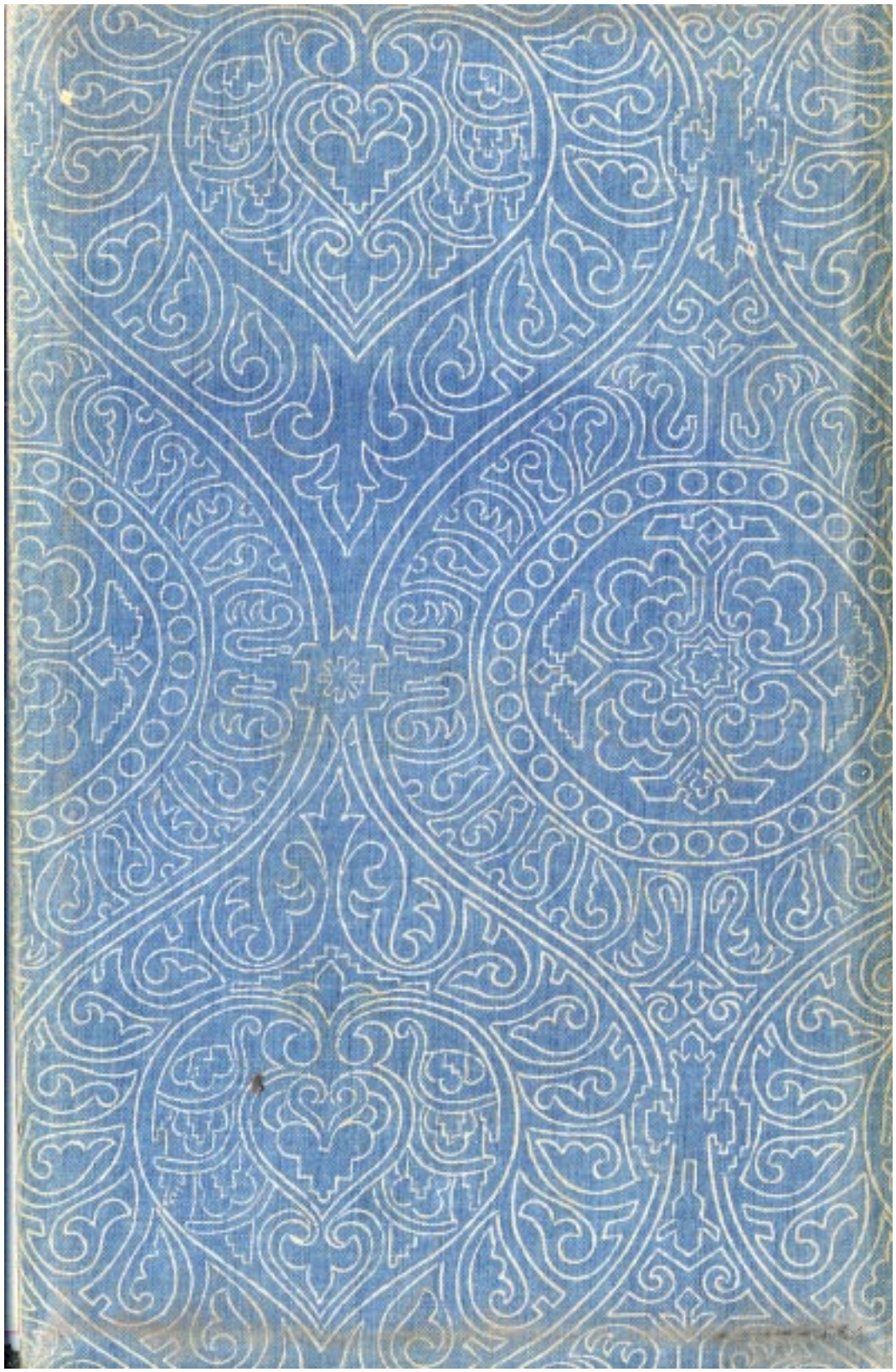
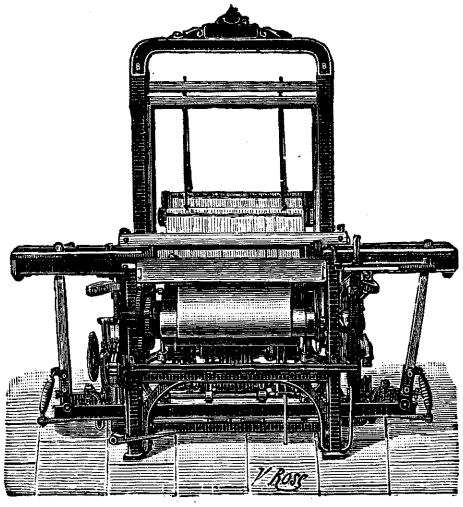
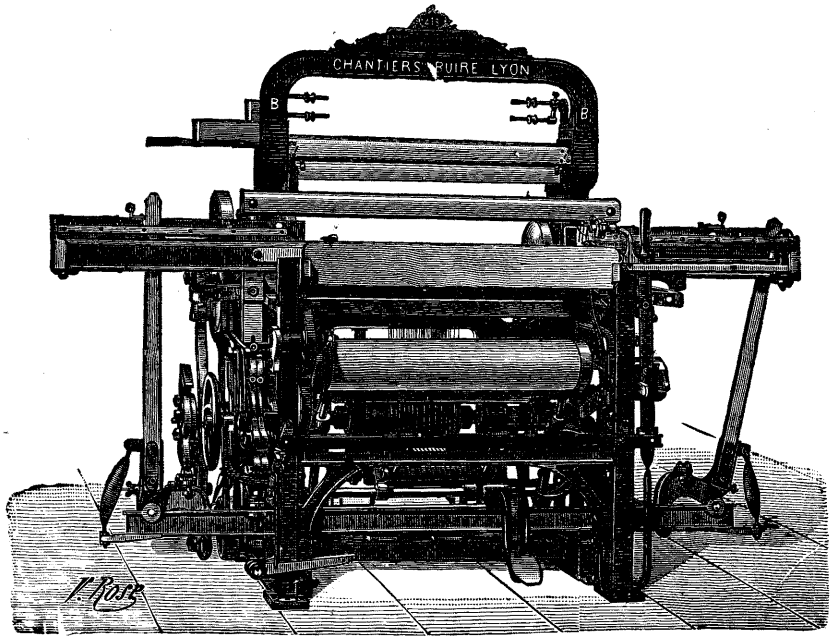




Type of Modern French Power Looms.



Perfected Loom System, Laisserson.

ON THE PRESENT DEVELOPMENT

OF

POWER-LOOM WEAVING

OF SILK FABRICS AT LYONS,

WITH ILLUSTRATIONS.

BY

THOMAS WARDLE,

Fellow of the Chemical Society; Fellow of the Geological Society; Fellow of the Imperial Institute; Member of the Council of the Palæntographical Society; Chevalier de la Legion d'Honneur of France; Officer d'Academie of France; Member du Jury de l'Industrie de la Soie aux Expositions Universelles à Paris, 1878 and 1889; Honorary Superintendent of the Indian Silk Culture Court of the Colonial and Indian Exhibition, London 1886; Chairman of the Silk Section of the Royal Jubilee Exhibition, Manchester, 1887; one of the Examiners to the City and Guilds of London Institute; President of the Silk Association of Great Britain and Ireland; President of the North Staffordshire Field Naturalists' Club and Archæological Society; Chairman of the Standard Sewage and Water Purification Company Limited

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Dedicated by Gracious Permission to

H. R. H. PRINCESS MARY ADELAIDE,

DUCHESS OF TECK,

President of the Ladies' National Silk Association,

and of the Ladies' Committee of the

Silk Association of Great

Britain and Ireland.

PREFACE.

The object of this Brochure is simply to call the attention of British Silk Manufacturers to the gradual but certain replacement, in all but the most elaborate Silk fabrics of the traditional Hand-loom Weaving for which Lyons for centuries has been so famous, by that of the Power-loom in which so many gradual improvements on the Continent in recent years have been made

Leek, January 26th, 1893.

☞ The pattern printed on the cover is a Byzantine design, found a few years ago on the Silken burial Robe of Otto the Great, Emperor of Germany, A.D. 936-973.

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ON THE PRESENT DEVELOPMENT OF

POWER-LOOM WEAVING

OF SILK FABRICS AT LYONS,

BY

THOMAS WARDLE, F.G.S., F.C.S.,

PRESIDENT OF THE SILK ASSOCIATION OF GREAT BRITAIN AND IRELAND.

READ BEFORE THE WEAVING AND POWER-LOOM COMMITTEE,
17TH APRIL, 1891, WITH SUBSEQUENT ADDITIONS.

I shall preface my notes with some apposite remarks of Mr. Fougeirol, one of the Ministers of the French Government and a Member of the French Chamber of Deputies who has lately stated to a Committee Meeting of the Association of French Industry held in Paris, the system at present practised in Lyons in the production of silk goods, when he and M. Bérenger, President of the General Syndicate of the French Silk Cultivators, and member of the Senate, pleaded the cause of the proposed protective duties on silk. Monsieur Fougeirol has shown the system to be quite different to that in use in England, and the information elicited during the discussion of the question of the protection of raw and other silks, is extremely interesting as it gives us a clear view of the industrial and manufacturing position. It was translated from the "Bulletin des Soies" in January last, and appears in the "Leek Post," of the 24th of that month, in the columns set apart for the News Committee of our Association to fill. If I repeat the salient points on this occasion

it will be to form a fitting introduction to the facts relating to weaving which I have acquired during a recent visit to Lyons; facts which are not without serious bearing upon the causes which prevent Great Britain and Ireland doing their fair share in the production of the silk fabrics they require for home use and export, but mainly for home use.

But I must not be understood in quoting these remarks as having the least intention of referring at all to the vexed question of Protection versus Free or Fair-Trade. On the contrary I would rather prefer to state at once that this subject being of necessity eliminated from the work of this Association, our attention is, and ought to be, wholly turned to matters connected with the educational, economical, and artistic aspects of the question, and I will venture so far as to express my firm conviction, that, as I feel sure this paper will prove, our aims ought to be primarily set in these directions, having as an industry, with special and rapidly advancing exceptions, much efficiency to acquire, before we can successfully compete in price and style with our Continental rivals; so irrefragably do I believe this to be the case that we may well leave fiscal contentions outside the Association's work as being of secondary importance.

