

A. BARBIER.

APPARATUS FOR OPERATING GUIDED SHUTTLES IN LOOMS.

(Application filed Aug. 6, 1901.)

(No Model.)

3 Sheets—Sheet 1.

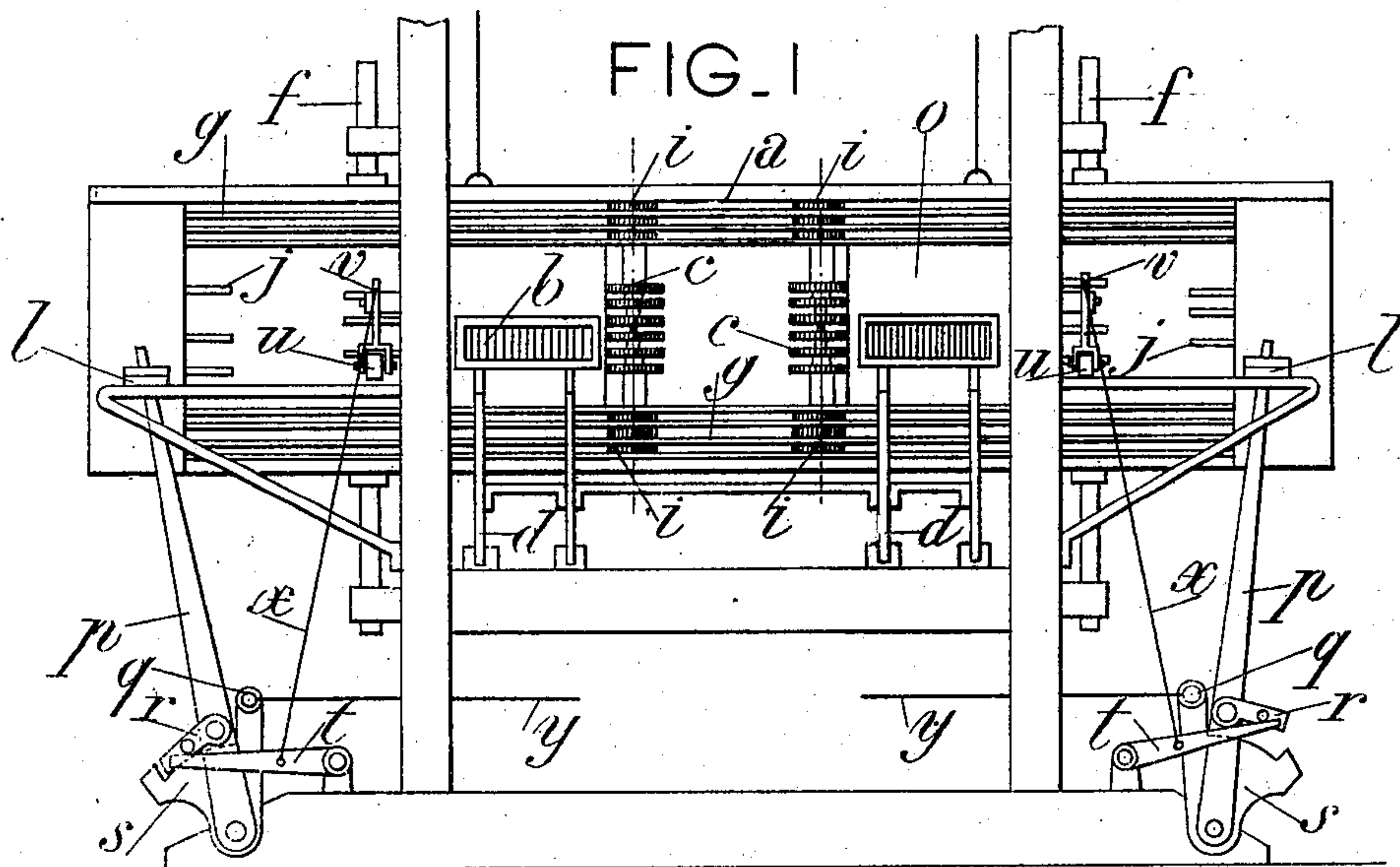
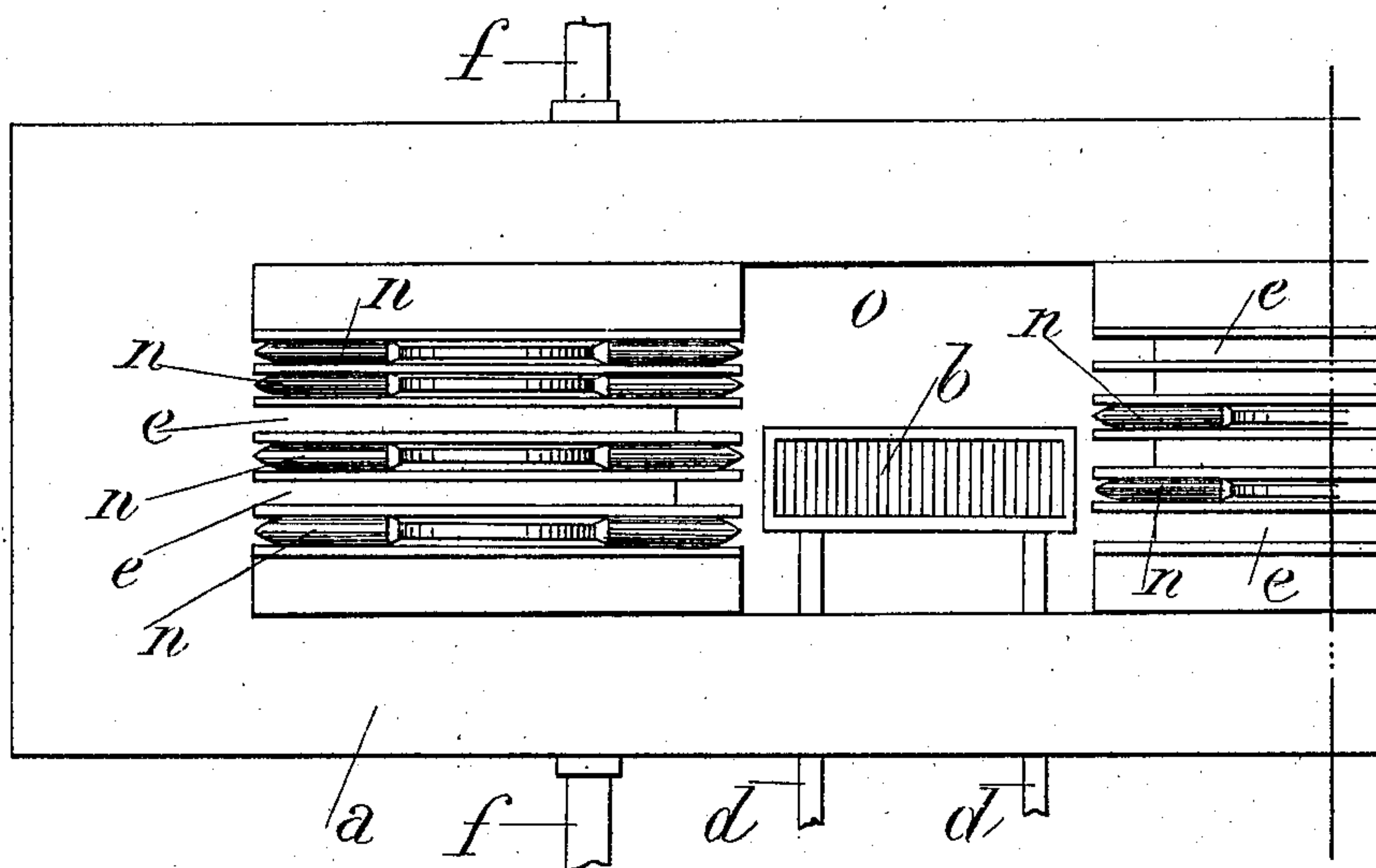


