

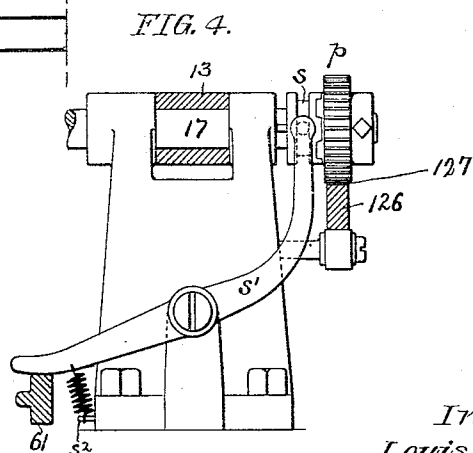
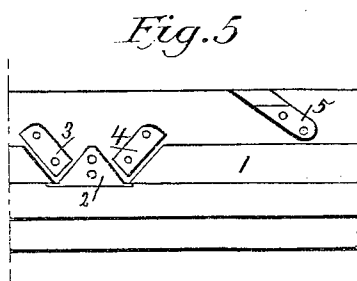
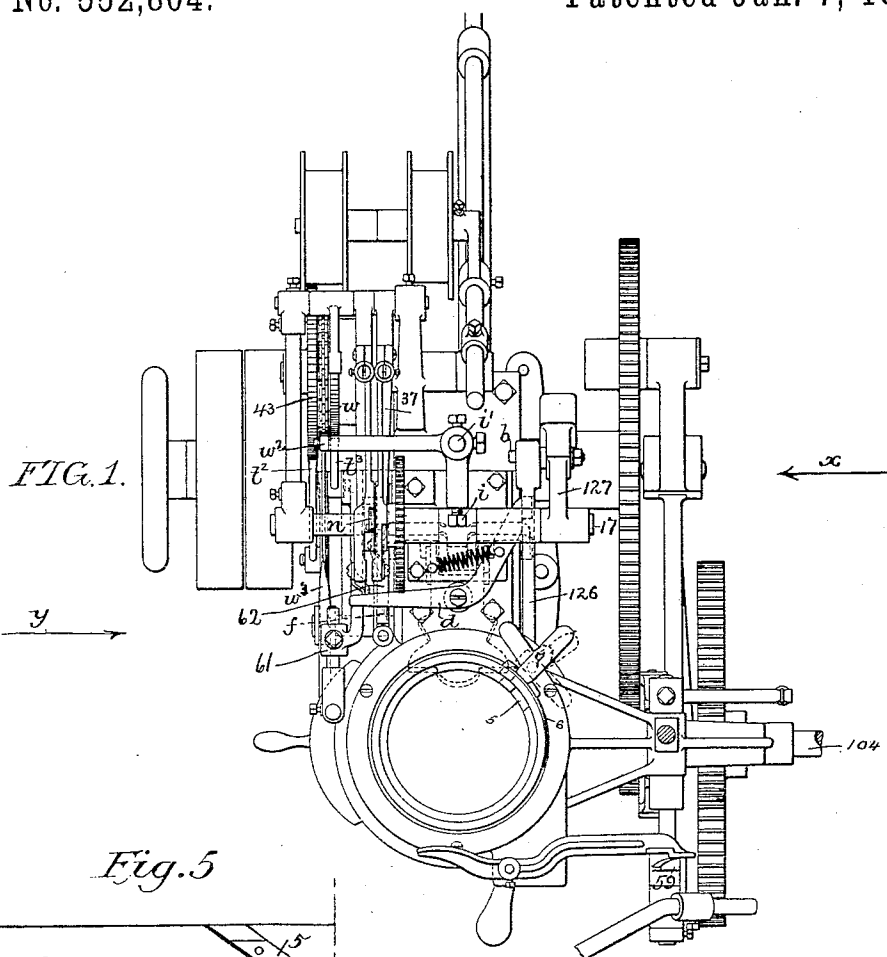
(No Model.)