THE LYONS MANUFACTURING SYSTEM.

The following is M. Fougeirol's description and explanation of the system under which the silk manufacture is carried on at Lyons—"The person who is called the Lyons Manufacturer has an office, a counting house where he buys the silk, where he sells his stuffs, and where the various persons whose services are necessary to him come to find him. He buys the silk in proportion to, and prepared for, his requirements. He sends it first to the dyer, and then to the winder who places it on the bobbins. Then comes the warper who warps the warp, and finally the "canut" to whom the warp is entrusted for weaving. This "canut" is the proprietor of his loom. The number of looms in Lyons itself is about 12,000. In the country there are between 55,000 and 60,000 hand looms, and 20,000 power looms, spread over the Rhone and the adjoining Departments. The looms in the country and the industrial establishments do not belong to the Lyons Merchants any more than do the looms in that town. The proprietors of such plant, manufacture to order. In other

Industries a large amount of capital is necessary to furnish and keep in a state of good repair the manufactory, with a smaller capital for trading, but in the silk industry of Lyons on the contrary the larger capital is applied to the trading, and is in the hands of but few, whilst the looms and industrial establishments are conducted with but limited funds. From this it will be seen that those who hold the capital are in reality the sleeping partners of those who might not inaptly be named the contractors, the reelers, the silk throwsters and the weavers. At the time of the crop the reelers are bound to make their provision for the year, and large sums of money are essential to them, which are furnished by the silk merchants or their bankers, who recover the amount they loaned in receiving the merchandise.

One of the members of the French Committee here remarked "that according to that explanation the Lyons Manufacturer was in reality only a negotiator, an agent or a merchant as he was formerly designated—that not himself possessing looms he had not to suffer from crises and stoppages, that if he had orders he gave them out, and if he had not, he remained tranquilly in his office, without occupying his mind with the troubles of the contractors and their workpeople. Under these conditions he failed to see why the so-called Manufacturers should speak in the name of interests other than their own. They had none of the troubles nor the responsibilities of other French producers."

M. Fougeirol then went on to describe in a variety of detail the nature of the employments in the manufacture of raw and thrown silk. Twenty-five years ago, silk was dyed before being woven, and as a consequence only thrown silk was used. Since then it has been found that many kinds of silk fabrics could be dyed in the piece, and at the present time piece-dyeing was very largely carried on at Lyons with the result that the thrown-silk trade had suffered.

Raw-silk when woven lends itself wonderfully to being dyed in the piece, and it is now very largely woven before being dyed, into a great variety of fabrics, pure and mixed. This kind of weaving is all done in power looms, and every day new products are woven with raw-silk, which are afterwards dyed in the piece, which could not be made formerly with thrown silk.

ST. ETIENNE RIBBON INDUSTRY AND LYONS BROAD-SILK STATISTICS.

One of the members of the Committee stated that the ribbon industry of St. Etienne produced annually ribbons of the value of 102 millions of francs or £4,080,000, and imported none of such goods, whilst Lyons imported annually broad silks to the value of 60 millions of francs or £2,400,000 but exported 240 millions of francs worth, or £9,420,000.

TUSSUR SILK.

A reference at this meeting was made to Tussur silk, which in passing I may be excused if I allude to, considering the recent rapidly growing importance and use of this silk in Lyons. The subject was introduced in discussion in the following way. A member remarked that the silk goods of St. Etienne bearing the name of ribbons and protected by a duty, had reached a production of 102 millions of francs whilst the importation was nil. For the silk goods of Lyons on the contrary the importation being 60 millions as against an exportation of 240 millions, if a duty could be levied on pure silk goods they would regain a portion of those 60 millions. A member said that whilst it might be urged that Lyons, strong in its superiority, need not fear competition, and that France was a great market for silk stuffs, it was none the less certain that the duty spoken of would insure the future of the silk industry, and would do much to prevent a crisis in the trade. M. Fougeirol answered that people were much guided by price, and it was especially so with regard to Tussur silk, which is a wild silk that France could not produce; but the French Colonies could do so if its production were duly encouraged there, Tonkin being an example. It is imported in the raw state. If one taxed raw-silk there would be no plausible reason for exempting Tussur. M. Bérenger remarked that so far as Tussur was concerned it was not necessary to make it an exception; to do so would be to increase the use of this silk, which is an inferior sort, and that would be to the prejudice of the consumers.

I may remark here that the recent weekly increase of Tussur Silk in Lyons is one of the most remakable developments in the history of the Silk industry in any country and may be considered phenomenal, for in the week ending 9th April, 1891 Lyons capped its record in the use of Tussur silk, 136 bales, equal to 19,040 lbs. having

passed through the Conditioning House, against 178 bales or 39,160 lbs. of French silk, and 38 bales or 8,360 lbs. of Italian. For the week ending July 4th, this quantity, large as it is, has been much exceeded, "The Moniteur des Soies" records 220 bales having been Conditioned in that week in the following states: Organzine 2 bales; Tram 45 bales, and Raw 173 bales. As each bale weighs 140 lbs., the amount expressed in English weight is no less than 30,800lbs. From these figures it will be seen that Tussur Silk is now largely used there much of it being Indian Tussur sent from Bengal by Messrs. Louis Payen and Cie, whose filature at Behrempore I saw when I visited India in 1885, and who were then successfully commencing to reel Tussur cocoons for the first time. Tussur silk is now used in Lyons in a variety of ways, very interesting specimens of which I exhibited to illustrate a paper on this subject which I had been asked to read at the Society of Arts on the 14th of May last by Sir Geo. Birdwood of the India Office. *

The facts I have mentioned relative to the mode of conducting the manufacture of Silk goods in France, although brought out in a discussion on protection, which as I have already stated forms no part of my subject, are useful as being an authoritative declaration of their procedure, and I think form a fitting introduction to this paper, the sole object of which is to place before my readers the nature and methods of the Lyons silk-manufacturers and to illustrate what I mean by a series of silk fabrics most of which I saw being woven under their newest systems.

French Power Looms and their Products.

I availed myself of opportunities which were kindly accorded to me to make myself acquainted with the most recent developments of the Lyons manufacturers.

It is with reference to the new adaptations of power-loom weaving that I want to call attention, to the newer construction of looms, their increasing weaving of raw-silk and of many kinds woven with thrown silk after dyeing. I obtained by the kindness

* Read on May 14th before the publication of this paper. It is issued in the form of an appendix to the annual report of the Association. In it will be found full particulars of the recent enormous utilization in France of Tussur Silk.

of the great mechanical engineering firm of Les Chantiers de la Buire of Lyons, ample specimens of silk fabrics of their weaving to illustrate what I shall proceed to state. This extensive house constructs machinery of many kinds, notably amongst others cocoon-reeling machines, winding machines and power-looms. In order to show the public the efficiency and excellence of their machinery, they have erected a silk factory in which they wind and weave silks by all kinds of power-loom weaving. They have about 100 looms at work and take orders from the Lyons manufacturers in the ordinary way for weaving this or that kind of fabric at the regulation prices in Lyons for weaving. I shall give particulars of these prices as I describe each fabric I saw being woven.

I will first begin with the weaving of goods which are afterwards to be piece-dyed or printed.

After a general description of each kind of fabric I have appended the weaving and other particulars in a tabulated form for readier reference.

POWER-LOOM FABRICS.

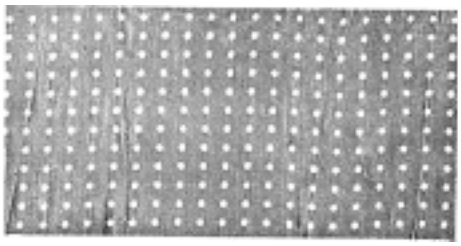


Fig. 1.

No. 1.—"FOULARD DE CHINE."

The first is a specimen of what they call "China gum cloth" or "Foulard de Chine" in three states, 1st as woven in gum, 2nd as printed with black spots on a self-coloured ground; and 3rd (fig. 1.) printed with a blue ground with white spots. This cloth is woven in water.

Their system of weaving generally is to place the looms in pairs, end-to-end. The weavers are women only, who help each other in their pair looms when necessary. The women are paid 40 centimes per metre or 3½d. per yard for weaving this cloth. It is a Foulard and is called "Foulard de Chine." It is 60 centimetres (23 6/10 inches) wide, Both warp and shute are Japan silk. It is sold in the gum at about 1 franc 60 centimes per metre, equal to 1s. 4d. per metre, or 1s. 2¼d. per yard.

Number 1, fig. 1.
Name of Cloth: China gum cloth, or Foulard de Chine. Samples in Gum and Printed.
Price charged to Manufacturer for Weaving: Not stated.
Price paid to woman for Weaving: 40 centimes per metre or 3½d. per yard.
Number of Warp Threads: Not stated.
Width of Fabric: 22½ inches.
Warp: (Chaine) Japan.
Shute: (Trame) Japan.
Quantity Loom can Weave per day: Not stated.
Speed of Shuttle per minute: Not stated.
Cost of Loom: B16, francs 1015. £40 10.

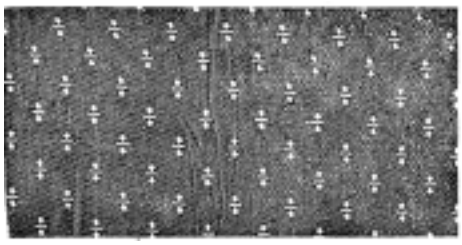


Fig. 2.

No. 2.—SURAH FANTASIE.