FIG. 2



WITNESSES:

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No. 708,752.

Patented Sept. 9, 1902.

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FIG. 4

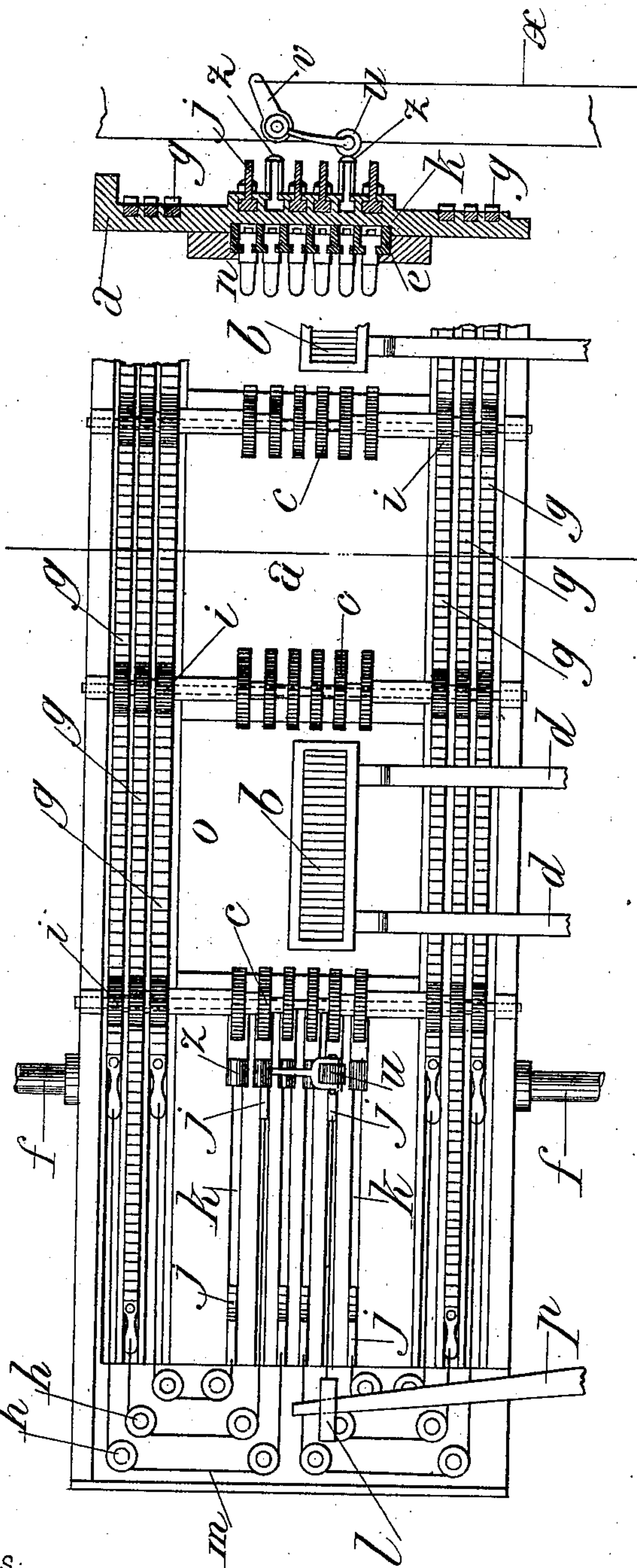


FIG. 3

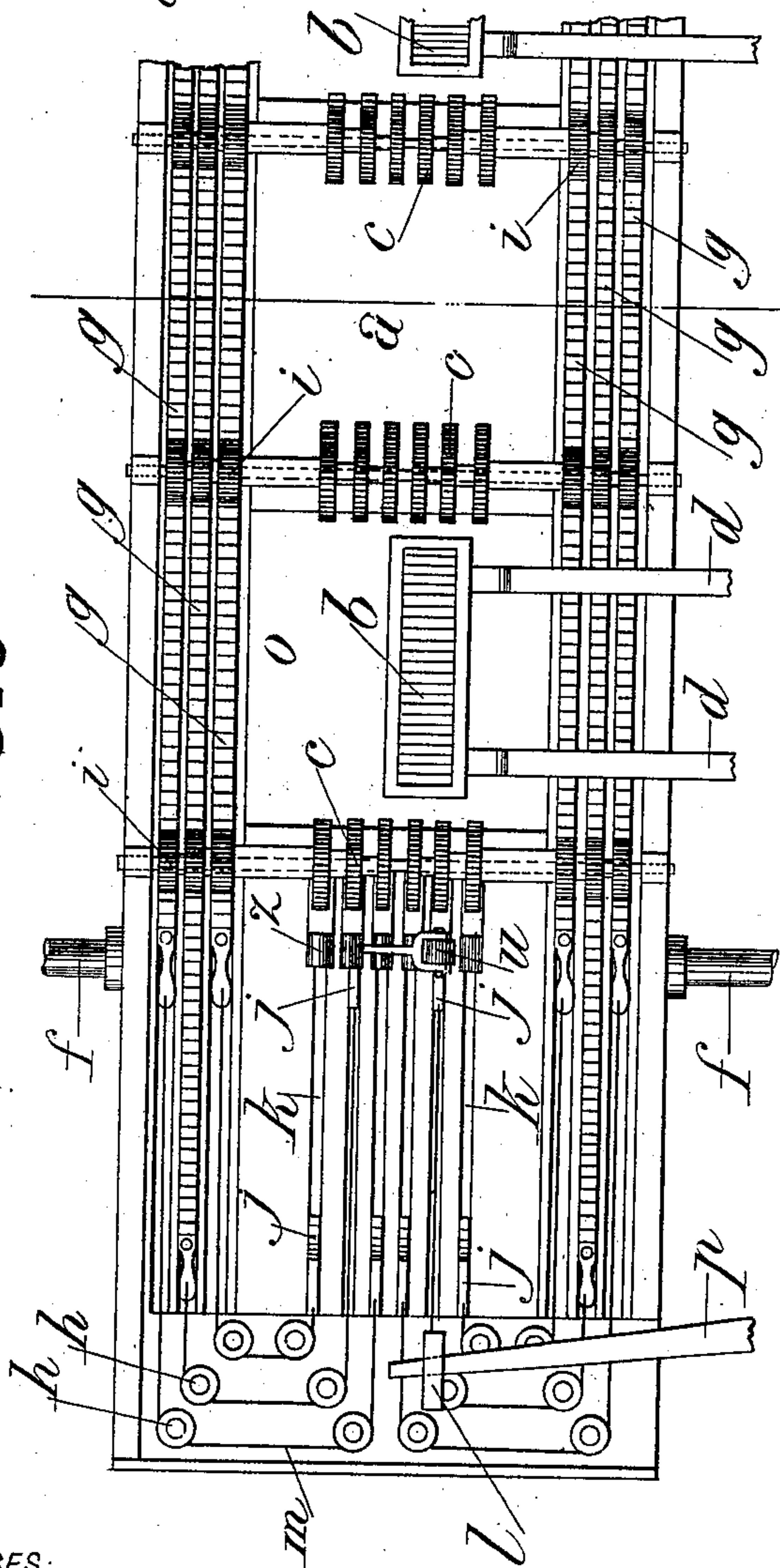
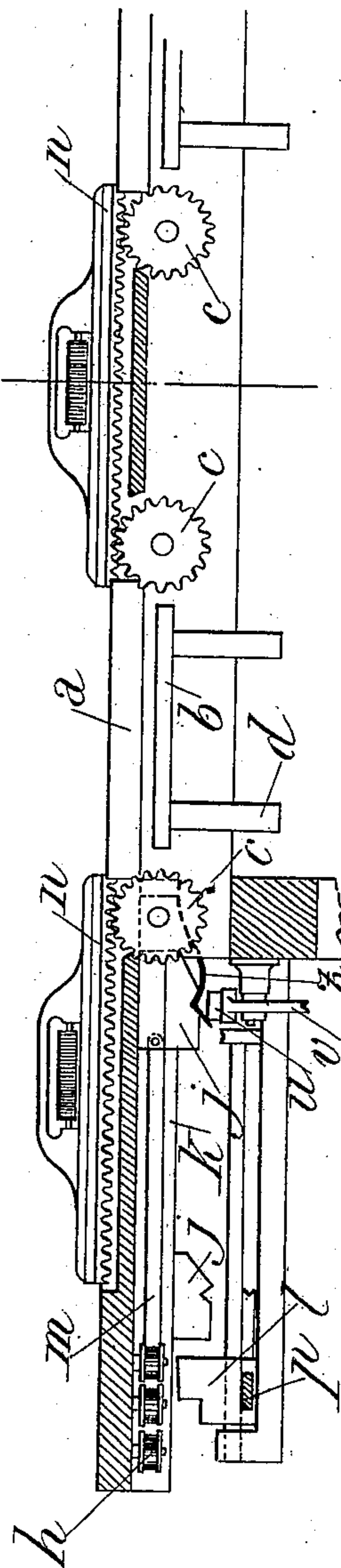


