ 139
6. Rail locomotives:—				No.	
(a) Main line ..	1,676	2,445	2,445	401	2,445
(a) Contractors' and light ..	397	423	423	439	423
(b)	1,093	1,397	1,398	—	—
7. Tractors and steam rollers:—					
(a) Agricultural ..	158	344	346	402	326
(a) Other	694	1,115	1,191	729	631
TOTALS—PRIME MOVERS.	{ (a) 8,553 (b) 2,128 (c) 32	{ 10,965 3,031 660	{ 11,043 3,032 723	{ Tons 70,420 No.	{ 10,346
	10,713	14,656	14,798	4,442	
Boilers and boiler-house plant.				Tons.	
1. Boilers (not marine or locomotive):—					
(i) Internally fired (Lancashire, Galloway or Cornish type.)	{ (a) 517 (b) 65 (c) —	{ 528 65 22	{ 528 65 22	{ 14,550	{ 582
(ii) Locomotive type (stationary).	{ (a) 110 (b) 9	{ 118 12	{ 118 12	{ 2,840	{ 129
(iii) Water tube ..	{ (a) 1,640 (b) 116 (c) 279	{ 1,856 131 488	{ 1,856 131 488	{ 41,500	{ 1,942
(iv) Other sorts ..	{ (a) 279 (b) 7 (c) —	{ 488 23 32	{ 488 23 36	{ 6,670	{ 423
TOTAL—BOILERS.	{ (a) 2,546 (b) 197 (c) —	{ 2,990 231 54	{ 2,990 231 58	{ 65,560	{ 3,076
2. Economisers, feed-water heaters, etc.	{ (a) 1,410 (b) 123	{ 1,421 179	{ 1,421 179	{ 41,010	{ 1,291
3. Other boiler-house plant.	{ (a) 1,780 (b) 299 (c) —	{ 2,218 416 12	{ 2,218 416 47	{ 64,820	{ 2,286
4. Boilers and boiler-house plant, not separately distinguished.	{ (a) 113 (b) 19 (c) —	{ 157 21 11	{ 157 21 18	{ 5,110	{ 177
TOTALS—BOILERS AND BOILER-HOUSE PLANT.	{ (a) 5,849 (b) 638 (c) —	{ 6,786 847 77	{ 6,786 847 123	{ 176,500	{ 6,830
	6,487	7,710	7,756		

Engines, Boilers and Boiler-house Plant, &c.—continued.

(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned			Output for which particulars of quantity were supplied.	
	By firms mainly engine and boiler builders.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
	£'000.	£'000.	£'000.	Tons.	£'000.
Condensers	(a) 561 (b) 28 (c) —	777 40 163	777 40 163	5,490	641
TOTAL—CONDENSERS ..	589	980	980		
TOTALS—PRIME MOVERS, BOILERS, BOILER-HOUSE PLANT AND CONDENSERS.	(a) 14,963 (b) 2,794 (c) 32	18,528 3,918 900	18,606 3,919 1,009	252,410 No. 4,442	17,817
	17,789	23,346	23,534		

In addition to the internal combustion engines shown above, an output of engines (and parts) for motor cars, motor cycles and aeroplanes was recorded on schedules for the Engineering Trades. Firms whose main business was that of engine and boiler building, returned an output of such engines and parts valued at £709,000, and other firms that made returns on schedules for the Engineering Trades, an output valued at £125,000. Engines of this class were chiefly produced in the Motor, Cycle and Aircraft Trades (see page 312).

Excluding these engines, the value of the engines, boilers and boiler-house plant made in 1924 was £23,534,000, of which 75.6 per cent. was produced by firms mainly engaged in the construction of those products. The value of the gross output of these firms was £29,637,000, of which engines (excluding motor car, etc., engines), boilers, etc., formed 60.0 per cent. and other machinery and parts (including engines for motor cars, etc.), 24.9 per cent. The degree of specialisation in this branch of engineering was thus fairly high.

Comparison with 1907.—A comparison of the output in 1924 and 1907, as returned on schedules for all trades, so far as the headings can be identified for the earlier year, is made below :—

Engines, etc., and parts.	1924.	1907.
	£'000.	£'000.
Internal combustion engines*	4,777	2,130
Reciprocating steam engines	2,331	7,726
Steam turbines	1,642	
Rail locomotives	4,266	4,529
Tractors	1,537	453
Boilers and boiler-house plant	7,756	4,085†
Hydraulic prime movers	37	110

* Excluding engines for motor cars, etc.

† Boilers only.

Taking into account the change in the level of prices, an increase of output is indicated in the case of internal combustion engines and tractors, and a decrease in steam engines and rail locomotives.

Included in the total of reciprocating steam engines for 1907, shown above, are *Steam engines : Agricultural*, valued at £1,283,000, which mainly consisted of stationary engines for use at farms. The value of the output of boilers in 1924 was £3,279,000 (plus some part of £196,000), and the decrease since 1907 was probably accompanied by some decrease in the output of general boiler-house plant; an increase in economisers, feed-water heaters, etc., is, however, by no means excluded. It is also probable that there was a substantial increase in the output of steam turbines since 1907; part of the decrease in the output of reciprocating steam engines may have been due to this cause and to an extension in the use of the internal combustion engine.

Exports and imports.—The following table compares the recorded value of production, exports and retained imports in 1924 :—

Engines, etc., and parts.	Production	Exports.		Net imports.	
	Value (at works).	Quantity.	Value f.o.b.	Quantity.	Value c.i.f.
	£'000.	Tons.	£'000.	Tons.	£'000.
Hydraulic prime movers	37	655	40	42	4
Internal combustion engines :—					
Gas	442	4,662	383	628	28
Heavy oil, including Diesel	2,464	24,959	2,302	3,752	375
Petrol and light oil (stationary)	498	1,580	225	305	44
TOTAL—INTERNAL COMBUSTION	4,777*	31,201	2,910	4,685	447
Reciprocating steam engines :—					
Pumping	517	686	81	62	5
Winding	298	1,127	77	1	‡
Other	1,516	10,222	701	924	59
TOTAL—RECIPROCATING STEAM	2,331	12,035	859	987	64
Steam turbine and other rotary engines	1,642	3,016	550	661	111
Water turbines, and other water engines (not hydraulic)	208	1,946	180	44	7
Boilers and boiler-house plant :—					
Boilers—					
Internally fired	615	6,238	289	2	‡
Locomotive type (stationary)	130	2,296	151	5	1
Water tube	1,987	24,781	1,278	170	10
Other sorts	547	4,544	252	64	5
TOTAL—BOILERS	3,279	37,859	1,970	241	16
Economisers, etc.	1,600	12,753	396	37	3
Other boiler-house plant	2,877†	4,786	265	447	68
TOTAL—BOILERS AND PLANT ..	7,756	55,398	2,631	725	87
Condensers	980	1,019	99	20	4

* Including £1,373,000 in respect of unclassified internal combustion engines.

† Including £196,000 in respect of boilers and plant not separately distinguished.

‡ Less than £500.

In all the classes of goods covered by the table, except heavy oil engines, British products dominate the home market. The total net imports of these goods have, however, increased since 1908, the first year for which detailed records are available, when they totalled 3,267 tons, valued at £153,000 f.o.b. Exports of steam and internal combustion engines in that year were 100,742 tons and of boilers, 51,552 tons.

Attention may be directed to the particulars relating to production and exports of boilers, locomotive type (stationary), where the works value of the output was £130,000, and the weight was furnished in respect of £129,000 of this, amounting to 2,840 tons. The recorded export of 2,296 tons, valued at £151,000, appears to represent about four-fifths of the production, and the average value f.o.b. exceeds by about 45 per cent. the average value at works of the entire output of such boilers in the census year. Possibly the classes of boiler included in the figures for *Other sorts* may be responsible for the obvious lack of comparability of the data relating to boilers of the locomotive type for stationary purposes. The aggregation of the headings *Locomotive type* and *Other sorts* appears to yield totals that present no unreasonable divergence between the average of the values at works and the average f.o.b. value of exports. An alternative explanation, not necessarily entirely independent of the preceding, is that there were important differences between the average character or grade of the output for the business years for which the several makers furnished returns and that which secured a record, under this heading, as exported in the calendar year 1924.

A similar comparison for locomotives and tractors is given below:—

Locomotives and tractors.	Production.		Exports.		Net imports.	
	Quantity.	Value at works.	Quantity.	Value f.o.b.	Quantity.	Value c.i.f.
	No.	£'000.	No.	£'000.	No.	£'000.
Rail locomotives:—						
Main line	401	2,445	305	1,640	—	—
Contractors' and light	439	423	177	212	11	5
Parts .. .. .	..	1,398	..	645	..	25
Tractors:—						
Agricultural	(a) 402	326	320	161	1,735	174
	(b) ..	20				
Other sorts	(a) 729	631	876	563	390	49
	(b) ..	560				

(a) Returned by quantity.

(b) Quantity not stated.

Railway locomotives manufactured in railway companies' workshops are not included in the production figures shown in the table.*

In the case of tractors exported in 1924, the figures indicate that their average value was markedly below that of tractors built for use in this country.

* The output of these workshops in 1924 included 223 locomotives of an aggregate weight of 16,900 tons, valued at £1,291,000, and parts of locomotives (other than wheels, tyres and axles), valued at £3,473,000; these values are on a cost basis.

Machine Tools.

Output.—The output in 1924 of firms mainly engaged in making machine tools was as follows:—

	£'000.
Machine tools	2,322
Other machinery and parts	178
Jobbing and repair work	104
Work in progress (additional)	2
Other products	411
Total	3,017

The following statement gives particulars of the output of machine tools in 1924, distinguishing the output of firms that were mainly makers of machine tools from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which particulars of the tonnage made were supplied is shown separately in the table.

Machine Tools (Metal-working).

	Value of output returned			Output for which particulars of quantity were supplied.			
	(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	By firms mainly makers of machine tools.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.	
					Tons.	£'000.	
Drilling	(a) 316 (b) 10 (c) 2	316 10 75	327 10 178	5,340	356		
Grinding	(a) 236 (b) 9 (c) 1	236 9 2	274 9 31			1,460	102
Lathes	(a) 519 (b) 26 (c) —	519 26 204	617 29 219					6,930	532
Milling	(a) 139 (b) 1 (c) —	139 1 69	142 2 69	2,780	143		
Planing and shaping	(a) 232 (b) 5 (c) 251	232 5 438	238 5 438			3,610	243
Presses, punching and shearing machines.	(a) 22 (b) — (c) 448	22 18 688	39 22 688					6,500	459
Other machine tools	(a) 39 (b) 1 (c) 59	39 1 70	84 135 70	7,000	648		
Chucks and work-holders.	(a) 3 (b) 3 (c) 3	3 7 14	7 7 14			200	38
TOTALS—MACHINE TOOLS AND PARTS.	(a) 2,200 (b) 115 (c) 7	2,200 115 516	2,794 185 668					33,820	2,521
	2,322	3,495	3,647				

The total output in 1907 was valued at £2,936,000. Particulars of weight were furnished in respect of 66·4 per cent. of the total value of the output in 1907 and 69·1 per cent. in 1924. If the two samples be taken as representative, the weight of the machine tools and parts made in 1907 would be about 78,000 tons and the corresponding total for 1924 would be about 49,000 tons.

Exports and imports.—The following table sets out the weight and value of the exports and retained imports of the different kinds of machine tools in 1924, and, when due allowance is made for the different bases of values, some measure may be obtained of their relation to the total value (£3,647,000 at factory) of the machine tools produced.

In the table of exports, two classes, viz., *Lathes* and *Other descriptions*, are of outstanding importance, and the same two classes dominate the record of value of output. Nearly half the value of the output shown in the above table, and three-fifths of the value of the exports shown below relate to goods under one or other of these headings. The average value of the exports entered under *Other descriptions* was £107 per ton, as compared with £114, the average value of the machine tools, etc., of all classes exported in 1924, while, in the part of the output for which weights were furnished, the average value of which was £75 per ton, goods recorded under *Other descriptions* were entered at values averaging £93 per ton. Thus the relation of this heading to the specific classes of goods separately recorded is clearly of much importance. In most instances, the average value of exports would be reduced, and that of output raised, by the distribution to individual headings of any goods which, through insufficient precision of description, may have been included under *Other descriptions*. Apart from this consideration, it is to be observed that complete particulars of weights of goods produced were furnished only in the case of planing and shaping machines, and nearly complete particulars (92 per cent.) in the case of presses, punches and shearing machines. For the remaining four-fifths of the output, the proportion of the value covered by the particulars of weight varied between 32 per cent. and 71 per cent., and averaged 63 per cent. If the omitted 37 per cent. included a large proportion of goods of relatively high value, the effect would be to diminish the divergence between the average value of goods made and of goods exported.