The next specimen is called Surah Fantasie. It is chiefly used for neckties and is printed. It is composed of raw-silk warp the shute being Schappe. The price charged by the Chantiers de la Buire for weaving it is 20 centimes, or 2d. per metre, or 1¾d. per yard. (A metre is one yard three inches and ⅜ths). The price paid to the women who weave it is 9 centimes or ¾d. per metre, equal to 13/16th's of a penny per yard. Two women working a pair of looms placed end-to-end can turn out 60 metres per day, or 65⅔rds

yards. In four months four women can make on eight looms 5,376 to 5,760 metres, or 56 to 60 metres per day, the shuttles working at the speed of 240 to 250 strokes per minute. Sample *a* is as it comes out of the loom with the raw warp "in gum," and the schappe partly discharged in the schappage before spinning. Sample *b* is the same cloth printed green with white spots fig. 2. In the ordinary Foulards made of raw-silk warp and net-silk or schappe weft, the shuttle is often made to work 300 strokes per minute.

Number 2, fig. 2.

Name of Cloth: Surah Fantasie.

Price charged to Manufacturer for Weaving: 20 centimes per metre or $1\frac{3}{4}$d. per yard.

Price paid to woman for Weaving: 9 centimes per metre, or $\frac{13}{16}$ of a penny per yard.

Number of Warp Threads, not ascertained.

Width of Fabric: 24 inches.

Warp. (Chaine) Raw Silk.

Shute (Trame) Spun Silk.

Quantity Loom can Weave per day: 60 metres or 66 yards 2 feet 9 inches.

Speed of Shuttle per minute: 240 to 250 strokes.

Cost of Loom: B 16, francs 1015, or £40 10 0.

Fig. 3.

No. 3.—SURAH.

The next specimen is Surah. I have only one, but it represents two cloths for different purposes, handkerchiefs and dress. This specimen is a black Surah handkerchief. No cards are used in

weaving this Twill Surah ; it was being woven in a small square loom with six lisses, each lifted alternately. The cost of the loom for Surah-weaving is 1015 Francs, or £40 10 0. There were a number of these looms at work for Serges, Dress, Garniture, and Handkerchief purposes. The price charged to the Manufacturers for weaving this cloth is 30 centimes per 78 centimetres square, or 3d. per $30\frac{7}{10}$ inch square, this is the price paid everywhere in Lyons by the manufacturers to the weavers for weaving this cloth. The price the women receive for weaving it is 12 centimes or $1\frac{1}{6}$d. per square, and they get good livings at this price, and the same price is charged whether the cloth is woven by power-loom or by hand-loom. The hand-loom work is chiefly done in the hills in the winter by weavers who have other occupations in summer. I was informed that the advantages in power-loom weaving lie in a greater production, and better and more even work ; but the cheaper hand-loom weavers I have referred to can weave this cloth as cheaply as the power-loom. In the power-loom two women will make 15 metres a day each, at a cost of 35 centimes per metre, which is of course a little larger than a square. The dye of the warp is 50 per cent, or 24 oz. bright black, and the shute 200 per cent or 32 oz. bright black not souple.

Number 3, fig. 3.

Name of Cloth : Surah.

Price charged to Manufacturer for Weaving : 30 centimes per square of 78 centimetres or 3d. per $30\frac{7}{10}$ inches square.

Price paid to woman for Weaving : 12 centimes or $1\frac{1}{6}$d. per yd.

Number of Warp Threads : 3440.

Width of Fabric : 31 inches.

Warp : (Chaine) Japan or Italian.

Shute : (Trame) Japan.

Quantity Loom can Weave per day : Two women weave 15 metres or 16 yards 1 foot $4\frac{1}{2}$ inches per day each.

Speed of Shuttle per minute : 180 to 200 strokes.

Cost of Loom : 1015 francs or £40 10 0.

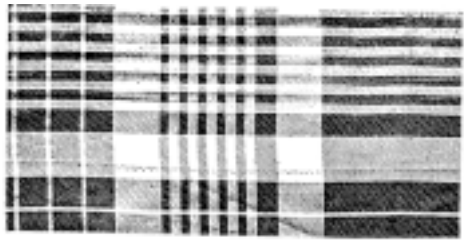


Fig. 4.

No. 4.—CHECK HANDKERCHIEFS.

Black and white checks or plaid handkerchiefs, size 78 centimetres equal to 30 $\frac{7}{10}$ inches square, of excellent quality. 12 metres or 13 yards 6 inches, per day are woven at a labour cost of 40 centimes, or 4d. per handkerchief.

Number 4, fig. 4.

Name of Cloth: Black and White plaid Handkerchiefs. Size 78 centimetres or 30$\frac{7}{10}$ths of an inch square.

Price charged to Manufacturer for Weaving: 8d. per Handkerchief.

Price paid to woman for Weaving: 4d.

Number of Warp Threads: 3440.

Width of Fabric: 30 inches.

Warp: (Chaine) Japan or Italian.

Shute: (Trame) China or Japan.

Quantity Loom can Weave per day: 12 metres or 13 yds. 6 ins.

Speed of Shuttle per minute: 120 to 140 strokes.

Cost of Loom: 4 navettes E. francs 1575 or £65 12 6.

Fig. 5.

No. 5 —FIGURED DAMASKS.

Figured Damasks are being woven with 12,000 warp threads, also figured damasks woven in two breaths at once on the same loom,

20 inches each. Damasks of two colours are woven at the rate of 5 metres a day.

Some very charming patterns and colourings are woven in this loom as the example will testify, the weaving seems perfect.

Number 5, fig. 5.

Name of Cloth: Damask 2 lats. The word "lat" means one shuttle or color, 2 "lats" 2 shuttles or colors.

Price charged to Manufacturer for Weaving: 1 franc 80 centimes or 1/-.

Price paid to woman for Weaving: 60 centimes or 6d.

Number of Warp Threads: 12,000

Width of Fabric: $22\frac{3}{4}$ inches.

Warp: (Chaine) China Organzine.

Shute: (Trame) China.

Quanity Loom can Weave per day: 6 metres or 6 yds. 21 ins.

Speed of Shuttle per minute: 90 to 100 strokes.

Cost of Loom: B 2 lats. francs 1000 or £41 13 4.

Fig. 6.

No. 6.—FIGURED DAMASK.

This is another kind of figured Damask, a furniture stuff in three browns, a floral design, and as perfectly woven as hand-loom work can be done.

Number 6, fig. 6.

Name of cloth: Damask 2 lats.

Price charged to Manufacturer for Weaving: 1fr. 185c. or 1s. $6\frac{1}{2}$d. per yard.

Price paid to women for weaving: 60 centimes or $5\frac{1}{4}$d. per yd.

Number of Warp Threads: 9600.

Width of Fabric: 22 inches.
Warp (Chaine): French.
Shute (Trame): China or French.
Quantity Loom can Weave per day: 5½ metres or 6 yards.
Speed of Shuttle per minute: 90 to 95 strokes.
Cost of Loom: B2 lats. francs 1000 or £41 13s. 4d.

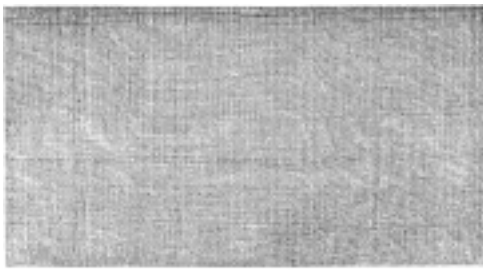


Fig. 7.

No. 7.—CORA.

This is a thin but substantial plain cloth. The sample is dyed a dove colour, it is probably for lining purposes. It is much better woven than the Indian corahs.

Number 7, fig. 7.

Name of Cloth: Cora.

Price charged to Manufacturer for Weaving: 45 centimes or 3½d. per yard.

Price paid to women for Weaving: 15 centimes or 1¼ yard.

Number of Warp Threads: 2160.

Width of Fabric: 22½ inches.

Warp (Chaine): Schappe 200s.

Shute (Trame): Schappe 200s.

Quantity Loom can Weave per day: 14 metres or 15 yards 13 inches.

Speed of Shuttle per minute: 140 to 150 strokes.

Cost of Loom: B16, francs 1015 or £40 10s. 0d.

Fig. 8.

No. 8.—GAZE DE VOILETTE.

This is an exceedingly thin and transparent gauze, woven in-gum, quite web-like.

Number 8, fig. 8.

Name of Cloth : Gaze de voilette.

Price charged to Manufacturer for Weaving : 12 centimes per metre or $1\frac{1}{16}$d. per yard.

Price paid to women for Weaving : 7 centimes or $\frac{5}{8}$d. per yd.

Number of Warp Threads : not ascertained.

Width of Fabric : not ascertained.

Warp (Chaine) : Broussa.

Shute (Trame) : Broussa.

Quantity Loom can Weave per day : 25 metres or 27 yards $15\frac{1}{2}$ inches.

Speed of Shuttle per minute : 115 to 120 strokes.

Cost of Loom : B16 lisses, francs 1015 or £40 10s. 0d.

Fig. 9.

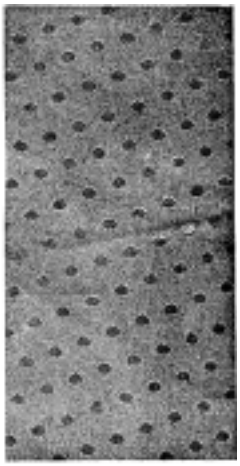


Fig. 10.

Nos. 9 & 10.—BLACK FIGURED DAMASK.

These are black dress Damasks, one a floral design, the other woven in spots, both ground and spots black.

Numbers 9 & 10, figs. 9 & 10.

Name of Cloth : Damask.

Price charged to Manufacturer for Weaving : 75 centimes or $6\frac{9}{16}$d. per yard.

Price paid to women for Weaving : 30 centimes or $2\frac{5}{8}$ yards.

Number of Warp Threads : 5760.

Width of Fabric : $21\frac{1}{4}$ inches.

Warp (Chaine) : Italy.

Shute (Trame) : China.

Quantity Loom can Weave per day : 9 metres or 9 yards $31\frac{1}{2}$ inches.

Speed of Shuttle per minute : 100 to 110 strokes.

Cost of Loom : B façonné, francs 800 or £33 6 8.

