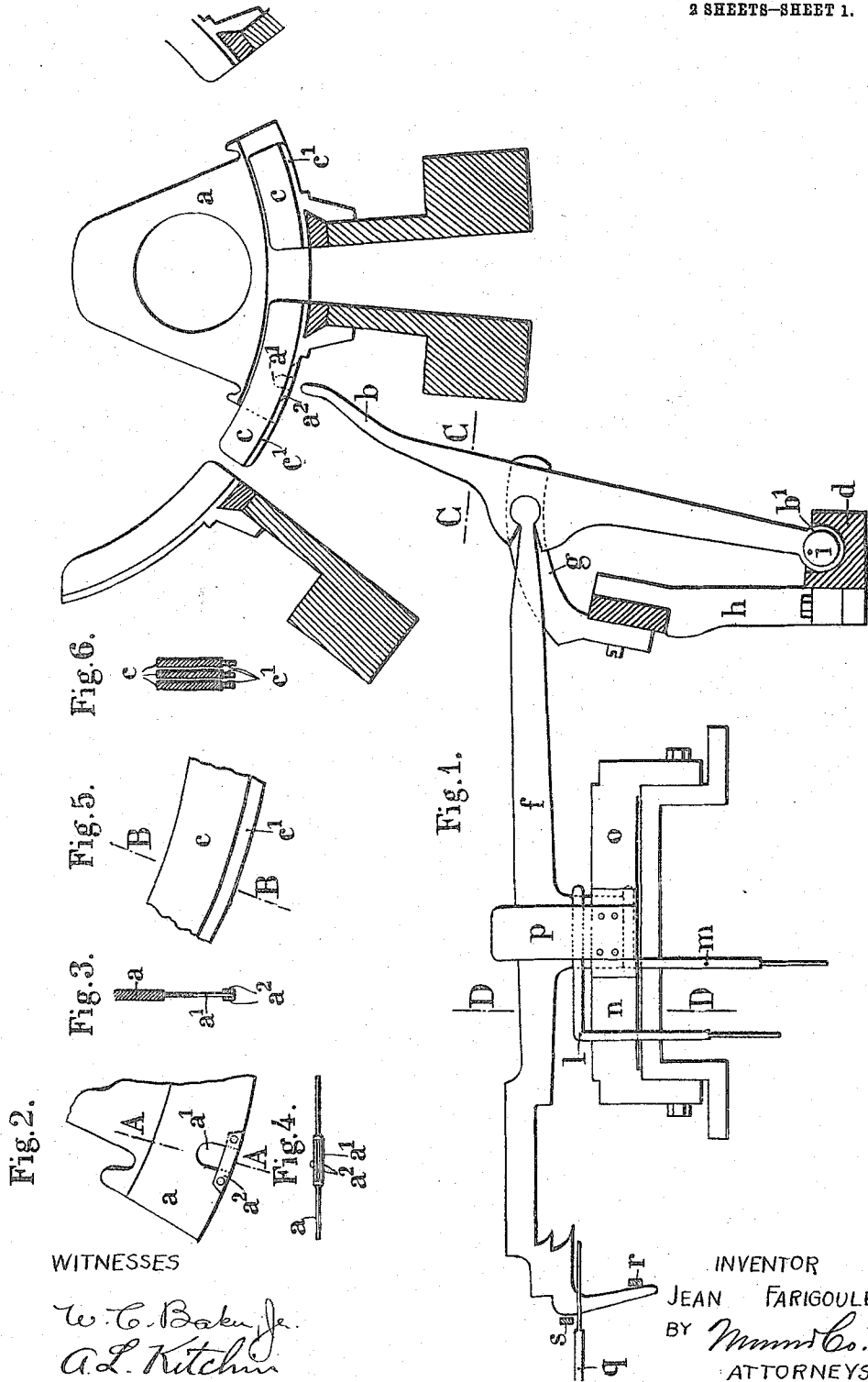


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 APPLICATION FILED JULY 1, 1913.

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Fig. 7.

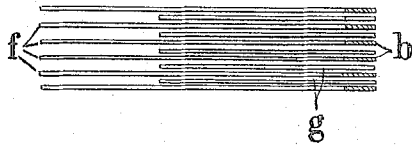


Fig. 8.

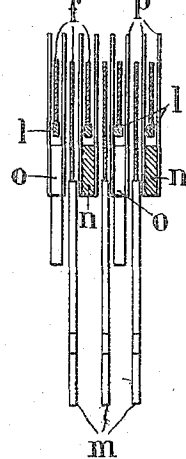


Fig. 9.