It is understood that, broadly speaking, no great divergence in character exists between machine tools of a given description made for export and goods similarly described made for use in this country.

Machine tools and parts.	Exports.		Net imports.	
	Weight.	Value f.o.b.	Weight.	Value e.f.
	Tons.	£'000.	Tons.	£'000.
Drilling	1,613	215	393	58
Grinding	828	131	412	73
Lathes	4,523	493	370	55
Milling	374	56	327	47
Planing and shaping	870	70	172	25
Presses, punches and shearing machines	750	64	600	76
Other descriptions	3,011	321	541	117
Chucks and work-holders	26	12	74	36
TOTAL	11,995	1,362	2,889	487

Marine Engineering.

Output.—The output in 1924 of firms mainly engaged in making marine machinery is given below. Machinery of this class was produced both by firms that were marine engineers only and by the marine engineering departments of shipbuilding firms; the output of the latter is shown separately.

	Shipbuilding firms only.	
	All firms.	firms only.
	£'000.	£'000.
Marine machinery	13,896	7,971
Other machinery and parts	3,069	2,084
Iron and steel structural work	4	4
Jobbing and repair work	2,084	1,622
Work in progress (additional)*	1,784	2,053
Other products	1,409	1,156
Total	22,246	14,890

The following statement gives particulars of the output of marine machinery (except that made in Government Dockyards) in 1924, distinguishing the output of firms that were mainly marine engineers from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which particulars of quantity as well as of value were supplied is shown separately in the table. While the particulars furnished under the first four headings covered well over 90 per cent. in each case and over 96 per cent. of the value of the total production shown against these headings, particulars of quantity were lacking in respect of about 28 per cent. of the total value of the marine machinery produced.

About 92·1 per cent. of the total output of marine machinery in 1924 was produced in establishments whose principal products consisted of marine machinery, including the engine-building works of shipbuilding firms.

* In the case of marine engineering firms that were not also shipbuilders, the value of the work in progress at the beginning of the year exceeded that of the work in progress at the end of the year by £269,000.

Marine Machinery.

	(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned			Output for which particulars of quantity were supplied.	
		By firms mainly makers of marine machinery.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
Reciprocating steam engines.	(a) 4,691 (b) 25	4,756 25	4,756 25	506	4,746	
Steam turbines	(a) 1,748 (b) 32	1,748 32	1,748 32	27	1,748	
Internal combustion engines.	(a) 2,467 (b) 72	2,513 78	2,595 88	1,670	2,491	
Boilers	(a) 1,744 (b) 56	1,837 91	1,863 91	Number 834 Sets 22	1,812	
Engines and boilers, not distinguished.	(a) — (c) —	91 270	91 270	—	74	
Other marine machinery.*	(a) 2,625 (b) 436 (c) —	2,935 548 12	2,935 548 46	—	—	
TOTALS—MARINE ENGINES, BOILERS AND PARTS.	(a) 13,275 (b) 621 (c) —	13,880 774 282	13,988 784 316	Sets 2,725 Number 834	9,059 1,812	
		13,896	14,936	15,088		

* Including some engines and boilers not separately distinguished.

Capacity of engines constructed.—Firms were asked to state voluntarily the capacity of the marine engines made by them in 1924, and this information was furnished in respect of 378 sets of reciprocating steam engines, 17 sets of steam turbines, and 1,317 sets of internal combustion engines, as follows:—

	Number of sets.	Indicated horse-power.
Reciprocating steam engines:		
Compound	72	17,141
Triple	295	449,009
Quadruple	9	33,350
Other sorts	2	75
Steam turbines	17	103,400
Oil engines	1,317	119,874

No attempt was made in 1907 to obtain a quantity measure of the engineering products manufactured in that year, but the value of the marine machinery and boilers made by all firms was calculated as £9,840,000, and firms with an output of marine and other machinery valued at £7,670,000 stated that they made 1,281 sets of engines of an aggregate indicated horse-power of 1,200,000.

Exports and imports.—In 1924, 65 sets of reciprocating steam engines, 7 sets of steam turbines, and 95 sets of internal combustion engines, valued in all at £1,083,000, besides 129 boilers, valued at £397,000, and other marine machinery valued at £273,000, were exported as fixed in new ships built for owners abroad; and marine reciprocating steam engines weighing 1,842 tons and valued

at £186,000 f.o.b. were exported separately. In 1907 particulars of quantity were not obtained but the value of machinery exported with ships was £2,551,000. Retained imports of marine machinery were negligible in both years.

Printing, Bookbinding and Paper-working Machinery.

Output.—The output in 1924 of firms mainly engaged in making printing, etc., machinery was as follows:—

	£'000.
Printing, etc., machinery	2,269
Other machinery and parts	52
Jobbing and repair work	84
Work in progress (additional)	24
Other products	10
Total	2,439

This branch of the Engineering Trades is highly specialised.

The following statement gives particulars of the output of machines for printing, typesetting, bookbinding, envelope, bag and cardboard-box making, and allied purposes, distinguishing the output of firms principally engaged in the construction of such machines from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which both the quantity and the value of the machines made was stated is shown separately in the table. In the aggregate that output was, in value, less than one-half of the total output of such machinery in the censal year.

Printing, Bookbinding, etc., Machinery.

	(a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned			Output for which particulars of quantity were supplied.	
		By firms mainly makers of printing, etc., machinery.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
Typesetting and printing (newspaper, letter-press and lithographic) machines.	(a) 1,315 (b) 260 (c) 127	1,318 269 132	1,318 269 136	3,620	652	
Bookbinding (including blocking, embossing, stitching, ruling and cutting) machines.	(a) 81 (b) 7	98 8	100 8	660	77	
Bag and envelope making machines.	(a) 48 (b) 8	57 8	57 8	110	35	
Cardboard-box making machines.	(a) 41 (b) 11	68 23	68 23	400	70	
Other machines for the Printing and allied trades.	(a) 344 (b) 27 (c) —	531 71 3	572 71 3	2,960	441	
TOTALS—PRINTING, ETC., MACHINES AND PARTS.	(a) 1,829 (b) 313 (c) 127	2,072 379 135	2,115 379 139	7,750	1,275	
		2,269	2,586	2,633		

Firms that specialised in this class of machinery produced 86·1 per cent. of the total output recorded for 1924. Separate particulars of this class of machinery were not required to be stated in 1907, and consequently it is not possible to estimate the progress of the industry between the two Censuses.

Exports and imports.—The following table gives the available particulars regarding exports and retained imports of printing, etc., machinery in 1924 :—

Kind of machine.	Exports.		Net imports.	
	Quantity.	Value f.o.b.	Quantity.	Value c.i.f.
	Tons.	£'000.	Tons.	£'000.
Typesetting	705	343	118	58
Newspaper, letterpress and lithographic	2,394	430	2,497	451
Bookbinding, etc. .. .	446	79	531	140
Bag and envelope-making .. .	34	9	104	32
Cardboard-box making .. .	42	13	213	41
Other sorts .. .	633	153	245	48
TOTAL .. .	4,254	1,027	3,708	770

The total British exports were probably equivalent in value to rather more than one-third of the production.

Textile Machinery.

Output.—The output in 1924 of firms mainly engaged in making textile machinery was as follows :—

	£'000.
Textile machinery	13,548
Textile machinery accessories	4,164
Other machinery and parts	418
Iron and steel structural work	7
Jobbing and repair work	614
Work in progress (additional)	69
Other products	769
Total .. .	19,589

There was a high degree of specialisation in this branch of engineering.

The following statement gives particulars of the output of textile machinery in 1924, distinguishing the output of firms that were mainly engaged in the making of textile machinery from that of other engineering firms and of firms that made their returns on schedules for other trades. The output in respect of which particulars of the tonnage of machines made were supplied is shown separately in the table.

Textile Machinery.

	Value of output returned			Output for which particulars of quantity were supplied.	
	By firms mainly makers of textile machinery.	On all schedules for the Engineering Trades.	On schedules for all trades.	Quantity.	Value.
	£'000.	£'000.	£'000.	Tons.	£'000.
For spinning and twisting and all preparatory processes. {	(a) 6,677	6,773	6,773	113,380	7,803
(b) 2,110	2,130	2,130			
(c) —	92	120			
For weaving and processes preparatory to weaving, but subsequent to spinning and twisting. {	(a) 1,394	1,406	1,406	32,070	1,773
(b) 555	563	563			
For bleaching and dyeing. {	(a) 276	427	427	6,400	482
(b) 186	219	219			
(c) —	14	14			
For printing and finishing. {	(a) 266	408	408	6,180	488
(b) 181	211	211			
Hosiery and knitting {	(a) 574	575	575	3,460	454
(b) 115	122	122			
(c) —	19	21			
Lace and net. {	(a) 57	57	57	450	76
(b) 40	40	40			
(c) —	23	23			
Other machinery .. . {	(a) 603	721	721	9,920	916
(b) 345	383	386			
(c) 169	188	189			
TOTALS — TEXTILE MACHINERY AND PARTS. {	(a) 9,847	10,367	10,367	171,860	11,992
(b) 3,532	3,668	3,671			
(c) 169	573	604			
	13,548	14,608	14,642		
Accessories for textile machinery :—					
Bobbins	961	982	1,486	—	—
Shuttles	272	277	277	—	—
Reeds and healds .. .	801	821	827	—	—
Jacquard cards .. .	87	89	103	—	—
Card-clothing, etc. .. .	1,532	1,577	1,592	—	—
Other sorts	511	543	687	—	—
Total—Accessories .. .	4,164	4,289	4,972	—	—
TOTAL—TEXTILE MACHINERY, PARTS AND ACCESSORIES .. .	17,712	18,897	19,614	171,860	11,992

Firms that were chiefly engaged in the production of textile machinery made over 92·5 per cent. by value of the textile machinery and 83·7 per cent. of the accessories manufactured in the United Kingdom in 1924.

The total weight of machinery and parts for which tonnage statements were furnished was 171,860 tons, representing, in value, about 82 per cent. of the total recorded output. An examination of

the details indicates that the total quantity made may have been somewhat in excess of 200,000 tons. The total value of the textile machinery and parts made in 1907 was £13,099,000 and particulars of quantity were furnished in respect of an output valued at £10,386,000, or 79.3 per cent., the tonnage recorded being 313,000 tons. If these particulars were representative of the total output in 1907, the weight of that output may be estimated at about 395,000 tons. The output produced in 1924 was, on this basis, a little more than one-half that of 1907 in weight, and the average value in 1924 more than double that of 1907.

Exports and imports.—Exports of textile machinery amounted to 181,600 tons in 1907 and 103,600 tons in 1924.

In 1907 the exports of textile machinery were shown in one aggregate; in 1924 they were classified as follows:—

	<i>Tons.</i>
Spinning and preparatory processes ..	78,407
Weaving and preparatory processes ..	20,086
Bleaching and dyeing	827
Printing and finishing	2,273
Hosiery and knitting	289
Lace and net	261
Other sorts	1,475
TOTAL	103,618

The exports of spinning and weaving machinery thus accounted for 95 per cent. of the total weight of textile machinery exported, though, as these classes of machinery were valued at a lower average per ton than the remaining descriptions, the proportion of the value represented was less than 90 per cent. The average values per ton of the machinery of these classes exported were considerably higher than the averages resulting from the weights shown in the table on page 245. In the case of lace machinery and of printing and finishing machinery the exports formed, very roughly, one-third of the production. For bleaching and dyeing, hosiery and knitting, and "other sorts" of textile machinery the proportion exported was relatively small. Retained imports of textile machinery in 1907 amounted to 2,841 tons and in 1924 to 3,491 tons.

Other Machinery and Plant.

Output.—In addition to the classes of products and work discussed separately in the preceding pages, the returns received showed numerous other classes of machinery, plant and accessories, which do not fall into any well-defined groups and the production of which was on a smaller scale than that of the groups already dealt with. The available details are shown in the following table.

Other Machinery (mechanical) and Plant.