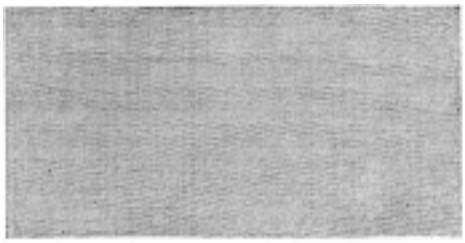


Fig. 11.

Nos. 11 & 12.—FAILLE.

ORDINARY FAILLE.—I saw several looms at work weaving ordinary Black Faille. It was being woven at the rate of eight metres per day. The price they charge the Lyons Manufacturers for weaving, is 1 franc 20 centimes per metre, or $10\frac{9}{16}$d. per yard. Women weave it, and earn 7 sous or 35 centimes per metre, equal to $3\frac{1}{16}$d per yard in both wide and narrow widths. Two specimens of ordinary Faille, black, dress silk, one a fine rep the other thick ribbed both well and regularly woven, the dye a weighted one, the warp 50% or 24 oz. per lb. The Shute a boiled off black, 90% or 30 oz. per lb.

Numbers 11 & 12, fig. 11.

Name of Cloth : Ordinary Faille.

Price charged to Manufacturer for Weaving : 1 franc. 30 cent. per metre or $10\frac{9}{16}$d. per yard.

Price paid to women for Weaving: 50 centimes or $4\frac{1}{8}$d. per yd.

Number of Warp Threads : 11,200.

Width of Fabric : $24\frac{1}{2}$ inches.

Warp : (Chaine) not ascertained.

Shute : (Trame) not ascertained.

Quantity Loom can Weave per day : 8 metres or 8 yards 2ft. 4 in.

Speed of Shuttle per minute : not ascertained.

Cost of Loom : B16, francs 1015 or £40 10 0.

Fig. 13.

No. 13.—FAILLE COTON.

This is a thick rep with a hard or gum silk warp, dyed yellow gum shade if a white silk, but if a yellow silk, undyed, the shute is a thick 4 thread white cotton.

Number 13, fig. 13.

Name of Cloth : Faille coton.

Price charged to Manufacturer for Weaving : 40 cent. per metre or $3\frac{1}{2}$d. per yard.

Price paid to woman for Weaving: 17 cent. or $1\frac{1}{2}$d. per yard.

Number of Warp Threads : 6200.

Width of Fabric : $22\frac{3}{4}$ inches.

Warp : (Chaine) French.

Shute : (Trame) Cotton.

Quantity Loom can Weave per day : 15 metres or 16 yards 1 ft. $4\frac{1}{2}$ inches.

Speed of Shuttle per minute : 120 to 140 strokes.

Cost of Loom : B16 lisses. francs 1015 or £40 10s. 0d.

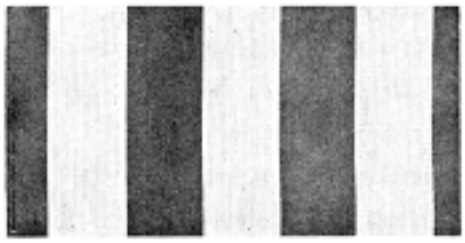


Fig 14.

No. 14.—PEKIN.

A dress or trimming cloth in broad $1\frac{1}{2}$ in. stripe of red satin and cream rep alternating.

Number 14, fig. 14.

Name of Cloth : Pekin.

Price charged to Manufacturer for Weaving : 1 fr. 10 cent. per metre or $9\frac{5}{8}$d. per yard.

Price paid to woman for Weaving : 35 cent. or $3\frac{1}{16}$d. per yd.

Number of Warp Threads : 13240.

Width of Fabric : 3 ft. 11 ins.

Warp : (Chaine) French.

Shute : (Trame) China.

Quantity Loom can Weave per day: 8 metres or 8yds. 28ins.

Speed of Shuttle per minute : 110 strokes.

Cost of Loom : H16 lisses. francs 1225, or £51 os. od.

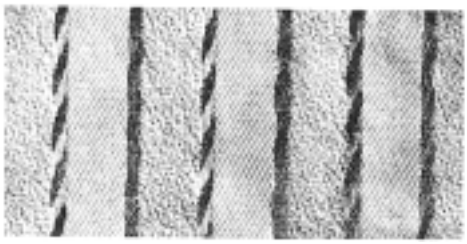


Fig. 15.

No. 15.—PEKIN NOUVEAUTÈ.

A rich and very pretty cloth in ribbon-like form, $\frac{1}{4}$ inch stripes of azure alternating with $\frac{1}{4}$ in. dove stripes of twill, each stripe separated by raised chain-like borders in two colours, giving it a corded appearance.

This being a new style its cost of production had not been ascertained.

Number 15, fig. 15.

Name of Cloth : Pekin Nouveauté

Price charged to Manufacturer for Weaving : not ascertained.

Price paid to women for Weaving: not ascertained
Number of Warp Threads: not ascertained.
Width of Fabric: 19⅝ inches.
Warp: (Chaine) French Silk.
Shute: (Trame) Japan.
Quantity Loom can Weave per day: 12 metres or 13yd. 6in.
Speed of Shuttle per minute: 90 to 100 strokes.
Cost of Loom: 16 lisses. francs 1015 or £40 10s. 0d

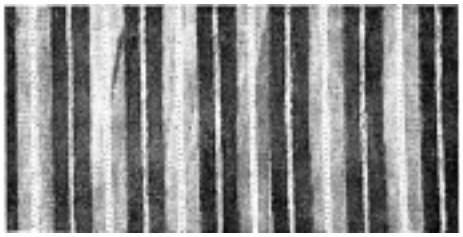


Fig. 16.

No. 16.—PEKIN VELOURS.

This is a very ingenious trimming, Pekin in stripes of maroon velvet with a gold velvet line in the centre of each stripe, alternated by stripes of dark blue open rep with a pale blue serrated line down the centre of each. The stripes are $\frac{8}{10}$ of an inch wide. The velvet appears perfectly regular and properly cut. The shute is cotton. A thick fabric and very handsome.

Number 16, fig, 16.
Name of Cloth: Velours. Pekin.
Price charged to Manufacturer for Weaving: not ascertained.
Price paid to woman for Weaving: not ascertained.
Number of Warp Threads: not ascertained.
Width of Fabric: not ascertained.
Warp: (Chaine) Silk.
Shute: (Trame) Cotton.
Quantity Loom can Weave per day: not ascertained.
Speed of Shuttle per minute: not ascertained.
Cost of Loom: 2400 francs or £96 0s. 0d.

No. 17.—VELOURS.

The only particulars ascertained are that this velvet is woven in power-looms, six widths at once, that is, three breaths in each loom face to face, which when cut make six.

The Warp (Chaine) is Silk.

The Shute (Trame) is Cotton.

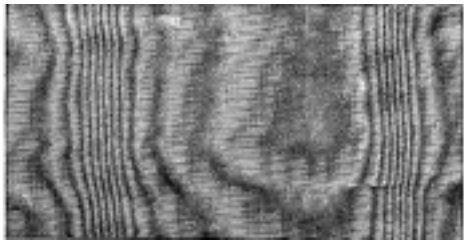


Fig. 18.

No. 18.—MOIRÉ ANTIQUE.

A weighted black silk watered by the heavy pressure of an immense stone moiré machine. Excellently woven and well watered.

Number 18, fig. 18.

Name of Cloth : Moiré Antique.

Price charged to Manufacturer for Weaving : 60 cent. per metre or $5\frac{1}{4}$d. per yard.

Price paid to woman for Weaving: 20 cent. or $1\frac{3}{4}$d. per yard.

Number of Warp Threads : 4100 double threads.

Width of Fabric : $19\frac{5}{8}$ inches.

Warp : (Chaine) French.

Shute : (Trame) French.

Quantity Loom can Weave per day: 24 metres or 26yds. 1ft.

Speed of Shuttle per minute : 90 to 100 strokes.

Cost of Loom : B 16 lisses, francs 1015 or £40 10s. 0d.

No. 19.—BENGALINE.

This is a kind of poplin, silk warp, woollen weft in steel blue of medium thickness. Great attention is being paid to the weaving of Bengaline in Lyons both in thick and very thin delicate qualities for dress. Dublin should look out as their old fashioned looms are in comparison to those of Lyons a thing of the past. This make of

cloth was also formerly called Taffeta. The name "Poplin" is said to have been derived from the papal cloth made at Avignon where this mixed fabric originated and was no doubt worn by the Pope who then resided there.

Number 19.

Name of Cloth: Bengaline.

Price charged to Manufacturer for Weaving: 45 cents per metre or $3\frac{5}{16}$d per yard.

Price paid to woman for Weaving: 19 cents or $1\frac{11}{16}$d per yd.

Number of Warp Threads: not ascertained.

Width of Fabric: not ascertained.

Warp: (Chaine) not ascertained.

Shute: (Trame) not ascertained.

Quantity Loom can weave per day: 13 metres or 14 yards $9\frac{1}{2}$ in.

Speed of Shuttle per minute: not ascertained.

Cost of Loom: B 16 lisses, 1015 francs or £40 10s.

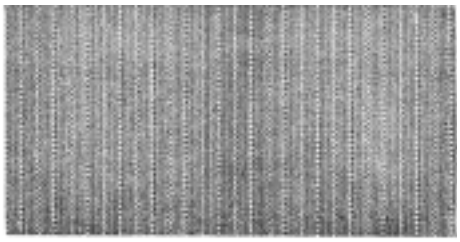


Fig. 20.

No. 20.—TROUSERING.

A thick material for Men's trousers chiefly cotton with narrow blue silk stripes.

Number 20, fig. 20.

Name of Cloth: Trousering.

Price charged to Manufacturer for Weaving: not ascertained.

Price paid for Weaving: not ascertained.

Number of Warp Threads: not ascertained.

Width of Fabric: not ascertained.

Warp: (Chaine) not ascertained.

Shute : (Trame) not ascertained.

Quantity Loom can weave per day 11 metres or 12 yards.

Speed of Shuttle per minute : not ascertained.

Cost of Loom: B 16 lisses. 1015 francs or £40 10s

Fig. 21.