FIG. 5



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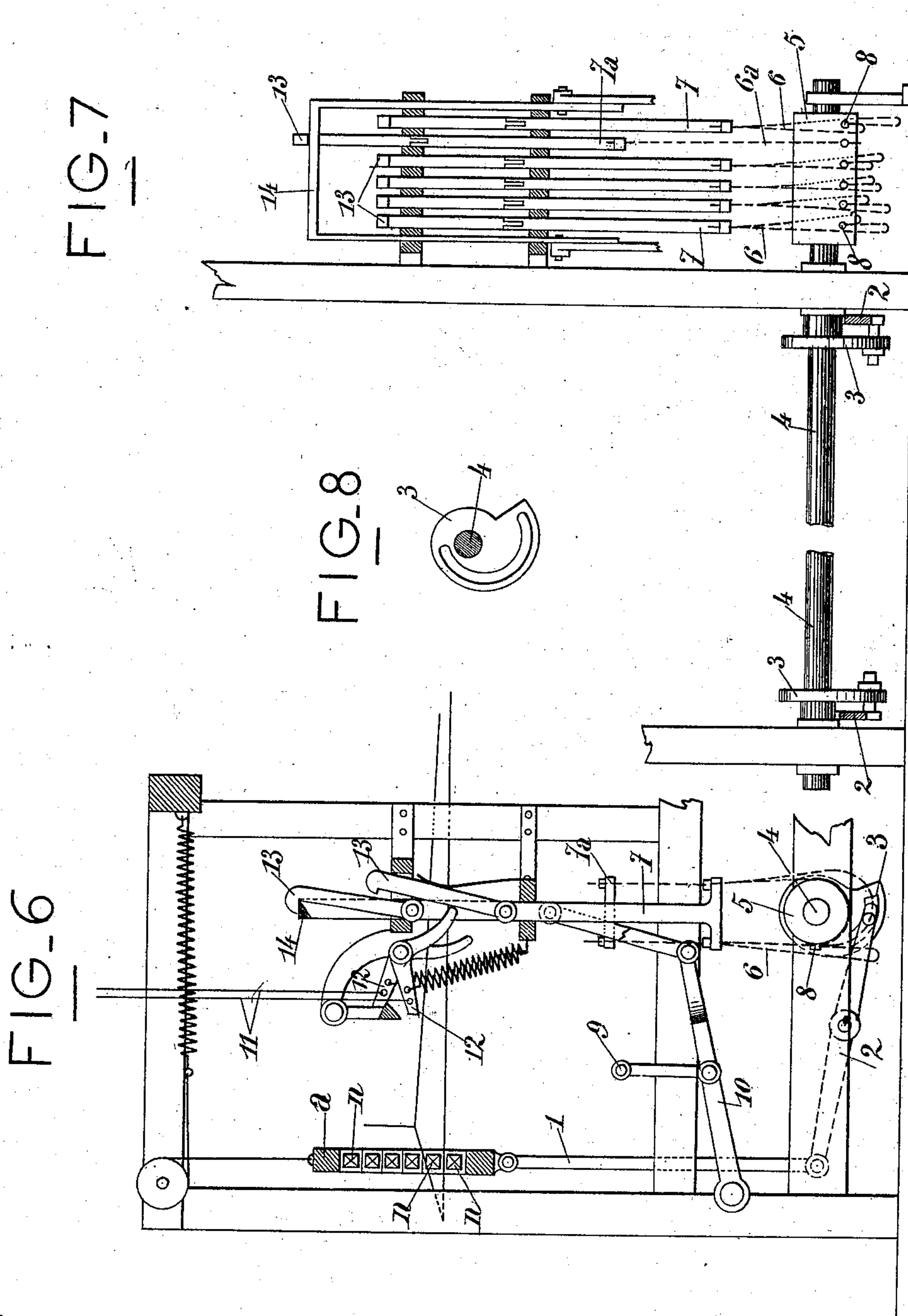
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UNITED STATES PATENT OFFICE.