Kind of machines. (a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned on schedules for			Output for which particulars of quantity were supplied.	
	The Mechanical Engineering Trades.	Other trades (including Electrical Engineering)	All trades.	Quantity.	Value.
				Tons.	£'000.
Air and gas compressors and exhausters:—	£'000.	£'000.	£'000.		
Reciprocating ..	{ (a) 364 (b) 87 (c) 273	{ 2 — —	{ 366 87 273	{ 5,900	{ 651
Rotary	{ (a) 119 (b) 26 (c) 28	{ — — —	{ 119 26 28	{ 1,916	{ 164
Other kinds ..	{ (a) 104 (b) 7 (c) 1	{ — 4 —	{ 104 11 1	{ 456	{ 57
Total—Air and gas compressors, etc.	{ (a) 587 (b) 120 (c) 302	{ 2 4 —	{ 589 124 302	{ 8,272	{ 872
Air-filtering	{ (a) 26 (b) 9 (c) —	{ — — 5	{ 26 9 5	{ 57	{ 5
Boot and shoe making	{ (a) 462 (b) 265 (c) 3	{ — — —	{ 462 265 3	{ 2,786	{ 631
Brewing and distilling	{ (a) 512 (b) 57 (c) 16	{ — — —	{ 512 57 16	{ 2,062	{ 237
Brick making	{ (a) 218 (b) 176 (c) 77	{ — — —	{ 218 176 77	{ 6,631	{ 310
Cable making	{ (a) 77 (b) 6 (c) 7	{ — — —	{ 77 6 7	{ 819	{ 68
Centrifugal drying ..	{ (a) 306 (b) 121 (c) 845	{ — — —	{ 306 121 845	{ 3,901	{ 426
Conveyers, telfers and transporters.	{ (a) 210 (b) 32 (c) —	{ — — —	{ 210 32 —	{ 16,737	{ 870
Cranes, hoists and other lifting machinery.	{ (a) 3,554 (b) 291 (c) 465	{ 5 2 26	{ 3,559 293 491	{ 40,269	{ 2,699
Dairy machinery	{ (a) 84 (b) 6 (c) 59	{ — — —	{ 84 6 59	{ 942	{ 131
Filter presses	{ (a) 97 (b) 20 (c) —	{ — — —	{ 97 20 —	{ 1,953	{ 115
Food preparation	{ (a) 895 (b) 78 (c) 763	{ — — 5	{ 895 83 763	{ 7,433	{ 742
Founding and die-casting.	{ (a) 104 (b) 39 (c) 1	{ — — 2	{ 104 39 3	{ 1,021	{ 86
Gas and chemical	{ (a) 1,267 (b) 173 (c) 349	{ 42 13 29	{ 1,309 186 378	{ 13,477	{ 716
Glass working	{ (a) 36 (b) 26	{ — —	{ 36 26	{ 493	{ 48

Other Machinery (mechanical) and Plant—continued.

Kind of machines. (a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned on schedules for			Output for which particulars of quantity were supplied.	
	The Mechanical Engineering Trades.	Other trades (including Electrical Engineering)	All trades.	Quantity.	Value.
Grain milling ..	(a) 394 (b) 97 (c) 90	— — 1	394 97 91	4,644	429
Heating and ventilating plant, not elsewhere specified.	(a) 657 (b) 38 (c) 11	— — —	657 38 11	4,605	239
Hydraulic machinery (not prime movers).	(a) 518 (b) 72	— —	518 72	9,951	536
Laundry	(a) 1,098 (b) 71 (c) 22	6 6 7	1,104 77 29	10,553	555
Mechanical power transmission.	(a) 1,001 (b) 187 (c) 67	2 — —	1,003 187 67	23,124	976
Mining machinery :—					
Coal cutters ..	(a) 286 (b) 310	22 21	308 331	2,381	469
Other machines and plant.	(a) 1,574 (b) 272 (c) 12	12 — 18	1,586 272 30	15,465	759
Total—Mining machinery.	(a) 1,860 (b) 582 (c) 12	34 21 18	1,894 603 30	17,846	1,228
Packing	(a) 273 (b) 28 (c) 2	— — —	273 28 2	700	300
Paper making ..	(a) 902 (b) 274 (c) 3	1 13 —	903 287 3	6,798	527
Pneumatic tools ..	(a) 136 (b) 222 (c) 2	— — —	136 222 2	2,249	271
Pumps :—					
Hand	(a) 187 (b) 19	3 —	190 19	1,496	186
Power :					
Reciprocating ..	(a) 485 (b) 55	— —	485 55	3,907	455
Centrifugal ..	(a) 752 (b) 85 (c) —	— — 16	752 85 16	6,428	742
Other kinds ..	(a) 316 (b) 39 (c) 2	1 — —	317 39 2	3,718	274
Total—Pumps ..	(a) 1,740 (b) 198 (c) 2	4 — 16	1,744 198 18	15,549	1,657

Other Machinery (mechanical) and Plant—continued.

Kind of machines. (a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned on schedules for			Output for which particulars of quantity were supplied.	
	The Mechanical Engineering Trades.	Other trades (including Electrical Engineering)	All trades.	Quantity.	Value.
Refuse and sewage disposal.	(a) 325 (b) 100 (c) 315	37 — —	362 100 315	1,784	81
Road making ..	(a) 626 (b) 112 (c) 46	— — 2	626 112 48	7,290	394
Rubber machinery ..	(a) 155 (b) 30 (c) 62	12 — —	167 30 62	2,143	127
Steel works, blast furnaces, etc.	(a) 866 (b) 146 (c) —	— — 83	866 146 83	19,819	770
Sugar making and refining (not centrifugal).	(a) 610 (b) 85 (c) 122	— — —	610 85 122	12,562	655
Tanning and leather working.	(a) 70 (b) 36 (c) 3	— — 4	70 36 7	182	19
Tobacco and cigarette making.	(a) 142 (b) 74 (c) 51	— — 5	142 74 56	903	213
Weighing	(a) 1,469 (b) 341 (c) 74	— 1 18	1,469 342 92	3,583	575
Welding	(a) 85 (b) 11 (c) —	6 — 2	91 11 2	176	25
Wire and tube making	(a) 74 (b) 17 (c) —	— — 3	74 17 3	1,136	55
Wood working ..	(a) 749 (b) 122 (c) 5	1 3 —	750 125 5	7,191	633
Other machinery and machinery not separately distinguished.	(a) 4,309 (b) 536 (c) 3,138	6 2 295	4,315 538 3,433	79,469	5,940
TOTALS— MACHINERY AND PARTS.	(a) 27,129 (b) 4,976 (c) 6,024	158 70 519	27,287 5,046 6,543	339,110	24,161
Ball bearings, roller bearings, steel rollers and steel balls.	(a) 387 (c) 917	— 964	387 1,881	1,773	916
Machinery accessories and parts, not elsewhere specified.	(b) 3,366	114	3,480	—	—

Other Machinery (mechanical) and Plant—continued.

Kind of machines. (a) Complete. (b) Replacement parts. (c) Complete and parts, not separately distinguished.	Value of output returned on schedules for			Output for which particulars of quantity were supplied.	
	The Mechanical Engineering Trades.	Other trades (including Electrical Engineering)	All trades.	Quantity.	Value.
				Tons.	£'000.
Ordnance :—	£'000.	£'000.	£'000.		
Guns, howitzers and mortars, including machine and quick-firing guns. (a)	372	—	372	—	—
Gun mountings and carriages .. (a)	458	101	559	—	—
Total—Ordnance (a)	830	101	931	—	—
Railway and tramway equipment and plant, not elsewhere specified (c)	2,591	18	2,609	—	—
GRAND TOTALS ..	28,346	259	28,605	340,883	25,077
(b)	8,342	184	8,526		
(c)	9,532	1,501	11,033		
	46,220	1,944*	48,164		

* Of which £218,000 was returned on schedules for the Electrical Engineering Trade.

The corresponding particulars for 1907, so far as they can be determined, are as follows :—

Machinery, plant and parts.	Returned on schedules for		
	The Engineering Trades.	Other trades.	All trades.
	£'000	£'000	£'000
Cranes and other prime movers not elsewhere specified	812	—	812
Hydraulic machinery	1,243	20	1,263
Machinery, not separately specified	11,466	256	11,722
Machinery accessories and parts not elsewhere specified	3,650	89	3,739
Ordnance	2,763	8	2,771
Railway and tramway equipment and plant ..	1,380	7	1,387
TOTAL	21,314	380	21,694

As stated previously, the output shown above for 1924 and 1907 is exclusive of goods produced by Government Departments, Local Authorities, Railway Companies, etc.

There would appear to have been a heavy decline in the output of hydraulic machinery, of machinery accessories not elsewhere specified, and of ordnance, but a substantial increase in the output of cranes, etc., and, in the mass, of those classes of machinery that were not separately specified in 1907.

Exports and imports.—Particulars of exports and retained imports of machinery, etc., not dealt with in the preceding sections, are shown below for 1924 :—

Kind of machinery.	Exports.		Net imports.	
	Quantity.	Value f.o.b.	Quantity.	Value c.i.f.
	Tons.	£'000.	Tons.	£'000.
Machinery and parts :—				
Air and gas compressors and exhausters :—				
Reciprocating	892	106	310	50
Rotary	179	30	179	25
Other sorts	294	38	155	24
Total : Air and gas compressors, etc.	1,365	174	644	99
Boot and shoe making	588	156	245	71
Centrifugal drying	3,736	315	19	3
Conveyors, telfers and transporters	2,423	177	121	10
Cranes, hoists, etc.	19,425	1,313	1,608	90
Dairy machinery	344	83	823	135
Filter presses	952	54	49	3
Glass working	137	10	200	46
Grain milling	3,932	413	227	32
Hydraulic machinery (not prime movers)	4,259	253	64	6
Mining coal cutters	302	92	565	159
Packing	112	59	42	19
Paper making	8,144	629	1,081	148
Pneumatic tools	130	72	232	127
Pumps :—				
Hand	248	53	1,227	231
Power :—				
Reciprocating	2,075	290	536	76
Centrifugal	2,527	349	610	78
Other kinds	1,569	210	121	20
Total :—Pumps	6,419	902	2,494	405
Sugar making and refining (not centrifugal)	11,837	759	505	31
Weighing	1,909	302	279	48
Woodworking	2,970	541	1,124	127
Machines and machinery not elsewhere specified	117,813	10,963	18,030	3,464
TOTAL—MACHINERY AND PARTS	186,797	17,267	28,352	5,023
Ball bearings, roller bearings (including steel balls and rollers for bearings) not for vehicles ..	271	121	318	102

Retained imports were in excess of exports in dairy machinery, glassworking machinery, mining coal cutters, pneumatic tools, and hand pumps, the total of retained imports of these classes of goods being 3,047 tons, valued at £698,000, while exports were only 1,161 tons, valued at £310,000. In all other classes of machinery included in the above table exports exceeded retained imports, the aggregates being 185,636 tons, valued at £16,957,000 for exports and 25,305 tons, valued at £4,325,000 for retained imports. Retained imports of ball bearings, etc., were greater than the exports in tonnage but less in value.

In the case of sugar making machinery, grain milling machinery and paper making machinery it may be estimated that, by weight, over one-half of the production of the census year was exported in 1924, and 47 per cent. of the filter presses. In the case of the first named the proportion was apparently more than three-fourths and that of the second over three-fifths. For paper making machinery the estimate of the total weight of the output rests on an inadequate sample, but the figures of value support the conclusion mentioned, when allowance is made for the difference between values at works and f.o.b. For the aggregate of the machinery (including parts) with which the above table deals, the exports may be estimated to represent, in value at works, roughly 40 per cent. of the production, while the net imports amounted, in aggregate value c.i.f., to about 13 per cent. of the value at works of the total output of similarly described goods.

Retained imports of ordnance in 1924 were about 5 tons, valued at less than £5,000; while exports were 257 tons, valued at £373,000, which may, however, have included some ordnance made in Government Ordnance Factories. Exports of railway material (other than rails, sleepers, fish-plates, spikes, tyres, wheels and axles) in 1924 were 52,602 tons, valued at £1,057,000, while retained imports were 9,419 tons, valued at £111,000.

Constructional Engineering.

The method of classification followed for Census purposes did not enable all operations which fall under the description of *constructional engineering* to be isolated. In so far as these operations are carried out by firms engaged in a general contracting business, particulars of their work are embodied in the aggregates returned for the various classes of building and contracting work*, and where manufacturing firms were also engaged in work of this kind, it was found convenient for purposes of enumeration to obtain the requisite particulars as part of their general returns. For example, manufacturers of steel girders, sections and other heavy iron and steel goods, also undertake a great deal of structural work of a similar type to that carried out by firms classified, for Census purposes, as engineers, and light

* See the report on the Building and Contracting Trades, which forms part of a separate volume.

structural work was frequently returned by firms making light metal castings or forgings for builders' use (see page 174). Further, it is shown on page 262 that an important volume of work described as *contract work* was carried out by firms of electrical engineers, and much of this consists of work of erection and installation of buildings, plant and equipment.