No. 21.—MOIRE ANTIQUE.

In rep and figured Satin stripes, dress silk. This is a sample of hand-loom weaving, but which I am assured by the Chantiers de la Buire, can be better made by a special loom of their construction which takes up with the compensator perfectly "enroulement direct avec compensateur parfait." Their looms make Moirés, French and Alsaciennes, and they inform me that they would be glad to weave a warp for any English Firm who would desire to send them one. To weave by power-loom a tissue conformable in every way with this sample it would be necessary to have a one-lat loom which would cost 775 francs, or £31 4s. 6d. without the jacquard arrangement.

Number 21, fig. 21.

Name of Cloth : Moiré Antique.

Price charged to Manufacturer for Weaving : 60 to 69 cents per metre or $5\frac{5}{16}$d. to $5\frac{11}{16}$d. per yard.

Price paid to Woman for Weaving : 20 to 22 centimes per metre, or $1\frac{3}{4}$d. or $1\frac{11}{16}$d. per yard

Number of Warp Threads : 4320.

Width of Fabric : 97 centimetres.

Warp : (Chaine) not ascertained.

Shute : (Trame) not ascertained.

Quantity Loom can Weave per day : 16 to 18 metres or 17 to 19 yards.

Speed of Shuttle per minute : 110 strokes.
Cost of Loom B. taconic. 775 francs, or £31 4s. 6d.

VARIOUS UNDESCRIBED FABRICS.

These consist of:—

(*a.*) Cheap thin black silk for cutting up and lining purposes. Warp, raw-silk ; Shute heavily weighted souple.

(*b.*) White thin twill lining cloth, boiled-off warp and Shute.

(*c & d.*) Cheap thin cream and green cotton-back satin for linings, highly glazed finish.

(*e*) A thin bengaline for pieced-yeing, woven in the grey, warp yellow-gum raw-silk. Shute, 1 thread fine wool.

(*f.*) Shot silk blue-grey warp and scarlet weft.

(*g. & h.*) Very fine rep plaid cloth four colours beautifully woven.

GROS-GRAIN containing 17,000 warp threads. Price charged for weaving, 4 francs 50 centimes per metre. The organzine is generally weighted 50 per cent, equal to 24oz. dye, and the shute 200 per cent. equal to 32 oz. dye, both dyed on the boiled-off silk.

VELVETS.

I saw Velvets and Plushes woven in power-looms at this establishment, and at another house six widths at once, that is, three breadths in each loom face to face, which when cut make six ; but all good velvets are woven in hand-looms, and it is only those velvets whose value is below 6½ francs per metre that are woven by power-looms.

WINDING & WARPING MACHINES

Their quill-winding frames wind about fourteen to twenty quills at once, and are very elegant machines.

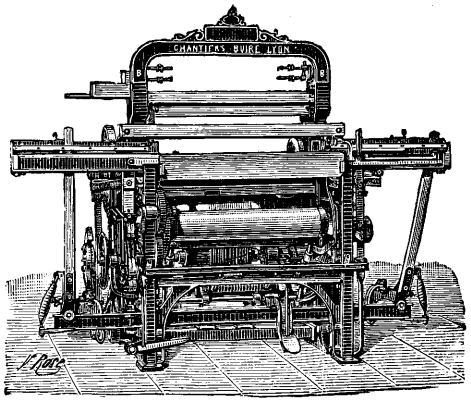
The winding frames for soft-silk winding are also very elegant, of two reels, the lower one sliding in a groove and accomodating itself to the varying strain on the skein. I have always thought that this method which is universally used in France, Germany and Switzerland, is much superior to the more rigid English method. The warping machines were of good firm construction. The large reels were

horizontal, and not vertical like the old-fashioned English ones. Those I saw working were warping raw-silk of from 11 to 13 deniers. The Chantiers de la Buire have issued two brochures, descriptive of their improved looms, one on looms "à deux et à trois lats suivé dit pique-pique," and the other on their velvet looms. Translations of both will appear in the News Committee's reports of the *Leek Post* in due course. There are also other highly celebrated houses in France for power-loom construction, whose names may be ascertained by reference to their advertisements in the *Bulletin des Soies et des Soieries*, *The Moniteur des Soies*, and *The Moniteur du Tissage*, all published at Lyons, and regularly obtained by this Association for translation and for the use of members. Most of the fabrics I saw being woven were in plain colours or "uni," which, of course constitute by far the greatest bulk of the Lyons trade, whether in all silk or mixed fabrics; but, as I have stated, some of the looms were weaving beautiful figured brocades, brocatelles, damasks, velvets rayée, glacé or shot-silks, now very fashionable in twill and printed upon, and even thick trousering-stuffs, samples of which can be seen at my office, and the office of the Secretary, or can be sent to any member for examination.

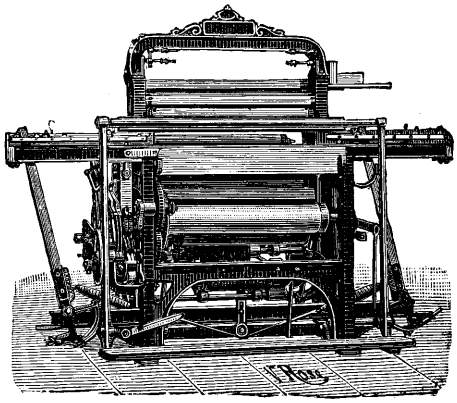
To a few of the more advanced of our manufacturers the information in this paper may perhaps not have much, if anything in it that is new, but even of these I doubt whether they may be fully aware of the high speed at which these looms are being worked with such excellent and regular results, giving a surprising rapidity of production which has been only arrived at by progressive improvements, modifications and developments in the construction of the looms themselves. That these progressive improvements do actually occur is proved by the fact of the Chantiers de la Buire looms, now producing more regular and perfect work at a higher speed than was possible in their looms at work in the Paris Exhibition of 1889, where they excited so much European attention.

I should be sorry if I should be understood in anything I have stated to undervalue the excellences of our British silk power-loom construction, which, during recent years has also been very much improved; but when we look back for only a very few years, and find

all the silk weaving of France, Germany and Switzerland then done by handlooms, which, except in the case of the higher class and more artistic fabrics, are being rapidly discarded and replaced by the power loom in all these countries, I may perhaps be excused for calling the attention of power-loom makers, of manufacturers, and not least, of the workpeople, to see that we, as the greatest machine constructing country in the world, are not the last to bring our looms to the highest state of perfection required by such a competitive age to the more perfect production of silk yarns and fabrics, and in possessing all the labour economies so highly necessary to hold our own, to recover our almost lost silk industry ; as also to take our part successfully in the great economical contest now raging between the Continental countries I have mentioned, and in which we must also now include Italy which has of late years become a serious factor of competition even against Lyons herself.



Perfected Loom System, Laisserson, made by the Compagnie des Fonderies, at Forges de l'Horme, Chantiers de la Buire Lyons.



Perfected Loom System, Laisserson, made by the Compagnie des onderies at Forges de l'Horme, Chantiers de la Buire Lyons.

NOTICE OF THE

POWER-LOOMS

OF THE

CHANTIER DE LA BUIRE,

AT LYONS.

LAESERSON AND WILKES' SYSTEM PERFECTED.

In the month of June 1884, M. Laeserson, of the firm of Laeserson & Wilkes, of Moscow, came to Lyons showing a new loom of his own invention. This Loom, two specimens of which were working during two months in a room in the street Bâs d' Argart, attracted much interest from many competent observers, and we cannot record the impression produced upon them better than by quoting selections from the report presented by M. Emery, in the name of the Chamber of Commerce of Lyons, to the Minister of the Interior.

"This new Loom is an instrument of precision, of relatively small compass, and low price, and it will, like the Sewing Machine, take its place in numerous families without any expenses for erection. With this Loom can be woven all textiles, such as silk, wool, cotton, and linen fabrics, in both plain and fancy cloths and all in widths, with a finish unequalled and with a rapidity scarcely surpassed by the very best power looms. The Jacquard Machine can be applied to it with the same advantageous results. The annual value of fabrics produced in France surpasses a million in value, and this loom will become a necessity in the future for those producers who are anxious to lighten labour."

The attention of the Company, "Chantiers de la Buire," was at once drawn to this new loom, and they conceived the idea of establishing at Lyons, (where up to this time no Loom-making establishments existed) a centre for the construction of Looms and especially for a perfected type of this new Loom.

After some consultation with M. Laeserson an agreement was entered into by which the Company, " Chantiers de la Buire," acquired the sole right of supplying the Laeserson Loom in France and Italy, and afterwards in Germany, Belgium, Spain and America.

The Chantiers de la Buire at once put themselves to the work with great activity, the new Loom was studied and perfected in various parts, resulting in the creation of a tool the precision of which left nothing to be desired, and the first pedal Looms left their factory in December, 1884.

But although the working of these Looms was good they had not much success in Lyons, owing to the general tendency there being towards a further development of the power Loom.

The German government however stirred itself in the matter, and at once voted funds which enabled the School at Crefeld to order a complete series of the Looms from the Company. An important German firm caused a workshop to be fitted with these Laeserson Hand Looms for the manufacture of umbrella cloth, which worked successfully. The Looms worked at a speed of from 100 to 150 picks per minute, and made an average of 10 yards of umbrella cloth per diem, and at an extremely small cost for general charges. We believe that these Hand Looms have a future before them especially in those countries where labour is cheap.

The result of these trials convinced the company that the new Loom presented considerable advantages, and that if whilst retaining its essential elements it was transformed into a Power Loom, it would become applicable to the general industry.

After a toil of three years, the result attained has been a complete rearrangement of the Loom, and an addition made to the patent of Messrs. Laeserson & Wilkes, of several new parts which give to this Loom a special physiognomy ; thus transformed it contains a greater amount of improvements than are ordinarily seen together.

By the careful adaption and finished execution of all its parts, the new instrument constitutes a remarkable progress over the most appreciated Power Looms whether French or foreign, it resembles by its general form and by the space it occupies, the pedal Loom of 1884 ; but is much heavier, weighing about 800 to 900 kilogrammes, which insures a great stability and freedom from vibration to it.