3 Sheets—Sheet 1.

L. N. D. WILLIAMS.
AUTOMATIC KNITTING MACHINE.

No. 552,804.

Patented Jan. 7, 1896.



Witnesses:
Hamilton D. Turner
Frank C. Bechtold

Inventor:
Louis N. D. Williams
by his Attorneys:
Howson & Howson

(No Model.)

3 Sheets—Sheet 2.

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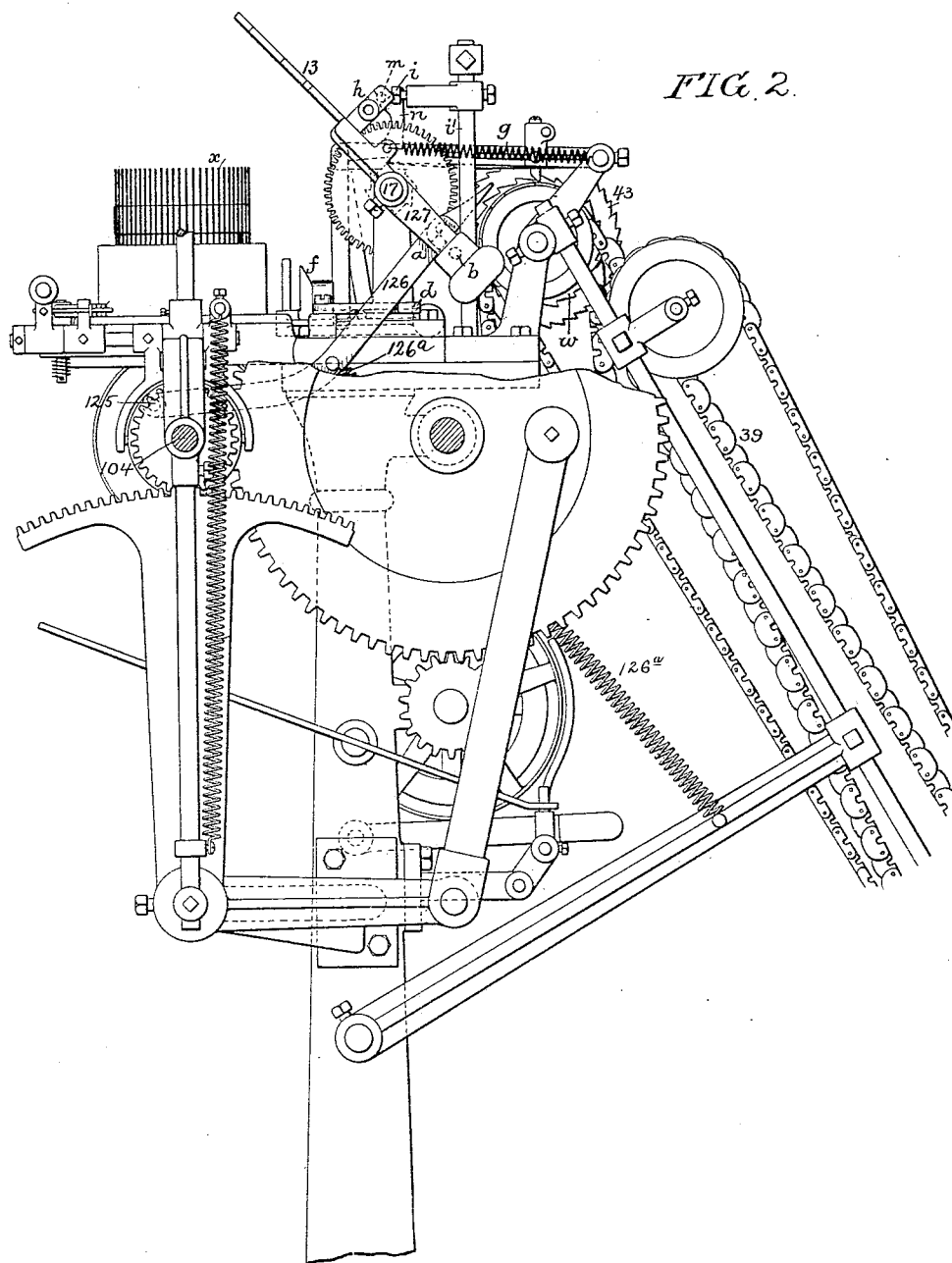


FIG. 2.