Constructional work of this character is regarded as falling within the scope of the Building and Contracting Trades and in the report on those trades the various items recorded by engineering firms and others that carried out such work are brought together.

The total value of iron and steel structural work returned on schedules for the Mechanical Engineering Trade in 1924 was £10,126,000, and included such work as the construction of bridges, gas works, etc., and the installation of factory and workshop plant and equipment. Firms were not required to distinguish the separate kinds of work covered by their entries under this heading, and it is probable that in some cases the figures returned represented the full value of the contracts carried out by firms in the year and that the value of the plant manufactured by those firms therefore escaped separate record.

In 1907, the value of structural work returned on schedules for the Engineering Trades was £5,501,000, and this figure is believed to cover substantially the same ground as that given in the preceding paragraph for 1924. As, however, particulars were not obtained in 1924 in respect of structural work involved in repairs and extensions of plant carried out for the firms concerned by their own staff, the data required for an estimate of the relative amount of constructional work carried out in 1924 and 1907 by engineering firms are not available.

Jobbing and Repairing Work.

The total amount returned on schedules for the Mechanical Engineering Trade for jobbing and repair work (including work done for the trade) in 1924 was £14,670,000, and £1,659,000 was returned on schedules for other trades in respect of similar work, making an aggregate of £16,329,000. About 70 per cent. of this total represented work carried out by manufacturers of machinery and plant and about 30 per cent. (£4,856,000) was received by firms whose main business consisted in jobbing and repair work. These latter firms, whose total output was £4,979,000, returned a sum of £1,857,000 as the cost of materials used, or 37·3 per cent. of the value of their output.

Work in Progress.

The quantities and values shown for individual classes of machinery as returned to the Census represent machinery *completed* in the year of return and do not, therefore, express with strict accuracy the output attributable to that year. Firms were therefore instructed to state, under the description of work in progress at the beginning of the

year, the estimated value of machines or structures not completed at that date and also to give an estimate of the value of similar unfinished work at the end of the year. While, therefore, the output statements for individual items are not necessarily exact for the year of return, all discrepancies are accounted for in the gross allowances made for work in progress at the beginning and at the end of the year, the difference between these two figures showing the amount by which the work *completed* in the year of return overstated or understated the work actually carried out in that year.

The aggregate value of the work in progress at the beginning of 1924 was returned as £26,413,000 and that at the end of 1924 as £29,573,000, and the increase of £3,160,000 is an addition to the gross value of the completed work returned. Thus, of the machines and structures finished in the year, nearly one-fifth of the value represented the work of an earlier period. As the unfinished work at the end of the year may not have been similarly distributed under the various headings to that at the beginning of the year, the distribution of productive work done may have differed widely under individual headings from that shown by the records of goods finished for delivery. For 1907 work in progress was returned at the aggregate value of £6,353,000, this sum representing the net increase at the end of the year compared with the position at the beginning; it probably includes, however, the value of *parts* (which were returned against individual headings in 1924) and is, therefore, not strictly comparable with the figure for that year.

II.—Electrical Engineering.

Sectional results.—Apart from certain large undertakings whose activities cover a very wide range of output, there are three fairly highly specialised branches of production in the Electrical Engineering Trade, viz., the manufacture of electrical machinery, insulated cables and accumulators. The chief results of the Census of 1924 for the firms mainly engaged in these three branches are given in the following table, together with the corresponding particulars for the Electrical Engineering Trade as a whole :—

Branch of engineering.	Gross output.	Net output.	Average number of persons employed.	Net output per person employed.	Mechanical power available.	
					Prime movers.	Electric motors driven by purchased electricity.
	£'000.	£'000.	No.	£	Th. H.P.	Th. H.P.
Electrical machinery	18,230	9,750	48,470	201	23·6	35·0
Insulated cables..	24,097	8,434	35,456	238	14·9	37·5
Accumulators ..	3,247	1,340	3,924	341	1·6	3·5
All other..	24,732	14,046	66,246	212	8·6	38·1
Electrical Engineering Trade..	70,306	33,570	154,096	218	48·7	114·1

Summary comparison with 1907.—In the following table are set out the leading classes of goods made and work done in the electrical branch of the Engineering Trades in 1924 and in 1907 :—

Electrical machinery and parts, etc.	1924.		1907.	
	Returned on schedules for		Returned on schedules for	
	The Engineering Trades.	All trades.	The Engineering Trades.	All trades.
	£'000.	£'000.	£'000.	£'000.
Electrical machinery, switchboards and parts	17,409	17,800	4,214	4,312
Telegraph and telephone cables ..	6,377	6,377	1,911	1,911
Power and lighting cables	12,206	12,286	3,351	3,351
Telegraph and telephone apparatus	3,927	3,939	315	380
Electric lamps and parts (except carbons and primary batteries)..	2,478	2,512	465	465
Primary batteries	768	768	109	109
Accumulators	3,530	3,530	440	440
Electrical instruments	1,791	2,517	520	543
Transmission apparatus and plant	1,337	1,417	539	543
Wireless apparatus and thermionic valves	6,126	6,632	—	—
Lighting accessories (including carbons)	2,156	2,725		
Starting and lighting apparatus for motor vehicles	867	867	374	385
Other apparatus	3,697	3,900		
Contract and repair work	5,379	5,383	1,659	1,659
TOTAL	68,048	70,653	13,897	14,098

These figures illustrate the great development of the Electrical Industry during the seventeen years under review. In each class for which comparative figures are available, a marked increase occurred in 1924, while industries of recent growth, such as the making of wireless apparatus and of electrical devices for the motor vehicle industry, formed a substantial proportion of the output of the industry as a whole.

More detailed particulars regarding the output of the Electrical Engineering Trade in 1924 are given in the sections which follow.

Electrical Machinery.

Output.—The output in 1924 of firms mainly engaged in making electrical machinery was as follows :—

	£'000.
Electrical machinery	14,667
Other electrical apparatus	2,474
Contract work	517
Other products	572
Total	18,230

There was a high degree of specialisation in this branch of the electrical industry.

The following statement gives particulars of the value of the output of electrical machinery in 1924, distinguishing the output of firms that were mainly constructors of such machinery from that of other engineering firms and of firms that furnished returns on schedules for other trades.

Electrical Machinery.

Kind of machinery and parts.	Value of output returned		
	By firms mainly electrical machinery makers.	On all schedules for the Engineering Trades.	On schedules for all trades.
	£'000.	£'000.	£'000.
Generators :—			
Alternating current	1,023	1,227	1,227
Direct current	662	684	684
Not distinguished	397	397	427
TOTAL—Generators	2,082	2,308	2,338
Motors :—			
Railway and tramway	1,537	1,555	1,555
Other :—			
Alternating current	2,151	2,191	2,196
Direct current	1,624	1,663	1,663
Not distinguished	225	245	245
TOTAL—Motors	5,537	5,654	5,659
Converters and transformers (including coils) :—			
Rotary	867	895	895
Static	1,525	1,757	1,757
Not distinguished	—	66	66
TOTAL—Converters, etc.	2,392	2,718	2,718
Control and switch gear*	3,349	3,592	3,675
Magnetos, ignition	562	669	942
Other electrical machinery*	745	789	789
TOTAL—ELECTRICAL MACHINERY	14,667	15,730	16,121

* Excluding switchboards.

The particulars furnished as to quantities of output of electrical machinery covered considerably less than one-half of the total value of such machinery and there being no means of determining whether they are adequately representative of the entire output, they are not reproduced here.

Exports and imports.—In the following table exports and imports in 1924 are shown in relation to the value of production in that year :—

Kind of machinery.	Production.	Exports.	Net imports.
	Value at works.	Value f.o.b.	Value c.i.f.
	£'000.	£'000.	£'000.
Generators :—			
Alternating current	1,227	708	55
Direct current	684	545	27
Not distinguished	427	—	—
Motors :—			
Railway and tramway	1,555	578	1
Other :—			
Alternating current	2,196	569	65
Direct current	1,663	500	135
Not distinguished	245	—	—
Converters and transformers :—			
Rotary	895	268	46
Static	1,757	431	41
Not distinguished	66	—	—
Control and switch gear*	3,675	945	25
Magnetos, ignition	942	28	17
Other electrical machinery*	789	782	572
TOTAL	16,121	5,354	984

* Excluding switchboards.

The figures given for "other electrical machinery" show so high a ratio of exports to output that it may be reasonable to assume either some lack of precision in the export entries falling into this group, or some differences between the goods available for export in the calendar year 1924 and the goods made in the business years to which the Census records relate. Thus precise comparison cannot be made, but in the aggregate exports represented about 30 per cent. and retained imports about 6 per cent. of the production.

Insulated Cables.

Output.—The output in 1924 of firms mainly engaged in making wire and cables was as follows :—

	£'000.
Insulated wires and cables	18,427
Other electrical apparatus	2,754
Contract work on lines and cables	1,213
Other contract work	53
Other products	1,650
Total	24,097

This branch of the electrical engineering industry is one of considerable specialisation.

The following statement gives particulars of the value of the output of insulated cables made in 1924. No particulars of quantity were required.

Insulated Wires and Cables.

Kind of wires and cables.	Value of output returned		
	By cable manufacturers	On all schedules for the Electrical Engineering Trade.	On schedules for all trades.
	£'000.	£'000.	£'000.
Electric wires and cables, insulated :—			
Telegraph and telephone, not submarine ..	3,610	3,685	3,685
Submarine telegraph and telephone ..	2,692	2,692	2,692
Power and lighting cables :—			
Rubber insulation	3,567	3,636	3,716
Other insulation	8,558	8,570	8,570
TOTAL—Power and lighting cables ..	12,125	12,206	12,286
TOTAL—WIRES AND CABLES	18,427	18,583	18,663

About 98·7 per cent. of the output of insulated wires and cables was made by the group of firms whose main business consisted in the manufacture of cables.

Exports and imports.—The following table compares, on the basis of values, production, exports and imports for 1924 :—

Kind of wires and cables.	Production.	Exports.	Net imports.
	Value at factory.	Value f.o.b.	Value c.i.f.
	£'000.	£'000.	£'000.
Telegraph and telephone (not submarine) ..	3,685	1,022	118
Submarine telegraph and telephone ..	2,692	948	—
Power and lighting cables :—			
Rubber insulation	3,716	1,323	212
Other insulation	8,570	1,184	240
TOTAL	18,663	4,477	570

Exports of insulated wires and cables, valued f.o.b., represented about 24 per cent. of the factory value of all insulated wires and cables made in the United Kingdom in 1924, and retained imports, valued c.i.f., represented about 3 per cent. of the factory value of production.

Accumulators.

Output.—The output in 1924 of firms mainly engaged in making accumulators was as follows :—

	£'000.
Accumulators	3,139
Other electrical apparatus	52
Contract work	41
Other products	15
TOTAL	3,247

There was a high degree of specialisation in this branch of the electrical industry.

The following statement gives particulars of the value of the output of accumulators in 1924, distinguishing the output of firms whose chief output consisted of accumulators from that of other firms. The whole of the output of accumulators in 1924 was recorded on schedules for the Electrical Engineering Trade :—

Accumulators.

Kind of accumulators.	Value of output returned	
	By accumulator makers.	On all schedules for the Electrical Engineering Trade.
	£'000.	£'000.
Portable :—		
For vehicles	282	353
Other sorts	1,545	1,576
Not distinguished	—	281
TOTAL—Portable	1,827	2,210
Stationary	1,312	1,320
TOTAL—ACCUMULATORS	3,139	3,530

Exports and imports.—The following statement compares, on the basis of values, production, exports and imports for 1924 :—

Particulars.	Accumulators.	
	Portable.	Stationary.
	£'000.	£'000.
Production (Value at factory)	2,210	1,320
Exports (Value f.o.b)	210	407
Net imports (Value c.i.f.)	42	14

Other Electrical Apparatus and Plant.

Output.—The following statement gives particulars of the output of electrical apparatus and plant not dealt with in the preceding sections, distinguishing the output of electrical engineering firms from that of firms that made their returns on schedules for other trades.

Other Electrical Apparatus and Plant.