This new Power loom which the Chantiers de la Buire offer to the Silk industry, differs essentially from other known Looms, in the following principal parts : 1st The Harness, 2nd The Dobby or Treading Motion, 3rd The Lay, 4th The Take Up Motion, 5th The Letting Off Motion, 6th The Picking Motion.

1.—THE HARNESS. (LE REMISSE.)

The Shafts are mounted in metal frames, by means of catches and a toothed rack, which permits of regulating tension of the harness, the mails of which are made of bronze. On account of the precise motion of the shafts in the guiding grooves, which retain a rigid perpendicularity without any possible rocking, the warp thread passes through the mail eye, without being either stripped or fettered by the friction or the over-riding of the mails, as in a harness simply suspended.

This class of harness offers the following advantages over those whether mail harness or with eyes in the twist of the ordinary make :—

It never requires to be turned.

By being made of silk or dressed double cotton and having a very small mail it prevents all hurtful friction on the silk warp thread.

By being held in a fixed position in the metal frame it does not produce crowding nor unequal lifting of the warp threads, as is often met with when employing an ordinary harness.

It receives its movement direct from the dobby or treading motion and a stretch of 40 millimetres at the first shaft suffices for the passage of the shuttle; these two properties constitute an important advantage, as they permit of the weaving of inferior materials without tendering, straining or splitting the threads, at a speed which has not up to this time been possible on any power loom.

Through the use of doubled cotton in the fabrication of the harness, the weaver can pass his hands amongst the mails without the latter being deviated from their position.

The leashes for the edges are seperate from the body of the harness, and work independently of the rise and fall of the shafts. They produce irreproachable edges.

As however the employment of the harness with eyes in the leash is more general than of the mail harness, the Company have produced a type of loom which will take either the one or the other.

With this new type the ordinary harness partakes in a great measure of the advantages of a mail harness, and whilst being fixed in a frame which gives excellent guidage it possesses a tension which is variable at will.

2.—THE DOBBY OR TREADING MOTION. (MÉCAMNE D'GARNSULE.)

The dobby is of the chain type and is placed in the loom. A large number of cards can be used with it without encumbering the loom.

It has in common with all chain dobbys, cams holding the shafts raised during several consecutive insertions of the weft according to the number of picks required by the draft.

The curvature of these cams is so arranged that the stroke of the lay can be made at will, either with open, closed or mixed shed. For plain cloth or for faille these cams are replaced by others working rise and fall, and causing the treadles to dwell for a moment as the lay strikes the fell of the cloth.

The frame carrying the dobby has a transverse movement of several inches, permitting what is called a grouping to be made use of, so that a dobby of sixteen shafts can be tied up in two drafts of eight shafts, and produce a fabric with weft stripes. This dobby acts directly upon the frames without any intermediate cords or wooden levers, giving to the movement of the warp a precision unattainable in any other loom.

3.—THE LAY. (LE BARRANT.)

The lay is of wood bound with iron, and arranged to receive the special shuttles (Novettes à Conducteur).

Two springs with regulating tensions are placed in the lower part of the boxes, softening the return movement of the pickers and deadening gradually the shock of the shuttle through acting upon it to the end of its course.

The connecting rods which give motion to the lay from the driving shaft are so arranged that this lay is at rest during the passage of the shuttle and has an accelerated motion during the remainder of the stroke. The blow given under these conditions is the same as that of a free lay.

The lay is also furnished with a clapper or reed holder the sensibility of which can be regulated by the tension put upon the springs at will, it has also an apparatus acting on the take-up motion, rendering it a compensating motion according to the thickness of the weft thread. The lay can also be arranged to receive an automatically inclined reed, with a possibility of variation within a large angle, and which permits the weaving of crapes, grenadines, straight gauze, and in fact all fabrics requiring this system of manufacture.

4.—THE TAKE-UP MOTION.

(LE RÉGULATEUR.)

The take-up is positive, that is to say the cloth advances in constant proportion at each insertion of the weft. The rolling-up is direct as the take-up works directly upon the cloth roll without the intervention of a sand roll, a compensation motion giving the correction rendered necessary by the increasing diams. of the cloth roll when filling with cloth.

By the simple regulation of a slide upon a graduated scale, any degree of wefting pick by pick can be given from thirty-five even to one hundred and eighty

picks per inch, without the need of a single change position, no other take-up motion offers a like simplicity. It is worked by two levers arranged in a special manner, which by their alternate movement transmit a continuous motion to a worm wheel on which depends the progressive rolling-up of the cloth.

The compensating motion is obtained by varying the angle of oscilliation of these levers, by means of a cam which diminishes this angle proportionaly to the thickness of the cloth roll, it works with a mathematical exactitude, and preserves the count of the weft (picks per inch) absolutely constant from the commencement to the end of the piece, no matter what the length may be.

The take-up does not produce any jerking on the cloth roll, and it holds it still at the moment the lay strikes the fell of the cloth and it follows therefore that the bedding of the weft takes place under excellent conditions.

The take-up can be made differential, in this case it only rolls up under the blow of the lay a quantity of cloth proportionate to the thickness of the weft inserted, it ceases to work if the shuttle is running empty.

This distinctive trait of the hand-loom of Laeserson and Wilkes can be retained in the power-loom of the Chantiers de la Buire in the fabrication of certain cloth.

5.— THE DELIVERY OR LET-OFF MOTION. "LA BASCULE."

The let-off motion is that of Laeserson & Wilkes, exercising a constant and regular traction upon the warp. The automatic releasing of the counter weights takes place without jerking and without any cessation of the tension on the warp, thus giving all the advantages of the ordinary bell weighing without the inconveniences. It does not produce cracks or stripes in the fabric, due to the dampness or dryness of the ropes as in other let-off motions, but on the contrary gives to the cloth a silky feel and a brilliant appearance obtainable now only in articles made on the hand-loom.

6.—THE PICKING MOTION. "LA CHASSE."

This motion is underpicked with swords and can be regulated whilst the loom is working, it does not require any lubrication which might injure the lay or soil the cloth as is frequently the case with other systems.

The shape of the picking cam is so constructed that the shuttle is sent outside the looms with a progressive motion. It has the advantage of gently stretching the weft at the commencement of the stroke and of not injuring it by plucking. The weft being well laid receives the blow of the reed fairly, which perfectly unites it

with the warp, and gives mellowness and pliability to the cloth. For certain very delicate fabrics the spring picking motion of Laeserson & Wilkes may be retained.

From the description of the principal parts of the new loom shown by the Chantiers de la Buire one can understand the considerable advantages which should result from the reunion of their respective qualities.

The harness acting in so delicate a manner upon the silk permits of working cloths of fine high counts and also those composed of inferior qualities. It prevents splitting and the breaking of threads, and allows of the silk retaining all its beauty and strength.

The dobby being able to work with an open, closed, or mixed shedding motion can also receive a large quantity of cards without encumbering the loom. Its direct action upon the harness permits of a very high speed.

The lay by its dwell at the moment the reed strikes the cloth and through its long bones being furnished with brakes, facilitates the delivery of the weft under a constant tension.

The take-up motion gives a regular number of picks from the commencement to the end of the piece, and the advantage of being able to make it a differential motion renders the loom applicable for articles which ordinarily could only be made on a loom with a free reed.

The let-off motion by the regular tension which it exercises upon the warp, has a great influence upon the nature of the tissue, it gives to the cloth woven on this power-loom a feel and mellowness never to be obtained on the hand-loom.

The picking motion by the gentle and progressive stroke given to the shuttle gives time for the weft to be delivered in the shed without dragging or plucking.

The faculty of being able to weave with an ordinary harness or a mail harness.

The power-loom of the Chantiers de la Buire offers therefore very characteristic advantages. It augments the daily product of the workman in a considerable degree, which is from 25% superior to that of the best known looms, it can be used for the better kinds of work with as much success as the old hand-loom, it admits of using the most varied kinds of threads, silk, wool, cotton and mixtures as well as inferior and heavily weighted silks.

Its normal speed varies from ninety to two hundred picks per minute according to the fabric and it can easily be made to attain a speed of two hundred and fifty, for instance, Faille and stuffs of high counts can be woven at a speed of ninety to one hundred and twenty picks per minute according to the article. 60 to 80 picks per minute for ribbons is the usual rate.

Satin merveilleux, and all satin faced tissues with either discharged or souple weft can be advantageously made at a speed of one hundred and fifty picks per minute. Gum silk warps shot with cotton can easily be woven at a speed of from two hundred to two hundred and fifty per minute.

The Chantiers de la Buire construct a loom worked by hand-rail and foot treadle on the same system, possessing all the improvements mentioned above, and consequently much superior to the first type of the loom made in 1884 by Laeserson & Wilkes.

Its advantages can be summarised as follows :—

The extraordinary simplicity of all the parts and the easily regulated tension on the warp.

The easy rise and fall motion of the harness.

The motion of the lay and the regularity of the stroke.

The proportionate speed of the shuttle whether the loom be driven quickly or slowly.

The easy motion of the shuttle.

The being able to use either roller or glide shuttles.

The shuttle protector stopping the loom when the shuttle is trapped.

The easy change of harness, treadles or cards in order to alter the tie.

The possibility of working with either open, closed, or mixed shed.

The passage of the warp threads rendered easy.

The great control over the warp threads.

The small quantities of threads broken during weaving.

The loom represents the greatest amount of progress accomplished for some time in any machine.

Discretion prevents our giving the names or testimonials of the French firms, and particularly those of Lyons, who have tried and now make use of our looms. All recognise that our looms work with a superior regularity to any other, and that their powers of production are considerable even on the most delicate fabrics, at the same time preserving to the cloth its beauty and giving it a feel and softness not otherwise obtainable.

It is unanimously recognised that for an equal weight of silk it gives a superior cloth to that of any other loom.