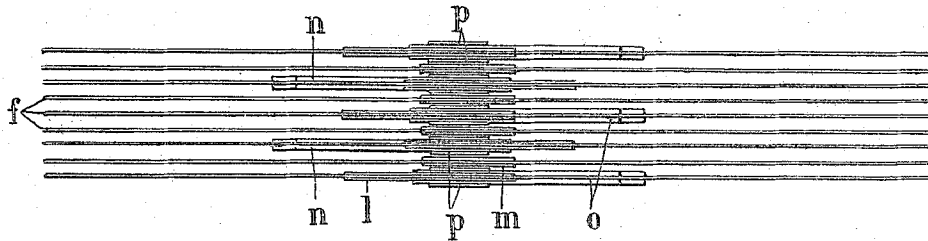


Fig. 10.

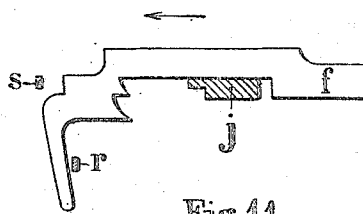
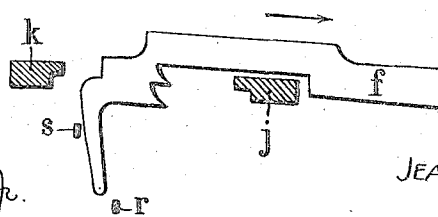


Fig. 11.



WITNESSES

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LOOM FOR THE MECHANICAL MANUFACTURE OF LACE.

1,135,782.

Specification of Letters Patent. Patented Apr. 13, 1915.

Application filed July 1, 1913. Serial No. 776,790.

To all whom it may concern:

Be it known that I, JEAN FARIGOULE, of 40 Rue des Jeuneurs, in the city of Paris, Republic of France, have invented Improve-
5 ments in and Relating to Looms for the Mechanical Manufacture of Lace, of which the following is a full, clear, and exact description.

In the specification of a pending United
10 States patent application filed May 27th, 1910, under Serial Number 563817, there is described a loom for the mechanical manu-
15 facture of lace in which the carriages are selected and brought into engagement with the catch bar which drives them, by levers
20 worked by pull rods operated at the desired moments by a special mechanism operated by a jacquard. In this loom, each carriage
has at its lower part a notch intended to
25 receive the end of a selecting lever. This notch is disadvantageous to the efficient working of the loom, because it is liable
to engage the bobbin threads over which
30 this carriage passes, when it is brought into the front comb bar and thus causes breakage
of the threads, which is detrimental to the
35 good working of the loom. Furthermore, in this loom the levers, like the pull rods, are placed side by side and their thickness is
such that each lever and pull rod shall be
40 exactly beneath the carriage which they operate. These levers and pull rods therefore always rub against each other, in their different
movements, with the result that it
45 frequently happens that a lever or a pull rod, owing to increase of the friction caused by damp, oil, rust or a small blister, carries
with it in its movement the adjoining lever
50 or pull rod when this latter ought to remain stationary.

The present invention relates to improve-
ments in the mechanism for operating the
45 carriages of this class of loom for the purpose of remedying the inconveniences above mentioned. These improvements are char-
acterized essentially by the application:
1, to the edge of the notch of each carriage,
50 of a special guiding device intended to keep the end of the lever engaged in this notch
and to prevent any discontinuity of the edge
thereof so that no hooking up of the bobbin
threads can take place. 2, of a special sys-
55 tem of comb at the points of articulation of the levers and pull rods to completely isolate these latter yet preserve their connection
with the levers. 3, of a counter comb which
isolates the pull rods toward the middle of

their length. 4, a special locking device
which insures the absolute locking of the
60 pull rods corresponding to the carriages which are to remain in the center of the loom.

In the accompanying drawing: Figure 1
shows in elevation the whole of the im-
65 proved operating mechanism. Figs. 2, 3 and 4 are detail views to a larger scale showing respectively in elevation, in vertical
70 section on the line A—A of Fig. 2, and in an underneath view, the guiding device carried by the carriages. Fig. 5 shows in elevation
and Fig. 6 in section (on the line B—B of
75 Fig. 5) the comb or comb-bar in which the carriages move. Fig. 7 is a horizontal section on the line C—C of Fig. 1. Fig. 8 is a
vertical section on the line D—D of Fig. 1.
80 Fig. 9 shows in plan means for guiding the pull rods at their central part. Figs. 10 and 11 show two positions of the pull rods in
relation to the locking device.