Kind of apparatus, etc.	Value of output returned on schedules for		
	The Electrical Engineering Trade.	Other trades (including Mechanical Engineering).	All trades.
	£'000.	£'000.	£'000.
Telegraph apparatus	278	—	278
Telephone apparatus	3,649	12	3,661
Wireless apparatus	4,857	263	5,120
Thermionic valves	1,262	250	1,512
Electric lamps and parts thereof:—			
Incandescent: Gas-filled	1,037	—	1,037
Other sorts*	1,419	30	1,449
Arc lamps, searchlights, hand flash lamps and parts of electric lamps (except carbon rods and primary batteries)	16	10	26
TOTAL—Lamps and parts	2,472	40	2,512
Primary batteries:—			
For hand flash lamps	42	—	42
Other sorts	394	—	394
Not distinguished	332	—	332
TOTAL—Primary batteries	768	—	768
Electrical instruments:—			
Meters: House service	978	7	985
Switchboard	65	—	65
Other sorts	30	—	30
Total—Meters	1,073	7	1,080
Other measuring instruments:—			
Indicating	488	237	725
Recording	63	10	73
Other sorts	88	—	88
Total—Measuring instruments	639	247	886
X-ray apparatus (industrial, medical, etc.)	41	122	163
Other electro-medical apparatus	25	42	67
Other and not distinguished instruments	—	321	321
TOTAL—Electrical instruments	1,778	739	2,517
Carbons (lighting, furnace, etc.)	565	4	569
Condensers, electric, static, power	393	—	393
Bell apparatus (not telegraph or telephone)	42	3	45
Switchboards (other than telegraph and telephone)	1,679	—	1,679
Lighting accessories and fittings (including switches)	1,568	588	2,156
Heating and cooking apparatus:—			
Heating apparatus:—			
Domestic	215	74	289
Industrial, hotel and restaurant	17	—	17
Not distinguished	55	—	55
Cooking apparatus:—			
Domestic	87	7	94
Industrial, hotel and restaurant	49	—	49
Not distinguished	6	—	6
Heating and cooking apparatus, not distinguished	56	—	56
TOTAL—Heating and cooking apparatus	485	81	566

* As regards 13,644,000 incandescent lamps, not gas-filled (i.e., about one-half of the total production), 11,494,000 were metal filament, vacuum; 1,574,000 were carbon filament, vacuum; and 576,000 were other kinds.

Other Electrical Apparatus and Plant—continued.

Kind of apparatus, etc.	Value of output returned on schedules for		
	The Electrical Engineering Trade.	Other trades (including Mechanical Engineering).	All trades.
	£'000.	£'000.	£'000.
Conduits, poles and fittings	445	9	454
Insulating materials and accessories of mica, ebonite and similar materials	892	71	963
Starting and lighting apparatus for vehicles	867	—	867
Other electrical goods and apparatus	2,702	194	2,896
TOTAL—ELECTRICAL APPARATUS AND PLANT	24,702	2,235†	26,937

† Of which £124,000 was returned on schedules for the Mechanical Engineering Trade.

Exports and imports.—The following table shows the values of the exports and retained imports in 1924 of miscellaneous electrical apparatus and plant:—

Kind of goods.	Exports.	Net imports.
	Value f.o.b.	Value c.i.f.
	£'000.	£'000.
Telegraph apparatus	2,659	817
Telephone apparatus		
Wireless apparatus (excluding valves)		
Wireless valves and X-ray tubes and vacuum tubes	176	98
Electric lamps and parts thereof:—		
Incandescent*: Gas-filled	138	9
Other	204	198
Arc lamps and electric searchlights and parts of electric lamps (except carbon rods)	11	13
Primary batteries	125	317
Electrical instruments:—		
Meters: House-service, complete*	170	41
parts	27	60
Other electrical instruments	248	77
Electro-medical apparatus (other than X-ray)	18	13
Carbons (lighting, furnace, etc.)	27	117
Bell apparatus (not telegraph or telephone)	8	24
Switchboards (other than telegraph or telephone)	91	†
Lighting accessories and fittings (including switches)	603	234
Other electrical goods and apparatus	1,082	567

*Particulars of the quantity produced are available for these items, and are shown below in relation to the quantities exported and imported:—

	Production.	Exports.	Net imports.
	Million.	Million.	Million.
Incandescent lamps, gas-filled	10.1	1.5	0.2
,, other sorts	26.0	3.7	13.0
House-service meters, complete	502	126	40

† Re-exports £1,000 in excess of imports in the year 1924.

Contract Work.

Constructional or "contract" work valued at a total of £3,241,000 was carried out in 1924 by firms whose returns were made on schedules for the Electrical Engineering Trade. This sum is, for the most part, exclusive of the value of plant and fittings that were made by the firms that carried out the contracts; goods so made were normally returned separately against the special headings provided for them. Details of this work are given below as returned for 1924 and 1907:—

Kind of work.	1924.	1907.
Contract work:—	£'000.	£'000.
Installation of telegraph apparatus, etc. ..	85	} Included below.
Installation of telephone switchboards ..	61	
Installation of other telephone apparatus and plant ..	16	
Installation of wireless apparatus ..	113	
On telegraph and telephone lines and cables ..	270	
On power and lighting lines or works ..	2,696	45
TOTAL	3,241	1,277
		1,322

As already stated in the section dealing with constructional engineering (page 252), contracting work in general is discussed in the report on the Building and Contracting Trades. Work on power and lighting lines and stations, which is the item of chief importance in the above table, is carried out extensively by labour employed directly by electricity supply undertakings and by firms engaged in a general contracting business. Work on telegraph and telephone lines and switchboards is also carried out by the staff of the General Post Office.

Repair and Maintenance Work.

The amounts returned under this heading for 1924 were as follows:—

Work on customers' premises	£	888,000*
Other repair and maintenance work ..		1,250,000

Work on customers' premises consists largely of repairs to electrical fittings and equipment in buildings and is more properly included in the output of the Building and Contracting Trades. The other work shown represents repairs carried out in the repairing firms' factories or workshops on customers' goods, and in addition to the sum returned for such work on schedules for the Electrical Engineering Trade (£1,250,000), a further £4,000 was returned on schedules for other trades.

The total amount recorded for electrical repairs of all kinds in 1907 was £337,000.

* Of which £37,000 was returned on schedules for other trades.

III.—Other Products.

The following statement shows the output of subsidiary products for 1924 and 1907, as returned on all schedules for the Engineering Trades. These goods, being of kinds mainly produced in other trades, are dealt with in the reports on those trades.

Kind of goods.	1924.	1907.
	Value.	Value.
	£'000.	£'000.
Semi-manufactured products:—		
Castings in the rough—		
Iron	4,214	} 2,594
Steel	386	
Forgings in the rough—		
Iron	96	} 1,289
Steel	1,419	
Special steels	147	} 845
Other semi-manufactured iron and steel ..	187	
Brass or copper castings	187	—
Aluminium castings	56	—
Finished products:—		
Tools and implements	661	1,936
Tanks, cisterns, etc.	6	268
Other finished iron and steel goods	4,470	334
Brass or copper manufactures not elsewhere specified	1,875	1,132
Manufactures of other metals	284	73
Aeroplanes and parts	204	—
Motor cars, touring and commercial	582	} 1,032
Parts of motor cars, except engines	257	
Railway carriages, wagons and tramcars ..	48	421
Road vehicles, other than motor cars	73	86
Ships and boats	167	397
Ammunition and components	247	753
Rubber manufactures	188	101
Wood patterns	167	} 96
Other wood manufactures	144	
Other goods made	665	1,098
Waste products	113	103
TOTAL	16,843	12,558

Output of steel in engineering works.—Firms that made their returns on schedules for the Mechanical Engineering Trade were required to state their total make of steel, distinguishing between special steels and other steel. The total quantity produced was returned as 78,100 tons, of which 19,900 tons were special steels and 58,200 tons were other steel.

Value of output free from duplication.

The gross value of the output of the Mechanical and Electrical Engineering Trades in 1924 amounted to £226,675,000. The principal source of duplication in this sum lies in the sale of machinery parts and accessories to firms who used them in the construction of

new machinery or in repairing work. As already explained, a complete statement of the value of parts and accessories sold for replacement was not obtained, and the full extent of the field within which duplication of this kind may arise is not known.

Replacement parts are sold very largely to firms outside the Engineering Trades, i.e., to owners of machinery of all kinds. In most establishments possessing machinery equipment an engineering staff is maintained to keep the machinery in order and to carry out small repairs, and the cost of labour and materials involved in industry as a whole in the course of a year, on account of this maintenance work, must clearly be large. In the Census of 1907, when all firms were required to state the amount so expended by them, the aggregate amounted to £13,900,000 (exclusive of work of this class done by engineering firms to their own machinery and plant), and it was estimated that about £4,300,000 of this sum consisted of replacement parts, forgings and accessories returned for that year as part of the output of engineering firms. As a similar requirement was not included in the Census of 1924, a corresponding figure for that year cannot be given, but it appears reasonable to assume that the total cost of the materials used in such work was at least twice that returned for 1907 and may have amounted to as much as £10,000,000.

The field of duplication is further narrowed by the consideration that, for the most part, every type of engine or machine possesses features peculiar to itself, and that parts are accordingly adapted for use chiefly for replacement in machinery of an individual type. Where the fitting of replacement parts is not carried out by the owners of the machinery, the work is largely done either by the original manufacturers of the machinery or by repairing firms who would obtain from the latter the parts required. Though, therefore, no extensive duplication appears probable on account of the sale and purchase of parts and accessories between actual manufacturers of machinery, a large proportion of the materials used by firms whose work was confined to repairing may consist of parts or accessories purchased from manufacturers. The value of repair and jobbing work carried out in 1924 by those repairing firms that made returns on schedules for the Mechanical Engineering Trade was £4,852,000 and the cost of the materials used in this work may be estimated at about £1,750,000, a sum which includes not only parts bought from engineering firms but iron and steel and other materials bought from firms in other trades; in the case of repairs to electrical plant and equipment, the value of the duplicated parts and accessories is estimated at £650,000, raising the possible total amount of duplication on account of parts used by repairing firms to £2,400,000.

The sum returned as the value of iron and steel structural work (£10,126,000) contains duplication in so far as any plant for installation was purchased from engineering firms. As already stated,

this amount probably includes the value of certain plant and apparatus manufactured by the firms that carried out the work, and to this extent the amount of duplication is reduced; it also includes substantial sums in respect of structural steelwork on buildings and bridges for which the material used was probably purchased from firms engaged in the heavy iron and steel trades rather than from engineering firms. Out of the total of £10,126,000, the sum of about £3,500,000 consisted mainly of work the nature of which was not likely to involve duplication with the values returned elsewhere, and of the balance of £6,626,000, the cost of materials used may be estimated at not more than £3,500,000. This sum represents the maximum amount of duplication arising from the purchase by structural engineers of machinery and other products of the Mechanical Engineering Trade. In the Electrical Engineering Trade some duplication of output may have arisen through the inclusion in the value of "contract work" of the cost of wires, cables and electrical apparatus purchased from electrical engineers, who also included the value of these goods in their Census returns. Contract work of the value of £1,300,000 was returned by firms who were not actual manufacturers and the cost of the materials used in this work was in the neighbourhood of £650,000. In so far as this material was purchased from electrical engineering firms in this country its value is duplicated in their returns. The total amount of duplication contained in the sums returned for iron and steel structural work in the Mechanical Engineering Trade and contract work in the United Kingdom in the Electrical Engineering Trade may amount on this basis to as much as £4,150,000, but this figure could probably be considerably reduced if more information were available as to the precise character of the work so returned.

A further element of duplication arises from the purchase, by makers of complete machines, of accessories, such as ball bearings, etc., which are made by specialist firms; it is estimated that the amount of this duplication would not exceed £1,000,000.

The output of semi-finished products, valued at £6,449,000, is believed to include a considerable sum on account of additions to makers' stocks and little duplication with headings for more finished products is probably involved.

The sum of £5,565,000 was returned as paid to other firms in respect of subdivided contracts, or for work done on machinery or on other materials given out to them. It is obvious that a considerable portion of this work must have been given out to firms outside the Engineering Trades, but no basis exists for measuring the extent of that portion.

The maximum amount of duplication in the gross total of £226,675,000 is thus:—£2,400,000 in respect of parts used in repair work, £3,500,000 in respect of plant used in iron and steel structural work, £650,000 in respect of plant used in electrical contract work,

£1,000,000 in respect of accessories sold to makers of complete machines, and £5,565,000 in respect of work given out to other firms, or £13,115,000 in all. The second and fifth items are, however, subject to very large reductions and it may be reasonable to express the range of duplication as being between £5 and £10 millions, and to estimate that the value of the output of the Engineering Trades, free from duplication, in 1924 lay between £217 and £222 millions.