In conclusion we wish to call attention to the fact that the Chantiers de la Buire possess a room in their works devoted to experiments, where all kinds of fabrics both plain and figured are being made, and that they put the looms at the disposal of any firm that wishes to make a trial. We are able to affirm without fear of contradiction that the general working expenses on the new power-loom of the Chantiers de la Buire are almost nil, that it renders eighty per cent of its speed in production, and that the fabric it produces leaves nothing to be desired.

A NEW LOOM FOR NARROW GOODS.

Abridgement of the Textile Recorder's translation of the description of this Loom in L'Industrie Textile, No. 80.

The loom is the invention of a Mr. Charles Kane of America, and is offered to the public by the firm of Messrs. Biernatzki & Co., of Hamburg, who undertook its introduction into Europe. It is made by the Chemnitzer Strickmaschinen Fabrik, at Chemnitz (Saxony), Zschopauerstrasse 60. It is patented by all European States. The English Patents are No. 5774 and No. 16,973.

The peculiarity of the new system consists essentially in the application of rotating cams furnished with curved grooves for the purpose of putting in motion the harnesses, by means of which textures of great variety can be produced with great rapidity. The cams fit on to vertical shafts, which can be made to turn with equal or different speed, and into the grooves of these cams pivots of movable levers are travelling, the opposite ends of which are attached to the harnesses, thus causing the up and down motion required for forming the shed. For producing any desired pattern it is only necessary to put a certain number of cams with curves, cut to meet, on to the shaft. Besides, the pattern can, at any time, be easily altered by either changing the cams, or making the two shafts, on which the cams are deposited, turn with different speed. A still greater variety of patterns can be produced by employing two or more shafts, fitted with cams, as above, one of which has to operate independently of the shuttle and reed mechanism; in fact, the greater the number of cams employed, with their respective harnesses, the greater is the variety of patterns that can be produced.

The driving mechanism, in all its details, is shown in figs. 1, 2, and 3.

The loom is built with six shuttles, separated in divisions of two and two by partitions, A, secured to the basis B. These so-formed three divisions contain two vertical cam shafts C and E each, as represented by figs. 1 and 2, the same receiving their impetus from the main shaft A (Fig 1), through the intermediate shafts B and D, and the conical cog-wheels fixed on to them. The extreme ends of the levers (Nos. 1-20) governing the harnesses, are fitted with small rollers, gliding in the grooves of the cams E 1-10 and E 11-20, when the mechanism is in motion.

For greater distinctness these latter cams are only visible in Fig. 3. The levers above mentioned are arranged in alternate succession on both sides of the cams (Fig. 2), and pivoted to the connection pieces G. When the cams C and E are turning round, the harnesses S, which slide in a frame S1, are moved up and down by the connecting levers 1 to 20, which, guided by their end rollers in the cams, are following the course of the curved grooves C and E, and thus a texture of the desired pattern is obtained.

The shuttle with the filling thread receives its impulse from the other vertical shaft C (Fig. 1). A conical wheel C2, at the end of the cam shaft, transmits the rotative motion by means of another conical wheel G1 (Fig. 2) to a horizontal cam shaft S3, destined to give impetus to the shuttle. The lever S, pivoting upon the pin S2, slides, guided by a roller, in the curved groove of S3, and receives by its rotation a horizontal swinging motion, thus causing the shuttle to move to and fro as desired.

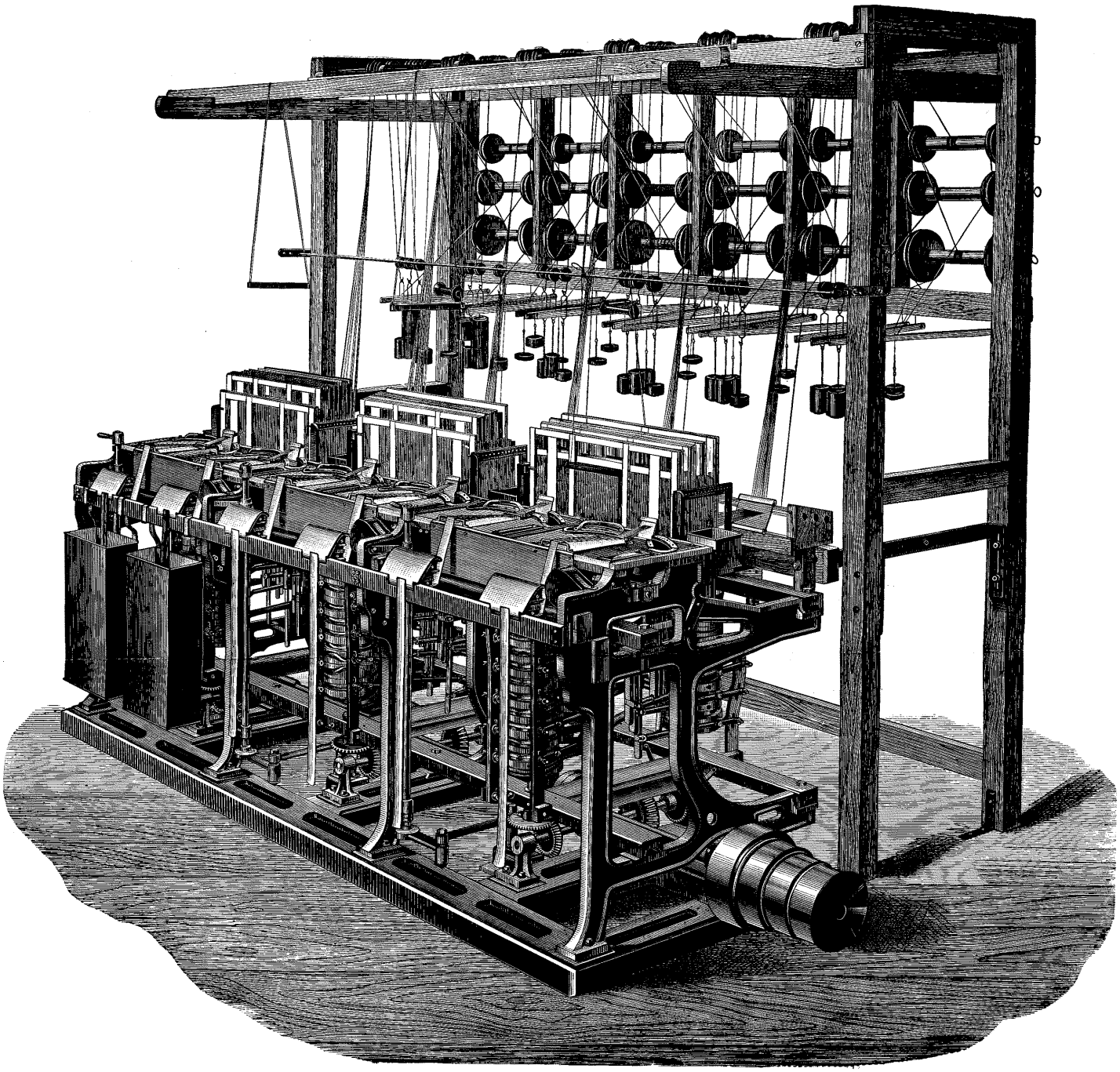
The swinging motion of the beater F with reed F2 (Fig 1) beating the filling-in place, is impulsed by the shaft G, through a rotative motion of shaft F4, assisted by a pair of cog-wheels F5 and F6 (Fig 2). On this shaft F4 a cam F3 is fixed (Fig. 1), the same being furnished with a curved groove on its side, destined to guide a roller fixed to a lever (not visible in the cut) attached to the rotating shaft F. The roller sliding in the curved groove imparts a to-and-fro motion to the aforesaid shaft, in which the beater F participates. The "taking-up" of the ready fabric W as it glides out from between rollers R, R2 and

R3 (Fig. 1) in the direction of the arrow, is automatically performed by the regulator U1, U2, in conjunction with eccentric U3. As said before, the principal impetus for putting all shuttles of this loom in activity, emanates from the main shaft A. An arrangement has, however, recently been made that by applying an intermediate driving mechanism (not visible in the illustration), each pair of shuttles can be made to work independently of the rest, as well as to run with greater or lesser speed, as the quality of the material may require. This fact offers various advantages, hitherto unknown, over all the old looms, one of which is, that with each pair of shuttles an article of different style and quality can be made.

Besides this, it is not any more necessary to rig up all the warps in the loom before work can be commenced, but directly after the first two warps are put in, the respective shuttles can be put in motion, the rest following in course. By this arrangement it is likewise not any more compulsory to work off all the warps before new work can be commenced, but a new warp can be put up directly after the warps of two combined shuttles are run out. The easy mode of putting the loom in and out of operation offers another advantage when occasionally small lots are required to be made. In such cases the warp can be easily removed and put aside for later use after the desired small quantity has been made.

Manufacturers may perhaps be surprised that the new loom is built with six shuttles only. However, these six shuttles, when producing ribbon in widths of from 1⅜in. upwards, besides offering all the advantages enumerated in the foregoing statement, are capable of turning out a greater quantity of fabricthan the old looms of 18, 24 and 30 shuttles, and this not only because it can be run with three and a half to four times the speed, but also because it reduces the loss of time caused by breakage of thread and supplying the shuttles with fresh bobbins toa mere minimum, considering that in such cases, the old loom has to be stopped entirely, while with the new loom only that division is stopped in which the accident happened, independently of the others, which are working on all the time.

The fabric turned out is perfect in texture and shows a remarkably fine edge, much superior, in the opinion of the proprietors, to what can be produced on the old loom.



THE NEW AMERICAN LOOM FOR NARROW GOODS.

SEE BLOCKS FOR FIGURES 1, 2, 3.

Foldout rotated 90° to fit on page.

Owing to a statement having been made to me that this loom could be run at a speed of 1500 picks a minute, and was so running at the Crefeld Weaving School, Rhenish, Prussia, which seemed a very high speed; I wrote to Messrs. Biernatzki & Co., and they informed me that in the Weaving School at Crefeld, a mistake had been made in adjusting the pulley, and owing to this fact it happened that the loom unexpectedly was speeded at 1,500 picks per minute, and there was no breakage whatever or damage to the ribbon.

A speed like this would never do in practice, the movement of the shuttle being fully out of control.