As is shown in Figs. 1 to 4, each carriage
85 *a* carries on the two faces of its lower edge, opposite the notch *a'* intended to receive the selecting lever *b*, two thin small plates *a*²
fixed in place for example by two rivets or
90 tin solder. Between these two small plates *a*² a space is left of sufficient size to allow the end of the selecting lever *b* to pass
through on the upward movement of the
95 same as will be seen hereafter. In order to prevent these small plates, owing to their thickness, impeding the free movement
of the carriages in the combs, which guide
100 them in their transverse movement, there is made in each of the faces of the plates *c* of the comb or comb-bar, a small longitudinal
groove *c'*, the depth and width of
105 which are slightly greater than the thickness and width of the plates *a*². By the application of these small plates *a*², the
plate which constitutes the carriage *a* no
longer presents on its lower edge any break
in the continuity thereof and therefore does
110 not hook into the bobbin threads. Furthermore the end of the selecting lever *b* once it has become engaged between the two small
plates *a*² in the notch *a'*, therefore cannot
move sidewise and become disengaged by
such movement from the carriage.

It should be noted that owing to the small
width of the small plates *a*², the upper part
115 of the notch *a'*, is not closed in at its sides, and consequently foreign bodies which might accumulate between the two plates *a*²
will be immediately discharged when the

head of the selecting lever *b* is introduced into the notch *a'*.

The selecting levers *b*, intended to bring the carriages *a* which are to be carried along into engagement either with the front catch bar or with the rear catch bar, are each formed at its lower end with a rocker foot *b'* of cylindrical form which engages a groove of cylindrical form made in a bar *d* arranged along the whole length of the loom. This bar *d* has imparted to it vertical reciprocations for the purpose of causing the ends of the lever *b* to engage at the desired moments the notches *a'* of the carriages *a* corresponding thereto and disengaging them therefrom. At their upper parts the levers *b* are engaged between the plates of the central comb *c* and are thus isolated from each other and guided by the plates. Each selector lever *b* receives its oscillatory movement from a pull rod *f* to which it is jointed. Between the levers *b* are interposed at the level of the joints of these latter with the pull rods *f*, the plates *g*, of a comb of a special form carried by a support *h* connected to the bar *d*.

The plates *g*, as is shown in Fig. 1, are of a curved shape which corresponds to the arc of the circle which is described by the points of articulation of the levers and pull rods when the levers rock upon their feet. The length of these plates is regulated so as to be slightly greater than the amplitude of the movement of these points of articulation, so that these latter remain constantly engaged between the plates of the comb *g*, in all the movements accomplished by the levers. The rocker feet of the levers *b* are also separated from each other, in the groove in the bar *d*, by small disks *i* of the same thickness as the plates of the comb *g*. By this arrangement the levers cannot rub together at any point along their length because they are separated from each other at their upper ends by the plates of the central comb *c*, toward their middle by the plates of the comb *g*, and at their lower ends by the disks *i*. The pull rods *f*, which operate the levers *b*, are likewise separated from each other by the plates of the comb *g*. These pull rods are operated, as is described in the specification of the aforesaid pending patent application, by a set of bars or beams *j*, *k* to which a to and fro movement in the transverse direction of the loom is imparted, and these pull rods are moved either toward the point or toward the rear of the loom or not moved at all according to the height which they occupy, that is to say according to the hooks they present opposite the bars or beams *j*, *k*.

The position of the pull rods in a vertical direction with relation to the bars or beams is regulated by a set of needles *l*, *m* worked by a jacquard operating mechanism and

upon which the pull rods rest as described in the aforesaid specification. The pull rods are held and guided in their vertical and to and fro movements by two combs *n*, *o*, and rest on the needles *l*, *m* in alternately long and short bearings. The first, that is to say the long bearings, engage in the intervals between the plates of the comb *n* and those of the comb *o*, and the second ones, that is to say the short bearings, are arranged above the plates of the two combs.

The needles are square in shape and each has a horizontal branch or arm upon which the bearing of the corresponding pull rod rests.

In order to avoid all friction of the pull rods against each other, each of the plates of the two combs *n*, *o* carries on its two faces two thin plates *p* which, as is shown in Figs. 1, 8 and 9, lie between the pull rods. The pull rods are also separated at their rear ends by a comb *q* comprising thin plates and sufficient in length not to impede the operation of these pull rods and to co-act with them in all their positions. The pull rods cannot therefore rub against each other because they are kept apart at their front parts by the plates of the comb *q*, about midway between their ends by the plates *p*, and at their rear ends by the comb *q*.

As has been described above, the movement of the pull rods is controlled by a set of bars or beams *j*, *k* which receive a movement of translation, in a direction transversely of the loom, as can be seen from the drawing, the pull rods resting in their lowest position upon the bar or beam *j*. In order to prevent the pull rods from being dragged along accidentally by friction caused by this bar, the loom is provided with two bars *r*, *s* which are fixed and between which the heels of the pull rods are locked when the pull rod is in its central position as shown in Fig. 1, which position corresponds to the case when the pull rod must not be moved in a horizontal direction, namely when the carriage corresponding thereto is to remain in the middle of the loom.