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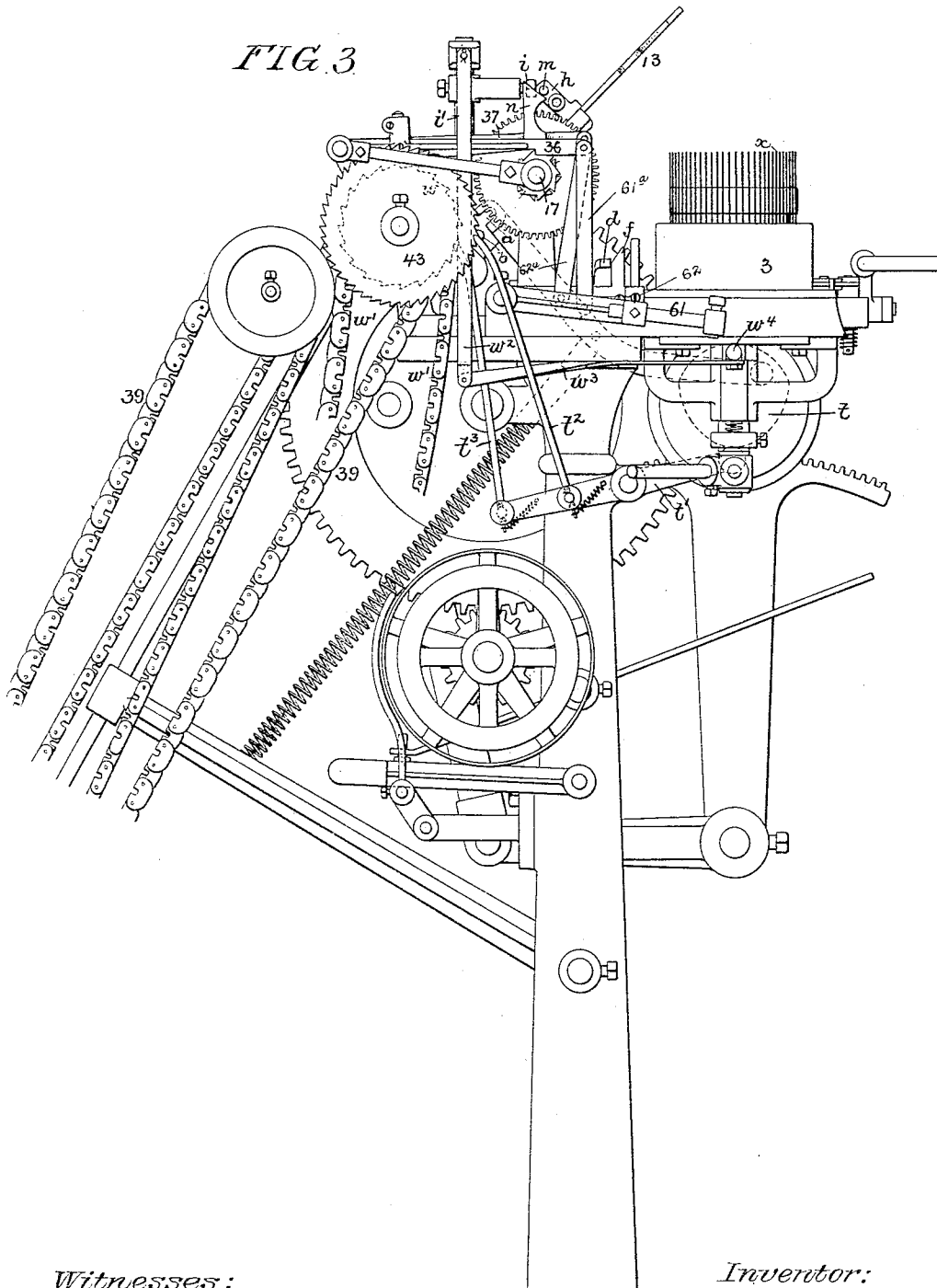
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UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF ASHBOURNE, ASSIGNOR OF ONE-HALF TO
ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 552,804, dated January 7, 1896.