Cost of materials and work given out.

The cost of materials used by firms that made their returns on schedules for the Engineering Trades was returned as £103,031,000 in 1924, a sum which, by the exclusion of purchases from other firms in the same trades, is reduced to an amount lying between £95 millions and £100 millions; the corresponding net figure for 1907 was not calculated.

The amount paid to other firms for work given out to them was returned as £5,565,000 in 1924 and £3,922,000 in 1907.

Net output.

The net output in 1924 of the firms that made their returns on schedules for the Engineering Trades (whose gross output was valued at £226,675,000) was £118,079,000, that sum representing, without duplication, the total amount by which the value, as delivered, of the aggregate output exceeded the cost, as purchased, of the materials used and the amount paid to other firms for work given out to them.

The net output per head of persons employed in the censal year 1924 was £198, as compared with £109 in 1907.

Kinds of materials used.

Mechanical Engineering Trade.—The following particulars were furnished by firms whose gross output was valued at £71,069,000, or 45 per cent. of the value (£156,369,000) of the output of all firms that made returns on schedules for these trades.

Materials used in 1924 :—	Tons.
Pig iron	484,500
Wrought iron and steel	577,800
Non-ferrous metals	22,800

The quantity of steel made by these firms amounted to 72,300 tons, or nearly 93 per cent. of the total quantity made at the works of all mechanical engineering firms (78,100 tons). These firms also produced 146,000 tons of iron castings, or nearly 70 per cent. of the total recorded by all mechanical engineering firms.

Electrical Engineering Trade.—The following particulars were furnished by firms whose gross output amounted to £37,708,000, or nearly 54 per cent. of the value (£70,306,000) of the output of all firms that made returns on schedules for the Electrical Engineering Trades :—

Materials used in 1924 :—	Tons.
Copper	68,300
Rubber	2,600
Paper	6,700

Particulars of the output of the leading classes of products returned by the firms that used these materials are shown below, the total output of each class being added for comparison :—

Kind of goods.	Output of firms giving particulars of materials used.	Total output of the Electrical Engineering Trade.
	£'000.	£'000.
Electric wires and cables, insulated	14,285	18,583
Telephone apparatus	2,526	3,649
Motors	3,877	5,596
Generators	1,437	2,106
Control and switch gear	2,445	3,538
Accumulators	1,568	3,530
Switchboards (other than telegraph and telephone)	803	1,679
Wireless apparatus (excluding thermionic valves)	1,602	4,857

It will be observed that, of the goods included under the first five of the eight headings shown, the firms furnishing particulars of copper, rubber and paper used by them returned 73 per cent. of the total output of the trade.

Wages in 1924.

Under the Census of Production Act, 1906, the powers of the Board of Trade to require information do not extend to particulars of the amount of wages paid, and, consequently, no information on this head was secured in connexion with the Census of 1924. As a result, however, of the voluntary enquiry undertaken by the Ministry of Labour into wages and hours in the United Kingdom in 1924, information was obtained as to the total wage-bill of a group of firms in the Engineering Trades that made returns both to the Ministry of Labour and to the Census of Production office. According to the Census records this group of firms employed, in the week ended 18th October, 1924, 375,605 operatives, or 72 per cent. of the total of 518,486 operatives for the trades as a whole, and their net output totalled £86,022,000, or 73 per cent. of the aggregate net output of £118,079,000 for the trades as a whole. The total wage-bill of these firms, as returned to the Ministry of Labour, was £44,539,000, representing about 52 per cent. of their aggregate net output. If it be assumed that the above group of firms, covering nearly

three-quarters of the Engineering Trades, is representative of the remainder also, then, on the basis of the percentages shown, the aggregate wage-bill for these trades as a whole in 1924 may be estimated as not less than £61,000,000 nor more than £62,000,000.

Employment.

The detailed information relating to employment in 1924 is summarised, for Mechanical Engineering, in Table III, on pages 277-8, and, for Electrical Engineering, in Table III on pages 284-5. The following table sets out certain particulars relating to both of these trades for that year together with those obtained at the 1907 Census. For the purpose of this comparison the average numbers of operatives of each sex returned for 1924 have been divided between the two age-groups in the proportions shown by the data relating to the week ended 18th October:—

Average number.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
1924.						
Operatives	60,612	457,107	15,120	48,137	75,732	505,244
Administrative, etc. ..	6,455	69,662	3,789	22,715	10,244	92,377
TOTAL	67,067	526,769	18,909	70,852	85,976	597,621
1907.						
Wage earners	59,515	408,390	4,593	14,037	64,108	422,427
Salaried	4,839	36,410	488	2,866	5,327	39,276
TOTAL	64,354	444,800	5,081	16,903	69,435	461,703

The numbers of operatives recorded month by month in 1924 ranged from 24,885 below the average, in January, to 21,433 above the average, in December (see Table IIIB, pages 278 and 285). Except for a slight falling-off in August, the aggregate numbers increased month by month throughout the year. The increase of males amounted to 38,132 or 8·8 per cent., and that of females to 8,186 or 18·2 per cent.

Mechanical Power.

The detailed information relating to mechanical power in 1924 is summarised, for Mechanical Engineering, in Table IV on page 279, and, for Electrical Engineering, in Table IV on page 286. The following table sets out the particulars for 1924 and 1907 relating to the capacity and kinds of *prime movers* and the capacity of *electric generators* installed for the two trades combined.

Power equipment.	1924.			1907.
	Ordinarily in use.	In reserve or idle.	Total.	Total.
	H.P.	H.P.	H.P.	H.P.
PRIME MOVERS:—				
Reciprocating steam engines ..	128,316	60,917	189,233	251,703
Steam turbines	62,645	25,511	88,156	5,946
Gas engines	59,277	11,323	70,600	64,625
Petrol and light oil engines ..	4,989	1,219	6,208	
Heavy oil engines	13,051	3,963	17,014	
Water power	985	35	1,020	2,936
Other power	—	—	—	6,041
TOTAL	269,263	102,968	372,231	331,251
ELECTRIC GENERATORS:—	Kw.	Kw.	Kw.	Kw.
Driven by—				
Reciprocating steam engines ..	35,363	26,907	62,270	74,076
Steam turbines	48,886	28,784	77,670	5,456
Gas engines	19,205	4,076	23,281	13,653
Petrol and light oil engines ..	1,188	436	1,624	
Heavy oil engines	7,723	2,648	10,371	
Water power	299	65	364	
Other power	—	—	—	
TOTAL	112,664	62,916	175,580	93,185

The capacity of *electric motors* recorded in 1924 was as shown below:—

Electric motors.	1924.		
	Ordinarily in use.	In reserve or idle.	Total.
	H.P.	H.P.	H.P.
Driven by—			
Electricity generated in own works	223,019	59,236	282,255
Purchased electricity	621,945	122,454	744,399

Corresponding information was not required for 1907. The total number of Board of Trade units of electricity purchased for power and lighting purposes in that year was returned as 62,710,000.

TABLES.

MECHANICAL ENGINEERING.

I.—Summary of Results.

Particulars.	Unit.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
Value of goods made and work done (gross output)	£'000	125,547	28,330	153,877	2,492
Cost of materials used .. ..	..	52,148	13,363	65,511	1,041
Paid for work given out to other firms .. ..	..	3,987	1,154	5,141	167
Net output .. ..	..	69,412	13,813	83,225	1,284
Average number of persons employed	No.	358,723	75,205	433,928	9,597
Net output per person employed	£	193	184	192	134
Mechanical power available :—					
Prime movers	H.P.	275,252	40,908	316,160	7,355
Electric motors driven by purchased electricity .. ..	..	475,526	153,950	629,476	819

II.—Production.

A.—TOTAL MAKE OF STEEL IN 1924 (AS RETURNED ON SCHEDULES FOR THE MECHANICAL ENGINEERING TRADE).

	Great Britain.*				
	Tons.				
Special steels	19,900
Other steel	58,200
					78,100

* No output of steel was recorded for Northern Ireland.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE.

NOTE.—The figures shown in the following table include the value of replacement parts as well as that of complete machines.

Kind of machinery, etc., made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.	£'000.
Prime movers (other than electrical and marine) :—				
Steam engines :—				
Locomotives, rail :—				
Main line	*	*	2,445	—
Contractors' and light ..	*	*	423	—
Parts	*	*	1,397	—
Total—Locomotives, rail	*	*	4,265	—
Tractors (including steam rollers) :—				
Agricultural	*	*	344	—
Others	*	*	1,115	—
Pumping	354	163	517	—
Winding	266	32	298	—
Rolling mill	26	—	26	—
Steam turbine and other rotary	*	*	1,260	—
Other steam engines (except marine)	1,367†	123	1,490†	†
TOTAL—Steam engines (except marine)	*	*	9,315†	†
Internal combustion engines (except marine) :—				
Gas	*	*	442	—
Heavy oil (including Diesel) ..	2,437	27	2,464	—
Petrol and light oil (except engines for aeroplanes, airships and motor vehicles) ..	*	*	446	—
For motor cars	*	*	570	—
For motor cycles and tricars ..	153	—	153	—
For aeroplanes	*	*	111	—
Not separately distinguished ..	1,362	—	1,362	—
TOTAL—Internal combustion engines (except marine) ..	*	*	5,548	—
Water :—				
Hydraulic	12	25	37	—
Water turbine and other ..	*	*	208†	†
Boilers and boiler house plant :—				
Boilers (other than boilers for ships or locomotives) :—				
Internally fired (Lancashire, Galloway and Cornish type)	504	111	615	—
Locomotive type (stationary)	130	—	130	—
Water tube	356	1,631	1,987	—
Other kinds	431	112	543	—
Not separately distinguished ..	177	12	189	—

*† See Notes on page 276.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE—*continued.*

Kind of machinery, etc., made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.	£'000.
Boilers and boiler house plant— <i>cont.</i>				
Economisers, feedwater heaters and superheaters	924	676	1,600	—
Other boiler house plant	916	1,650	2,566	80
TOTAL—BOILERS AND BOILER HOUSE PLANT (EXCEPT FOR SHIPS AND LOCOMOTIVES) ..	3,438	4,192	7,630	80
Marine engines and machinery :—				
Engines :—				
Steam, reciprocating	2,753†	2,028	4,781†	†
Steam turbine	1,079†	701	1,780†	†
Internal combustion	1,504†	1,087	2,591†	†
Boilers	1,053†	875	1,928†	†
Boilers and engines, not separately distinguished	345	16	361	—
Other marine machinery	2,220†	1,270	3,490†	†
TOTAL—MARINE MACHINERY ..	8,954†	5,977	14,931†	†
Agricultural machinery (except steam engines and tractors) :—				
Ploughs :—				
Mechanical power	*	*	67	‡
Animal power	401†	13	414†	†
Mowers, grass and lawn (including motor lawn mowers)	862	82	944	—
Planters and seeders	38	6	44	—
Reapers and binders	*	*	90	—
Threshers	324†	52	376†	†
Other agricultural machinery	1,237†	107	1,344†	†
TOTAL—AGRICULTURAL MACHINERY	*	*	3,279†	†
Air and gas compressors and exhausters :—				
Reciprocating	611	113	724	—
Rotary	173	‡	173	—
Other air and gas compressors and exhausters	112†	—	112†	†
Air filtering	35†	—	35†	†
Boot and shoe making	*	*	730	—
Brewing and distilling	547	38	585	‡
Brickmaking	*	*	394	—
Cable making	90	—	90	—
Centrifugal drying	*	*	427	—
Condensers	823	76	899	—
Conveyors, telfers and transporters	810	277	1,087	—
Cranes, hoists and other lifting machinery	3,724†	586	4,310†	†
Dairy machinery	*	*	149	—
Filter presses	*	*	117	—
Food preparation	1,567†	169	1,736†	†

*†‡ See notes on page 276.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE—*continued.*