The levels of the two bars *r*, *s* are determined in such a way, that a pull rod can pass freely either below the bar *s* when this pull rod is in its lowest position (see Fig. 10) is to be carried along in the direction of the arrow shown in this figure, so as by the aid of its lever *b* to bring the corresponding carriage into engagement with the rear catch bar or above the bar *r* when this pull rod, raised to its highest position, is to be carried along in the direction of the arrow shown in Fig. 11 to bring the carriage corresponding to it into engagement with the front catch bar.

The improved apparatus just described insures by the whole of its components for

guiding and locking, a satisfactory working, which is always certain without any risk of the pull rods being accidentally carried along by friction between the operative parts producing the selection of the carriages.

Claims:

1. In a loom for the mechanical manufacture of lace of the type described, carriages, selecting levers cooperating with said carriages, a notch provided on the lower edge of each carriage and into which the corresponding selecting lever projects when it is operated, a plate arranged on each side of said notch, the lower edge of each of these plates conforming to the lower edge of the carriage.

2. In a loom for the mechanical manufacture of lace of the type described, carriages, selecting levers cooperating with said carriages, a notch provided on the lower edge of each carriage and into which the corresponding selecting lever projects when it is operated, a plate arranged on each side of said notch, the lower edge of each of these plates conforming to the lower edge of the carriage, a comb bar guiding the carriages in their transverse movements, small longitudinal grooves in the blades of said comb bar, the depth and width of said grooves being slightly greater than the thickness and width of the plates of the carriages.

3. In a loom for the mechanical manufacture of lace of the type described, carriages, selecting levers cooperating with said carriages, pull rods hinged with said selecting levers, a notch provided on the lower edge of each carriage and into which the corresponding selecting lever projects when it is operated, a plate arranged on each side of said notch, the lower edge of each of the plates conforming to the lower edge of the carriage, a comb bar guiding the carriages in their transverse movements, small longitudinal grooves in the blades of said comb bar, the depth and width of said grooves being slightly greater than the thickness and width of the plates of the carriages with curved blades arranged on a level with the joints of the levers and pull rods, and means for spacing the selecting levers at the end opposite that engaging the carriages.

4. In a loom for the mechanical manufacture of lace of the type described, carriages, selecting levers cooperating with said carriages, pull rods hinged with said selecting levers, a notch provided on the lower edge of each carriage and into which the corresponding selecting lever projects when it is operated, a plate arranged on each side of said notch, the lower edge of each of these plates conforming to the lower edge of

the carriage, a comb bar guiding the carriages in their transverse movements, small longitudinal grooves in the blades of said comb bar, the depth and width of said grooves being slightly greater than the thickness and width of the plates of the carriages, a comb with curved blades, arranged on a level with the joints of the levers and pull rods, means for spacing the selecting levers at the end opposite that engaging the carriages, combs adapted to guide in their median part the pull rods controlling the selecting levers, vertical extensions on said combs, and a comb adapted to guide the back part of the pull rods.

5. In a loom for the mechanical manufacture of lace of the type described, carriages, selecting levers cooperating with said carriages, pull rods hinged with said selecting levers, a notch provided on the lower edge of each carriage and into which the corresponding selecting lever projects when it is operated, a plate arranged on each side of said notch, the lower edge of each of these plates conforming to the lower edge of the carriages, a comb bar guiding the carriages in their transverse movements, small longitudinal grooves in the blades of said comb bar, the depth and width of said grooves being slightly greater than the thickness and width of the plates of the carriages, a comb with curved blades, arranged on a level with the joints of the levers and pull rods, means for spacing the selecting levers at the end opposite that engaging the carriages, combs adapted to guide in their median part the pull rods controlling the selecting levers, vertical extensions on said combs, a comb adapted to guide the back part of the pull rods, and two fixed locking bars adapted to lock the heels of the pull rods when in their position of rest.

6. In a loom of the class described, a plurality of carriages formed with notches, guiding plates arranged on each side of each of said notches, a selecting lever for each of said notches, said selecting levers being designed to have one end project between said plates whereby each of said levers can only operate a single carriage, means for spacing said selecting levers apart so that the ends thereof will properly register with said notches and spaced operating means for swinging said levers.

The foregoing specification of my improvements in and relating to looms for the mechanical manufacture of lace signed by me this 16th day of June, 1913.

JEAN FARIGOULE.

Witnesses:

HANSON C. COXE,
RENÉ THIRIOT.