ALEXANDRE BARBIER, OF LYONS, FRANCE.

APPARATUS FOR OPERATING GUIDED SHUTTLES IN LOOMS.

SPECIFICATION forming part of Letters Patent No. 708,752, dated September 9, 1902.

Application filed August 6, 1901. Serial No. 71,021. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDRE BARBIER, a citizen of France, residing at Lyons, France, have invented certain new and useful Improvements in Apparatus for Operating Guided Shuttles in Looms for Simultaneously Weaving Several Pieces with Several Shuttles, of which the following is a full, clear, and exact description, and for which I have made application for patent in France, dated January 30, 1901.

My invention is applicable to looms in which several pieces are simultaneously woven, each with several shuttles, and in which the shuttles instead of being thrown are driven during their entire course—as, for example, in ribbon-loom. Its object is to permit the rapid working of the loom, whatever may be the number of the shuttles, by preventing the latter from participating in the motion of the batten and by driving them by simplified mechanism.

The invention is illustrated in the accompanying drawings, which represent the parts of the loom which have been modified by my invention.

Figure 1 is a view of a loom behind the shuttle-carrying frame. Fig. 2 is a view of half of the front of this frame. Fig. 3 is a view of half of the back of the same. Fig. 4 is a vertical section of Fig. 3. Fig. 5 is a horizontal section of the same figure. Fig. 6 is a side elevation of the mechanism. Fig. 7 is a front view of the same. Fig. 8 is a detail of the cams 3 acting on the frame.

The shuttles *n* are carried by a frame *a a*, which does not form part of the batten. The latter consists simply of the combs *b b*, of equal number to that of the pieces being woven, (two in the drawings.) The frame *a*, equilibrated by counterweights or springs, moves vertically the length of the guides *f f* to bring the required shuttles in front of the combs *b*. This motion is obtained by any known mechanism and so much more easily as the frame remains always in the same vertical plane. The shuttles *n*, Fig. 2, are arranged on the frame *a* in superposed ways or races *e e* and in as many vertical rows plus one as there are pieces to be woven. Between these vertical rows are provided openings *o o*, within which work the combs *b b*,

carried by oscillating levers *d* and operated like ordinary battens. The shuttles are sufficiently long to pass from one to the other of these ways or races in traversing the opened of the warp without ceasing to be held in one or other of the ways or races *e*, and they are driven in this motion by toothed pinions *c c*, Figs. 3 and 5, gearing with racks fixed to the back of each shuttle. The pinions *c c*, mounted on hollow axles, which render them capable of independent movement, are respectively fixed to other pinions *i i*, situated at the upper part and at the lower part of the frame and driven by racks *g g*, running the entire length of this frame. Each rack *g* thus operates all the shuttles placed on the same horizontal line and causes them to execute similar movements in each of the pieces being woven. To this point these arrangements are similar to those applied to movable battens.

I will now explain the new arrangements which enable the racks *g* to be operated at the desired time. I will explain first that in order to give these racks a reduced motion, thus enabling the length of the frame to be reduced, I have given to the pinions *i*, which they operate, a smaller diameter than that of the pinions *c*, which drive the shuttles. At the two extremities of each rack *g*, Fig. 3, are attached very flexible metallic ribbons *m*, which pass around guide-pulleys *h h* and are fixed to runners *j j*, sliding in horizontal grooves *k*. The same arrangement is repeated at the right and left of the frame *a*. The grooves *k* are placed opposite the shuttle ways or races *e e* on the opposite face of the frame *a*. Each runner *j* is situated at the same height as the horizontal row of shuttles which it drives. Each runner has the form of a projecting horizontal rib, beveled off at the front part and on the rear of which the pickers *l*, sliding horizontally on each side of the frame at the height of the combs *b*, can act. The result is that whatever may be the position in height of the frame the two runners situated opposite the pickers *l* are those which drive the shuttles which are required to operate. Only one of these runners is at the end of the groove *k* near the picker. It is the one required to be operated. The other is at the end of the groove the most remote