Application filed March 8, 1895. Serial No. 540,947. (No model.)

To all whom it may concern:

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, residing in Ashbourne, Montgomery county, Pennsylvania, have invented certain Improvements in Automatic Knitting-Machines, of which the following is a specification.

My invention consists of certain improvements in the knitting-machine for which Robert W. Scott and myself obtained Letters Patent numbered 484,610, dated October 18, 1892, the object of my present invention being to permit the operation of the machine at higher speed than heretofore during the rotating movement. This object I attain by throwing the mechanism for vibrating the presser-plates out of operation during the rotation of the machine for round-and-round knitting.

In the accompanying drawings, Figure 1 is a plan or top view of sufficient of the machine to illustrate my present improvements. Fig. 2 is a side view looking in the direction of the arrow *x*, Fig. 1. Fig. 3 is a side view looking in the direction of the arrow *y*, Fig. 1. Fig. 4 is a view illustrating another means than that shown in Figs. 1, 2 and 3, for throwing out of action the mechanism for vibrating the presser-plates, and Fig. 5 is a view representing in a flat plane the cams of the cam-cylinder.

The machine in its general construction is similar to that forming the subject of the above-recited patent. Hence I will only describe such parts of the same as are necessary to convey a proper understanding of the improvements to which my present invention relates.

The cams of the cam-cylinder are shown in Fig. 5 and are similar to those of the former patent, said cams comprising the needle rest or support 1, the lifting-cam 2, the combined lifting and depressing cams 3 and 4 flanking the same, and the depressing-cam 5, which is mounted upon a spring 6 on the outside of the cam-cylinder and is under control of a lever 7, so that it can either be thrust inward so as to act upon the bits of the needles, or can be permitted to move outward so as to be inoperative.

The shaft which drives the cam-cylinder of the machine is represented at 104, this shaft having as usual a crank-wheel or pin 125 to

which is connected one end of a rod 126, the opposite end being connected to the depending weighted arm 127 of the rock-shaft 17 which carries the vibrating-plate 13, the latter, as in the former machine, carrying the adjustable pressers for acting upon the needles of the machine and pressing them down into operative position after they have been raised to inoperative position by the cams of the cam-box. In the present instance, however, instead of providing a permanent connection between the bar 126 and the arm 127, I form a notch *a* in the bar 126 for engaging with a pin *b* on the arm 127, so that if the bar 126 is lifted until its notch is free from engagement with the pin, the vibrations of the plate 13 will be discontinued. The bar 126 is acted upon by a spring 126^a extending to a portion of the fixed frame of the machine and tending to depress said bar 126.

The lifting of the bar 126 is effected by means of a lever *d* mounted on the base of the machine and acted upon by a cam *f* on the lever 62 which is employed for acting upon certain of the lever mechanisms carried by the cam-box 3 of the machine. The lever 62 is elevated by reason of its connection by a link 62^a with the pawl-arm 37 when the machine is changing from to-and-fro and round-and-round knitting, and this effects the simultaneous lifting of the bar 126 so as to free its notch *a* from engagement with the pin *b* and thus stop the vibration of the plate 13.

If desired, the lever 62 may be held in an elevated position during the entire time that round-and-round knitting is being carried on; but as it may be advisable in some cases to drop the lever 62 before the completion of the round-and-round movements, I connect to the back of the plate 13 a spring *g* which, as soon as the pin *b* is free from the notch *a* of the bar 126, draws the frame 13 upward until a stop-lug *h* on the same strikes a set-screw *i* on an upright rod *i'* of the fixed frame, the pin *b* then occupying a position below the lowermost position assumed by the notch *a* in the movement of the bar 126.