Kind of machinery, etc. made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.	£'000.
Founding and die-casting	*	*	144	—
Gas and chemical	1,722	67	1,789	‡
Glass making :—				
Blowing	3	—	3	—
Other glass making	*	*	59	—
Grain milling machinery	*	*	581†	†
Heating and ventilating plant and machinery not elsewhere specified	629†	77	706†	†
Hydraulic machinery (except hydraulic prime movers)	503	87	590	—
Laundry	995	196	1,191	—
Machine tools :—				
Drilling	394	18	412	—
Grinding	*	*	285	—
Lathes	747	103	850	—
Milling	*	*	212	—
Planing and shaping	*	*	243	—
Presses, punching and shearing	424	71	495	—
Other kinds	712	81	793	—
Chucks and other work holders ..	*	*	91	—
Not separately distinguished	111	2	113	—
TOTAL—MACHINE TOOLS ..	3,163	331	3,494	—
Pneumatic tools	*	*	360	—
Mechanical power transmission ..	1,231†	24	1,255†	†
Mining machinery :—				
Coal cutters	*	*	596	—
Other mining machinery and plant not elsewhere specified ..	1,605	253	1,858	—
Packing	286	17	303	—
Paper making	970	209	1,179	—
Printing, bookbinding, etc., machinery :—				
Typesetting, newspaper, letterpress and lithographic	1,719	‡	1,719	—
Bookbinding (including blocking, embossing, stitching, ruling and cutting)	*	*	106	—
Bag and envelope making	*	*	65	—
Cardboard box making	*	*	91	—
Other printing, etc., machines ..	586	19	605	—
TOTAL—PRINTING, BOOKBINDING, ETC., MACHINERY ..	2,558	28	2,586	—
Pumps :—				
Hand	*	*	206	—
Power :—				
Reciprocating	419	121	540	—
Centrifugal	694	143	837	‡
Other power	324†	33	357†	†
Refuse and sewage disposal	*	*	740	—
Road making machinery	*	*	784†	†

*†‡ See notes on page 276.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE—*continued.*

Kind of machinery, etc. made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.	£'000.
Rubber machinery	*	*	247	—
Steel works and blast furnace ..	696	316	1,012	—
Sugar making and refining (other than centrifugal)	197	620	817	—
Tanning and leather working ..	109	—	109	—
Textile machinery :—				
For spinning and twisting, including all preparatory processes	7,973	465	8,438	557
For weaving and processes preparatory to weaving, but subsequent to spinning and twisting	1,963	243	2,206	—
Bleaching and dyeing	648†	12	660†	†
Printing and finishing	551	66	617	2
Hosiery and knitting	*	*	716	—
Lace and net	*	*	120	—
Other textile machinery	1,037†	75	1,112†	†
Parts and accessories (not included above) :—				
Bobbins	842†	140	982†	†
Shuttles	*	*	277	—
Reeds and healds	*	*	821†	†
Jacquard cards	74	15	89	—
Card clothing, roller covering, etc.	*	*	1,577	—
Other parts and accessories ..	532†	11	543†	†
Textile machinery and parts not separately distinguished	170	—	170	—
TOTAL—TEXTILE MACHINERY	17,207	1,090	18,297	590
Tobacco and cigarette making ..	*	*	267	†
Weighing	1,844	40	1,884	†
Welding	*	*	96	—
Wire and tube making	*	*	91	—
Wood working	736	140	876	—
All other sorts and not separately distinguished	4,856	3,127	7,983	—
Machinery accessories and parts, not included elsewhere :—				
Ball bearings, roller bearings, etc.	*	*	1,304	—
Machinery accessories and parts not separately distinguished or not shown elsewhere ..	3,085	279	3,364	2
Ordnance :—				
Guns, howitzers and mortars, including machine and quick-firing guns	372	—	372	—
Gun mountings and carriages ..	458	—	458	—
Railway and tramway equipment and plant not elsewhere specified	2,438	153	2,591	—
Castings in the rough :—				
Iron	3,536	592	4,128	37
Steel	303	83	386	—

*†† See notes on page 276.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE—*continued.*

Kind of machinery, etc. made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.	£'000.
Forgings in the rough :—				
Iron	89	6	95	1
Steel	1,134	285	1,419	‡
Other semi-manufactured iron or steel goods :—				
Special steels	147	—	147	—
Other kinds	187	—	187	—
Tanks, cisterns, etc.	1	—	1	—
Tools and implements :—				
Agricultural	29	3	32	—
Other sorts	545	49	594	—
Finished iron or steel goods not included elsewhere	3,964	461	4,425	9
Castings of brass or copper ..	151	34	185	2
Manufactures of brass or copper not elsewhere specified	460	46	506	—
Aluminium castings	55	1	56	—
Other manufactures of metals (other than iron, steel, brass or copper)	140	28	168	‡
Vehicles (other than steam locomotives and tractors) :—				
Aeroplanes and parts (other than engines)	204	—	204	—
Motor vehicles, cycles and parts :—				
Touring cars	47	—	47	—
Commercial vehicles	535	—	535	—
Parts of motor vehicles and cycles (including some repairs)	188	1	189	2
Railway carriages, wagons and tramcars	48	—	48	—
Carriages (road) and other wheeled vehicles	68	5	73	—
Ships and boats	94	71	165	1
TOTAL—Vehicles other than steam locomotives and tractors	980	77	1,057	3
Ammunition and components ..	247	—	247	—
Wood manufactures not elsewhere specified :—				
Patterns	141	26	167	—
Other sorts	93	29	122	‡
Other goods made	560	5	565	13
Electrical machinery and parts (generators, motors, etc.) ..	284	42	326	—
Other electrical goods and apparatus (including maintenance work) ..	162	‡	162	—
Waste products :—				
Scrap iron and steel	42	5	47	—
Other sorts	8	—	8	—
TOTAL VALUE OF GOODS MADE	102,659	23,800	126,459	1,954

‡ See notes on page 276.

B.—OUTPUT FOR SALE OR FOR STOCK AND WORK DONE—*continued.*

Kind of machinery, etc. made and work done.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	Selling value.	Selling value.	Selling value.	Selling value.
Iron and steel structural work ..	£'000. 8,013†§	£'000. 2,113§	£'000. 10,126†§	£'000. †
Repair and jobbing work, including work done for the trade ..	12,872†§	1,798§	14,670†§	†
Value of work in progress at the end of 1924	22,550	6,093	28,643	930
TOTAL	145,680	33,804	179,484	3,298
Less value of work in progress at the beginning of 1924	20,133	5,474	25,607	806
TOTAL VALUE OF GOODS MADE AND WORK DONE (GROSS OUTPUT).. .. .	125,547	28,330	153,877	2,492

* In order to avoid the possible disclosure of information relating to individual firms, figures are given only for Great Britain as a whole.

† In order to avoid the possible disclosure of information relating to individual firms, the particulars for Northern Ireland have been combined with those for England and Wales and for Great Britain.

‡ Less than £500.

§ Amount received for work done.

III.—Employment.

A.—NUMBERS EMPLOYED IN WEEK ENDED 18TH OCTOBER, 1924.

Kind of staff.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
<i>England and Wales :—</i>						
Operatives	35,793	301,909	2,769	10,477	38,562	312,386
Administrative, etc.*	3,626	39,725	1,631	10,574	5,257	50,299
TOTAL	39,419	341,634	4,400	21,051	43,819	362,685
<i>Scotland :—</i>						
Operatives	7,074	63,522	788	3,257	7,862	66,779
Administrative, etc.*	614	7,752	339	2,803	953	10,555
TOTAL	7,688	71,274	1,127	6,060	8,815	77,334
<i>Great Britain :—</i>						
Operatives	42,867	365,431	3,557	13,734	46,424	379,165
Administrative, etc.*	4,240	47,477	1,970	13,377	6,210	60,854
TOTAL	47,107	412,908	5,527	27,111	52,634	440,019
<i>Northern Ireland :—</i>						
Operatives	1,141	8,088	3	8	1,144	8,096
Administrative, etc.*	54	896	28	213	82	1,109
TOTAL	1,195	8,984	31	221	1,226	9,205
<i>United Kingdom :—</i>						
TOTAL	48,302	421,892	5,558	27,332	53,860	449,224

* Administrative, technical and clerical staff.

B.—OPERATIVES EMPLOYED IN ONE WEEK IN EACH MONTH OF 1924.

England & Wales. (Annual average: Males, 298,033; Females, 10,391; Total, 308,424.)

Week ended	Males.	Females.	Total.	Week ended	Males.	Females.	Total.
Jan. 12th ..	286,155	10,135	296,290	July 19th ..	303,492	10,270	313,762
Feb. 16th ..	290,471	10,325	300,796	Aug. 16th ..	300,825	10,328	311,153
Mar. 15th ..	290,745	10,405	301,150	Sept. 13th ..	302,939	10,402	313,341
April 12th ..	293,109	10,341	303,450	Oct. 18th ..	301,909	10,477	312,386
May 17th ..	298,395	10,431	308,826	Nov. 15th ..	302,519	10,572	313,091
June 21st ..	300,779	10,273	311,052	Dec. 13th ..	305,058	10,731	315,789

Scotland. (Annual average: Males, 61,446; Females, 3,204; Total, 64,650.)

Jan. 12th ..	56,790	3,005	59,795	July 19th ..	62,234	3,282	65,516
Feb. 16th ..	58,200	3,011	61,211	Aug. 16th ..	63,317	3,303	66,620
Mar. 15th ..	58,450	2,999	61,449	Sept. 13th ..	63,797	3,268	67,065
April 12th ..	60,008	3,101	63,109	Oct. 18th ..	63,522	3,257	66,779
May 17th ..	62,209	3,218	65,427	Nov. 15th ..	62,470	3,305	65,775
June 21st ..	63,241	3,316	66,557	Dec. 13th ..	63,116	3,382	66,498

Great Britain. (Annual average: Males, 359,479; Females, 13,595; Total, 373,074.)

Jan. 12th ..	342,945	13,140	356,085	July 19th ..	365,726	13,552	379,278
Feb. 16th ..	348,671	13,336	362,007	Aug. 16th ..	364,142	13,631	377,773
Mar. 15th ..	349,195	13,404	362,599	Sept. 13th ..	366,736	13,670	380,406
April 12th ..	353,117	13,442	366,559	Oct. 18th ..	365,431	13,734	379,165
May 17th ..	360,604	13,649	374,253	Nov. 15th ..	364,989	13,877	378,866
June 21st ..	364,020	13,589	377,609	Dec. 13th ..	368,174	14,113	382,287

Northern Ireland. (Annual average: Males, 8,479; Females, 9; Total, 8,488.)

Jan. 12th ..	9,087	10	9,097	July 19th ..	8,156	9	8,165
Feb. 16th ..	8,825	10	8,835	Aug. 16th ..	8,154	9	8,163
Mar. 15th ..	8,735	9	8,744	Sept. 13th ..	8,157	9	8,166
April 12th ..	8,787	9	8,796	Oct. 18th ..	8,088	8	8,096
May 17th ..	8,203	10	8,213	Nov. 15th ..	8,543	9	8,552
June 21st ..	8,100	10	8,110	Dec. 13th ..	8,909	9	8,918

IV.—Mechanical Power.

PARTICULARS OF PRIME MOVERS, ELECTRIC GENERATORS AND ELECTRIC MOTORS.

(a) Ordinarily in use. (b) In reserve or idle.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
	H.P.	H.P.	H.P.	H.P.
PRIME MOVERS :—				
Reciprocating steam engines	{ (a) 104,259 (b) 45,686	15,540	119,799	998
Steam turbines	{ (a) 30,504 (b) 17,706	9,181	39,685	2,042
Gas engines	{ (a) 47,917 (b) 9,484	4,792	52,709	1,050
Petrol and light oil engines	{ (a) 3,793 (b) 608	568	4,361	884
Heavy oil engines	{ (a) 11,384 (b) 3,224	147	11,531	215
Water power	{ (a) 685 (b) 2	114	799	76
	{ (a) 198,542 (b) 76,710	30,342	228,884	170
TOTAL		10,566	87,276	40
TOTAL OF PRIME MOVERS IN- STALLED				
	275,252	40,908	316,160	30
				—
ELECTRIC GENERATORS :—				
Driven by—				
Reciprocating steam en- gines.	{ (a) 26,115 (b) 16,344	4,635	30,750	700
Steam turbines	{ (a) 25,942 (b) 22,950	6,300	32,242	1,575
Gas engines	{ (a) 14,995 (b) 3,177	942	15,937	750
Petrol and light oil engines	{ (a) 898 (b) 211	112	1,010	1,350
Heavy oil engines	{ (a) 6,808 (b) 2,158	35	6,843	94
Water power	{ (a) 184 (b) 15	9	193	80
	{ (a) 74,942 (b) 44,855	12,033	86,975	20
TOTAL		6,883	51,738	55
TOTAL OF ELECTRIC GENERA- TORS INSTALLED				
	119,797	18,916	138,713	—
				6
ELECTRIC MOTORS :—				
Driven by—				
Electricity generated in own works.	{ (a) 148,236 (b) 51,826	26,801	175,037	2,626
Purchased electricity ..	{ (a) 390,776 (b) 84,750	128,707	519,483	2,557
		25,243	109,993	754
				65

ELECTRICAL ENGINEERING.