from the picker, where it is held by a spring *z*, entering an annular notch formed at the top of the bevel of the runner. This latter should not be operated. It is therefore necessary to render the picker corresponding to it immovable, which I obtain in the following manner: The pickers *l* are driven by picking-sticks *p p*. (Seen in front elevation at Fig. 1.) Each is mounted on the same axle with an operating-lever *q*, which is operated at each blow of the batten by a cam or by other known operating mechanism acting on the cords or bands *y y*. The connection of the lever *p* with the operating-lever *q* is effected by means of a pawl *r*, which can come into contact with a projection *s* on the operating-lever *q*. This pawl *r* is raised by a lever *t* every time that the picker-sticks are not required to operate. For this purpose when one of the runners *j* is pushed by the picker *l* it raises by its inclined plane the spring *z* corresponding with it. This spring raises in its turn a pulley *u*, Fig. 4, mounted on one arm of a crank-lever *v*, pivoted to a fixed point of the framing, the other arm of the lever *v* being connected by a cord *x* with the lever *t*, Fig. 1. This lever then raises the pawl *r*, and the operating-lever *q* works without carrying with it the picking-stick *p* or the picker *l*. When the frame *a* rises or falls for a change of shuttle, the springs *z*, which have been raised by the runners, also raise the pulley *u* by passing in front of it. It therefore results that whatever may be the position at which the frame stops the runner *j*, which has been driven, holds the pulley *u* raised and renders immovable the corresponding picker *l*. The vertical displacement of frame *a*, carrying the shuttles, is obtained by means of the jacquard and by any means known—for instance, that shown in Figs. 6, 7, and 8. The frame *a* is connected by connecting-rods *l* to two brakes *2*, engaged by one of their ends in the spiral cams *3*, which are fastened upon a transversal axis *4*. The rotating movements of the latter are thus transformed into ascending or descending movements of frame *a*, and the starting of each shuttle *n* corresponds to a certain position of axis *4*. Axis *4* receives these positions by means of a drum *5*, acted upon by a series of chains *6 6*, in

number equal to that of the shuttles. These chains of even lengths are with their two ends attached to rods *7 7*, sliding vertically over the drum *5*. They surround this drum and are fixed on it at points *8 8*, situated all in one and the same generating-line of the cylinder, but vary on the length of each chain. When one of the rods—*7^a*, for instance—is raised, so that the corresponding chain *6^a* is completely stretched, drum *5* takes a certain position, which latter varies for each chain and to which the starting of a corresponding shuttle answers. The raising of the rods *7* is effected by a claw *14*, receiving a vertical oscillating motion by crank *9* and lever *10*. This raising is governed by the jacquard, which, by means of the cords *11*, raises at every stroke one of the levers *12*. The latter allows one of the hooks *13*, attached to the rod *7*, to hook upon the claw *14*. Thus every time that the jacquard raises one of the cords *11* one of the rods *7* is raised by the claw *14* and the drum takes a corresponding position, which it transfers to frame *a*.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In combination, a batten, a shuttle-carrying frame *a*, independent of the batten, means for giving said frame a rising-and-falling movement, rows of shuttles arranged to move on said frame, racks *g* carried by the frame, pinions *i* and *c* of differential diameter driven by said racks and in turn driving the shuttles, runners *j* moving on the frame and situated at the same height as the shuttles corresponding with them, means connecting the runners with the racks, pickers *l*, picker-sticks *p* for operating the pickers, said pickers being arranged to push the runners which are at their level and locking means for preventing the picker-sticks from operating, said locking means being controlled by the runner which has just been driven, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ALEXANDRE BARBIER.

Witnesses:

GASTON JEANNIAUX,
MARIA VACHA.