IMPROVED JACQUARD MACHINE

of Messrs. Jules Verdol & Co.

Messrs. Jules Verdol & Co., of Boulevard Ménilomontant 120, près la rue Oberkampf, Paris, are the Inventors of a very important modification of the Jacquard Machine which they have patented. It is a cylinder machine for the substitution of card paper in the Jacquard Loom.

It can be used with every kind of Jacquard loom for patterned fabrics of all kinds, broad and narrow, of any kinds of fibres and for all purposes.

It is fixed in the loom by means of several screws, and causes no change in the loom, except the suppression of the cylinder which supports the cards, in such a manner that to weave with the cards, it is sufficient to unscrew the apparatus and to replace it by the cylinder.

The new modifications remedy the inconveniences resulting from the influence of temperature on the paper prepared for the Jacquard weaving.

This invention is receiving the attention of an increasing number of Silk power-loom weavers in England and Scotland, and is worth the most serious attention of the Silk Industry.

CONCLUSION.

I do not at all wish it to be understood that these notices of looms and jacquard improvements are in any way intended to be exhaustive. They only touch the fringe of the subject, and as I have already verified, there are excellent Silk Power Loom Makers in England, amongst whom may be mentioned:—Thomas Wilkinson, Days Lane, Coventry; William H. Gardiner, Cox Street, Coventry; Prince, Smith & Co., Keighley, Yorkshire; W. Smith & Bros., Heywood, Manchester, in addition to those I have mentioned in the text and also those which appear in the advertisements.

The object of this brochure is to press upon the attention of the Manufacturers of this country the great improvements effected in Power Loom Weaving on the Continent; great improvements even in minute details are being rapidly effected with a view of obliterating the differences and the difficulties which formerly made Power Loom Weaving appear at a disadvantage with the work of the hand-loom. Every issue of the *Moniteur du Tissage* of Lyons, announces new "perfectionments" of which probably our English Loom Makers do not fail to keep themselves *au courant.*

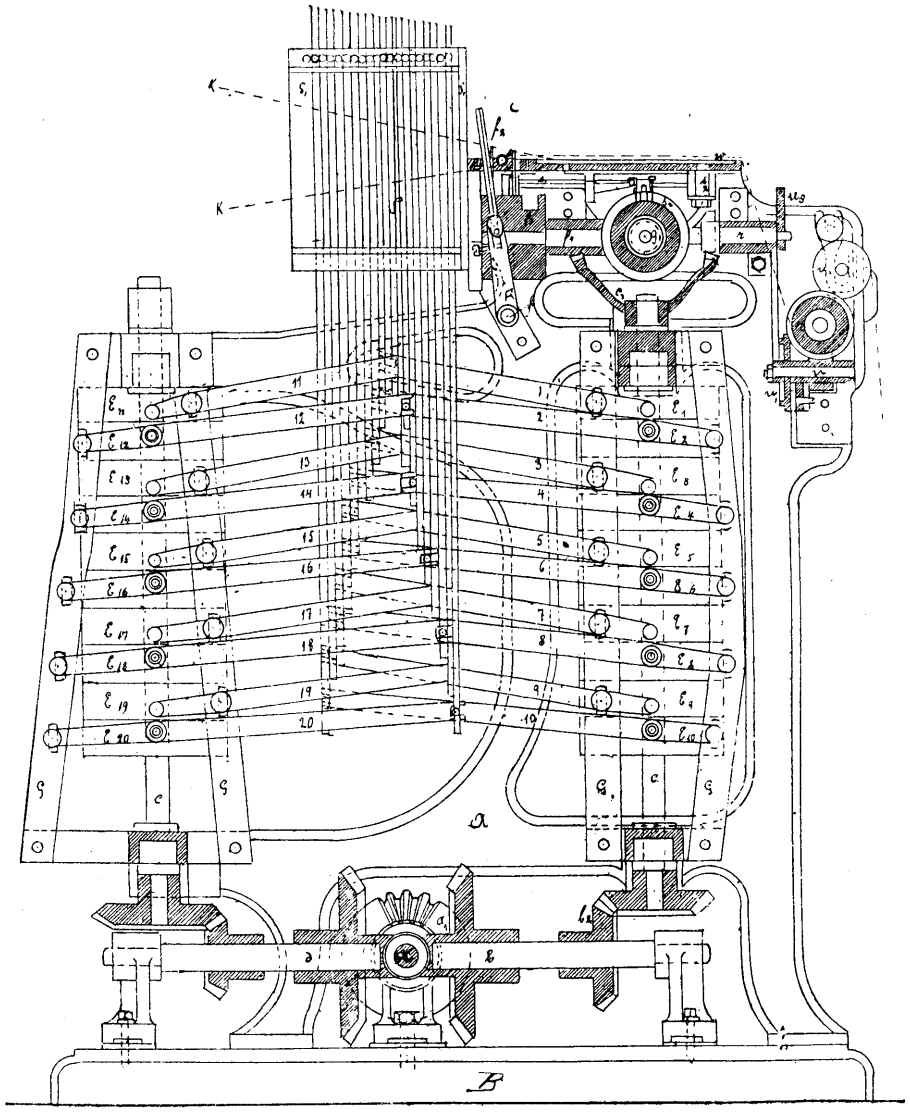


FIGURE I.

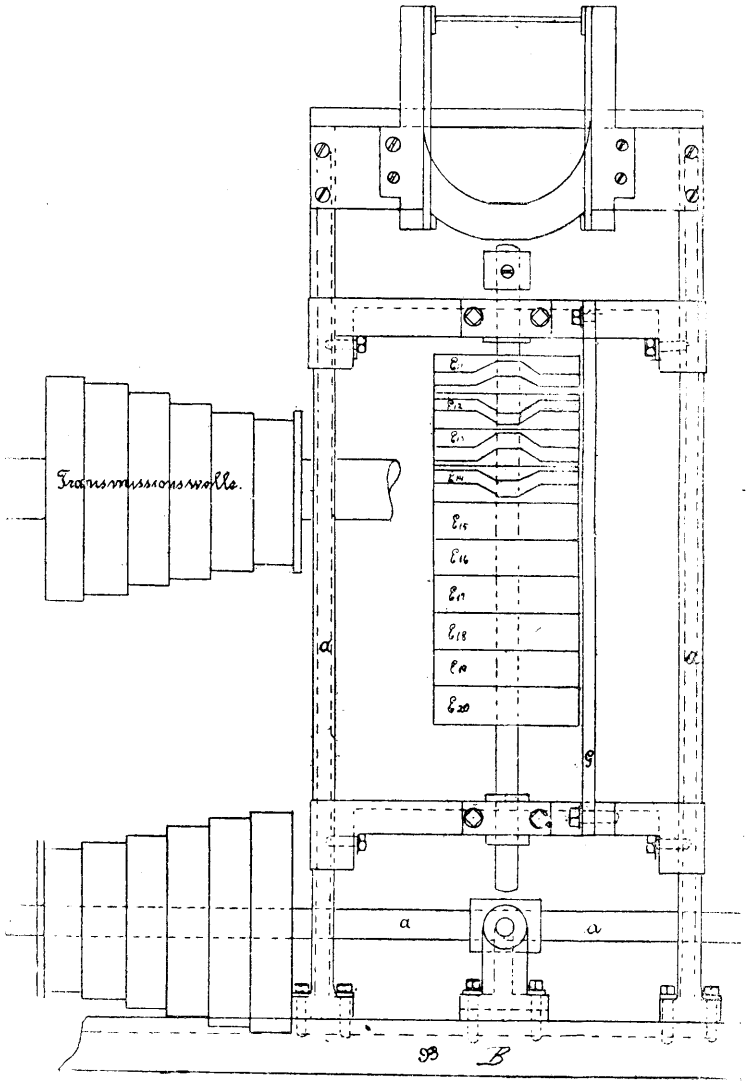


FIGURE 2.

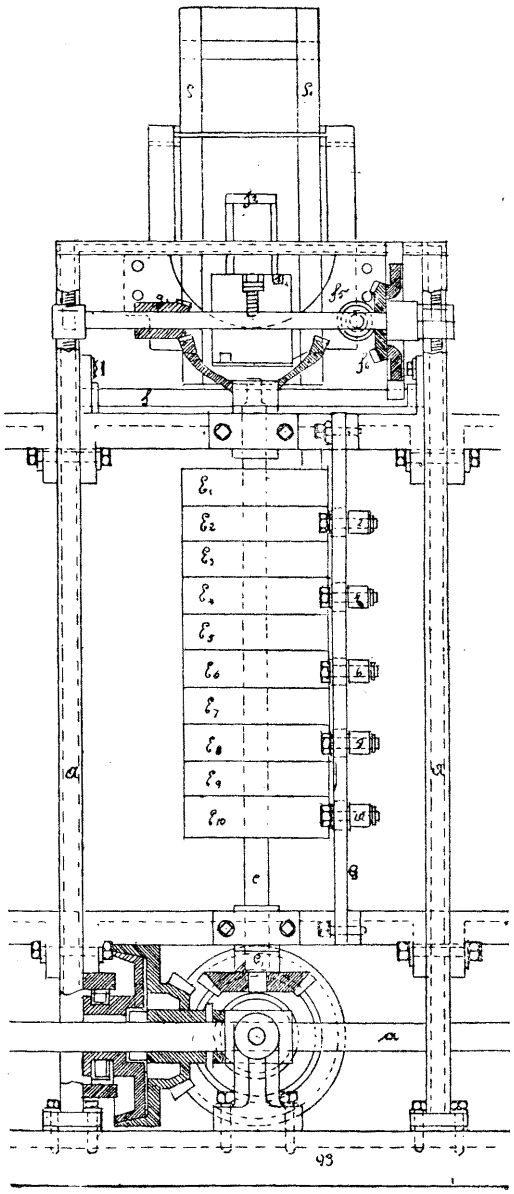


FIGURE 3.

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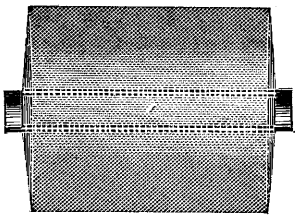

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