I.—Summary of results.

Particulars.	Unit.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
Value of goods made and work done (gross output)	£'000	68,859	1,291	70,150	156
Cost of materials used	„	35,723	658	36,381	98
Paid for work given out to other firms	„	252	5	257	*
Net output	„	32,884	628	33,512	58
Average number of persons employed	No.	150,439	3,383	153,822	274
Net output per person employed	£	219	186	218	212
Mechanical power available :—					
Prime movers	H.P.	48,222	494	48,716	—
Electric motors driven by purchased electricity	„	110,117	3,820	113,937	167

* Less than £500.

II.—Production.

Goods sold or added to stock and work done.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
	Selling value.	Selling value.	Selling value.
Electrical machinery and parts :—	£'000.	£'000.	£'000.
Generators—			
Alternating current	*	*	1,025
Direct current	*	*	684†
Not separately distinguished	397	—	397
TOTAL—Generators	*	*	2,106
Motors :—			
Railway and tramway	1,537	—	1,537
Other—			
Alternating current	*	*	2,151†
Direct current	*	*	1,663†
Not separately distinguished	245	—	245
TOTAL—Motors	*	*	5,596
Converters and transformers (including coils):—			
Rotary	*	*	891
Static	1,757	—	1,757
Not separately distinguished	66	—	66
TOTAL—Converters and transformers	*	*	2,714
Control and switch gear	3,459	79	3,538
Magnetos, ignition	669	—	669
Other electrical machinery	*	*	782
TOTAL—ELECTRICAL MACHINERY AND PARTS	14,883	522	15,405
Electric wires and cables, insulated :—			
Telegraph and telephone (not being submarine)	*	*	3,685
Submarine telegraph and telephone	2,692	—	2,692
Power and lighting cables :—			
Rubber insulation	*	*	3,636
Insulation other than rubber	*	*	8,570
TOTAL—INSULATED WIRES AND CABLES	*	*	18,583
Telegraph, telephone and wireless apparatus :—			
Telegraph	278	—	278
Telephone	3,649	—	3,649
Wireless	4,849†	8	4,857†
Electric lamps and parts thereof :—			
Incandescent :—			
Gas filled	1,037	‡	1,037
Other	(10,141)	‡	(10,141)
Other	1,419	‡	1,419
Other	(25,470)	‡	(25,470)
Arc lamps and searchlights (including hand flash lamps and parts of electric lamps, except carbon rods and primary batteries)	16	—	16

*†‡ For notes see page 283.

II.—Production—continued.

Goods sold or added to stock and work done.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.
Thermionic valves	*	*	1,262
Batteries :—			
Primary :—			
For hand flash lamps	*	*	42
Other primary batteries	394	—	394
Not separately distinguished	332	—	332
Accumulators :—			
Portable :—			
For vehicles	353	—	353
Other	1,576	—	1,576
Not separately distinguished	281	—	281
Stationary	1,320	—	1,320
Meters :—			
House service	978	—	978
Switchboard	65	—	65
Other kinds	30	—	30
Other measuring instruments :—			
Indicating	488	—	488
Recording	63	—	63
Other	88	—	88
X-ray apparatus (industrial, medical, etc.)	41	—	41
Other electro-medical apparatus	25	—	25
Carbons (lighting, furnace, etc.)	565	—	565
Condensers, electric, static, power	393	—	393
Bell apparatus (not telegraph or telephone)	*	*	42
Lighting accessories and fittings (including switches)	1,564†	4	1,568†
Switchboards (other than telegraph and telephone)	1,667†	12	1,679†
Heating apparatus :—			
Domestic	215	‡	215
Industrial hotel and restaurant	17	—	17
Not separately distinguished	55	—	55
Cooking apparatus :—			
Domestic	87	—	87
Industrial, hotel and restaurant	49	—	49
Not separately distinguished	6	—	6
Heating and cooking apparatus, not separately distinguished	56	—	56
Conduits, poles and fittings	445	—	445
Insulating materials and accessories of mica, ebonite and similar materials	880	12	892
Starting and lighting apparatus for motor vehicles	867	—	867
Electrical goods and apparatus, not elsewhere specified	2,693†	9	2,702†
Other products :—			
Iron castings	49	—	49
Other finished iron and steel goods	36	—	36
Tools, implements, etc.	35	—	35
Brass and copper alloys and manufactures	1,368	1	1,369

*†‡ For notes see page 283.

II.—Production—continued.

Goods sold or added to stock and work done.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
	Selling value.	Selling value.	Selling value.
	£'000.	£'000.	£'000.
Other products—continued.			
Other manufactures of metals other than iron, steel, brass or copper	116	—	116
Parts of motor vehicles and cycles	66	—	66
Ships and boats	1	—	1
Rubber manufactures, not elsewhere specified	188	—	188
Wood manufactures	22	—	22
Tanks and cisterns	5	—	5
Steam turbines and other rotary steam engines	382	—	382
Gun mounting and carriages	101	—	101
Other machinery parts and accessories (not electrical)	214	17	231
Other goods made	87	—	87
Waste products :—			
Scrap iron and steel	11	—	11
Non-ferrous scrap	47	—	47
TOTAL VALUE OF GOODS MADE	*	*	64,966
	Amount received.	Amount received.	Amount received.
	£'000.	£'000.	£'000.
Contract work in the United Kingdom :—			
Installation of apparatus, test boards, etc. :—			
Telegraph	85†	—	85†
Telephone :—			
Switchboards	61	—	61
Other	*	*	16
Wireless	110†	3	113†
Lines, cables and works :—			
Telegraph and telephone	*	*	270
Power and light	2,451†	243	2,694†
Repair and maintenance :—			
On customers' premises	646†	205	851†
Other	1,134†	116	1,250†
TOTAL—CONTRACT WORK, REPAIR AND MAINTENANCE	*	*	5,340
TOTAL VALUE OF GOODS MADE AND WORK DONE (GROSS OUTPUT)	69,015	1,291	70,306

* In order to avoid the possible disclosure of information relating to individual firms, figures are given only for the United Kingdom as a whole.

† In order to avoid the possible disclosure of information relating to individual firms, the figures for Northern Ireland have been included with those for England and Wales and for Great Britain: the individual items affected are also marked thus (†).

‡ Less than £500.

III.—Employment.

A.—NUMBERS EMPLOYED IN WEEK ENDED 18TH OCTOBER, 1924.

Kind of staff.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
<i>England and Wales</i> :—						
Operatives	17,364	91,290	12,419	36,995	29,783	128,285
Administrative, etc.*	2,065	20,794	1,712	8,830	3,777	29,624
TOTAL	19,429	112,084	14,131	45,825	33,560	157,909
<i>Scotland</i> :—						
Operatives	794	2,591	62	173	856	2,764
Administrative, etc.*	90	454	76	275	166	729
TOTAL	884	3,045	138	448	1,022	3,493
<i>Great Britain</i> :—						
Operatives	18,158	93,881	12,481	37,168	30,639	131,049
Administrative, etc.*	2,155	21,248	1,788	9,105	3,943	30,353
TOTAL	20,313	115,129	14,269	46,273	34,582	161,402
<i>Northern Ireland</i> :—						
Operatives	39	174	—	2	39	176
Administrative, etc.*	6	41	3	20	9	61
TOTAL	45	215	3	22	48	237
<i>United Kingdom</i> :—						
TOTAL	20,358	115,344	14,272	46,295	34,630	161,639

* Administrative, technical and clerical staff.

B.—OPERATIVES EMPLOYED IN ONE WEEK IN EACH MONTH OF 1924.

England and Wales. (Annual average : Males, 86,451 ; Females, 34,364 ; Total, 120,815.)

Week ended	Males.	Females.	Total.	Week ended	Males.	Females.	Total.
Jan. 12th ..	80,784	31,707	112,491	July 19th ..	86,033	33,012	119,045
Feb. 16th ..	81,998	32,836	114,834	Aug. 16th ..	85,697	33,466	119,163
Mar. 15th ..	83,431	33,477	116,908	Sept. 13th ..	88,973	34,901	123,874
April 12th ..	83,211	32,958	116,169	Oct. 18th ..	91,290	36,995	128,285
May 17th ..	84,166	33,036	117,202	Nov. 15th ..	92,700	38,304	131,004
June 21st ..	85,440	32,767	118,207	Dec. 13th ..	93,690	38,909	132,599

Scotland. (Annual average : Males, 2,487 ; Females, 167 ; Total, 2,654.)

Jan. 12th ..	2,330	156	2,486	July 19th ..	2,563	159	2,722
Feb. 16th ..	2,347	170	2,517	Aug. 16th ..	2,579	169	2,748
Mar. 15th ..	2,416	175	2,591	Sept. 13th ..	2,608	176	2,784
April 12th ..	2,464	164	2,628	Oct. 18th ..	2,591	173	2,764
May 17th ..	2,455	157	2,612	Nov. 15th ..	2,528	171	2,699
June 21st ..	2,437	161	2,598	Dec. 13th ..	2,525	168	2,693

Great Britain. (Annual average : Males, 88,938 ; Females, 34,531 ; Total, 123,469.)

Jan. 12th ..	83,114	31,863	114,977	July 19th ..	88,596	33,171	121,767
Feb. 16th ..	84,345	33,006	117,351	Aug. 16th ..	88,276	33,635	121,911
Mar. 15th ..	85,847	33,652	119,499	Sept. 13th ..	91,581	35,077	126,658
April 12th ..	85,675	33,122	118,797	Oct. 18th ..	93,881	37,168	131,049
May 17th ..	86,621	33,193	119,814	Nov. 15th ..	95,228	38,475	133,703
June 21st ..	87,877	32,928	120,805	Dec. 13th ..	96,215	39,077	135,292

Northern Ireland. (Annual average : Males, 211 ; Females, 2 ; Total, 213.)

Jan. 12th ..	198	2	200	July 19th ..	229	2	231
Feb. 16th ..	204	2	206	Aug. 16th ..	194	2	196
Mar. 15th ..	231	2	233	Sept. 13th ..	193	2	195
April 12th ..	245	2	247	Oct. 18th ..	174	2	176
May 17th ..	253	2	255	Nov. 15th ..	167	2	169
June 21st ..	269	2	271	Dec. 13th ..	178	2	180

IV.—Mechanical Power.

PARTICULARS OF PRIME MOVERS, ELECTRIC GENERATORS AND ELECTRIC MOTORS.

Power equipment.	England and Wales.		Scotland.		Great Britain.	
	Ordinarily in use.	In reserve or idle.	Ordinarily in use.	In reserve or idle.	Ordinarily in use.	In reserve or idle.
PRIME MOVERS :—	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Reciprocating steam engines	7,507	6,773	12	450	7,519	7,223
Steam turbines	21,910	2,385	—	—	21,910	2,385
Gas engines	5,662	952	22	—	5,684	952
Petrol and light oil engines	542	290	10	—	552	290
Heavy oil engines	1,480	565	—	—	1,480	565
Water power	156	—	—	—	156	—
TOTAL	37,257	10,965	44	450	37,301	11,415
TOTAL OF PRIME MOVERS INSTALLED	48,222		494		48,716	
ELECTRIC GENERATORS :	Kw.	Kw.	Kw.	Kw.	Kw.	Kw.
Driven by :—						
Reciprocating steam engines	3,908	4,661	5	300	3,913	4,961
Steam turbines	15,894	1,984	—	—	15,894	1,984
Gas engines	3,171	615	3	—	3,174	615
Petrol and light oil engines	158	133	—	—	158	133
Heavy oil engines	880	375	—	—	880	375
Water power	100	50	—	—	100	50
TOTAL	24,111	7,818	8	300	24,119	8,118
TOTAL OF ELECTRIC GENERATORS INSTALLED	31,929		308		32,237	
ELECTRIC MOTORS :—	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Driven by :—						
Electricity generated in own works	45,356	2,598	—	—	45,356	2,598
Purchased electricity	98,125	11,992	3,476	344	101,601	12,336

Note.—The only power recorded for Northern Ireland consisted of electric motors driven by purchased electricity of a total capacity of 167 h.p. (107 h.p. ordinarily in use and 60 h.p. in reserve or idle).