In order to bring the pin *b* again into position for engaging with the notch *a* when it is desired to resume the vibration of the plate 13 on the resumption of to-and-fro knitting,

the lug *h* has a pin *m* which is acted upon by a cam *n*, carried by the pawl-arm 36, which is connected by a link 61^a to the lever 61, the latter being lifted by the pattern mechanism when it is desired to change from round-and-round to to-and-fro knitting. The cam *n* thus acts upon the pin *m* so as to lower the upper portion of the plate 13 and lift the pin *b* again into range of the notch *a*, the latter being permitted to engage with the pin, owing to the fact that the lever *d* has been previously withdrawn by reason of the dropping of the lever 62. By thus throwing the vibrating presser-carrying plate out of action during round-and-round knitting I am enabled to run the machine at a much higher rate of speed during such round-and-round knitting than was possible in the machine previously patented, for in the said patented machine the speed of rotation as well as that of the to-and-fro movements of the cam-box was limited by the speed at which the plate 13 could be vibrated, whereas in the present machine the rotating movements of the cam-box are not so limited and the machine can, during round-and-round knitting, be run at a very much higher rate of speed than during to-and-fro knitting when the vibrating plate 13 is in action.

The main idea of this part of my invention therefore consists in stopping the vibration of the plate 13 during round-and-round knitting, and I do not limit myself to the particular mechanism which may be employed for effecting this result, as the mechanism may be modified in various ways without departing from the main feature of the invention. In Fig. 4, for instance, I have shown one such modification, the bar 126 in this case having a rack 127 formed upon its upper edge for engagement with a pinion *p*, which is so mounted upon the shaft 17 as to turn loosely thereon, but is prevented from moving longitudinally on the shaft. Splined upon the shaft is a clutch-sleeve *s*, having teeth for engaging with notches on the pinion *p*, this sleeve being under control of a lever *s'*, which is adapted by a spring *s*² to throw the clutch-sleeve *s* out of engagement with the hub of the pinion *p* and by the lever 61 to throw said clutch-sleeve into engagement with the hub of the pinion. As the lever 61 is lifted, therefore, when the machine starts to-and-fro knitting the pinion *p* will be clutched to the shaft 17, so as to start the vibrations of the plate 13, but when the lever 61 drops in changing from to-and-fro to round-and-round knitting the pinion *p* will be unclutched from the shaft 17 and the vibration of the plate 13 will be discontinued.

On the shaft 104 is a cam *t*, (shown by dotted lines in Fig. 3,) and this cam acts upon a lever *t'*, which has two pawls *t*² and *t*³, the pawl *t*² engaging with the ratchet-wheel 43 on the drum which carries the main pattern-chain 39 of the machine, said pattern-chain acting upon the arms 36 and 37, which are connected to the devices whereby the stopping and start-

ing of the vibrating presser-plate is effected, while the pawl *t*³ engages with a ratchet-wheel *w* on a drum which carries a pattern-chain *w'*, the latter acting on a depending arm *w*², which is connected by a link *w*³ to the arm *w*⁴ of a needle-cylinder-adjusting device of any ordinary character, the purpose of this device being to raise or lower the needle-cylinder at intervals, so as to provide for drawing longer or shorter stitches.

In the former machine the ratchet-wheel 43 on the pattern-chain shaft or drum was operated by a pawl receiving motion from the rock-shaft 17; but as the latter shaft in the present machine is motionless during a considerable part of the time it becomes necessary to operate the pattern-chain drum from the shaft which drives the cam-box.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a knitting machine, of the needles, cams for raising said needles to inoperative position, a presser plate for depressing the needles, a cylinder capable of both to and fro and rotating movement, and provision whereby the presser plate is caused to vibrate during the to and fro movements of the cylinder, and is allowed to remain stationary during the rotating movement.

2. The combination in a knitting machine, of the needles, cams for raising the needles to inoperative position, a presser plate for depressing the needles, a cylinder capable of both to and fro and rotating movement, mechanism for vibrating the presser plate, and means for connecting said mechanism to and disconnecting it from the plate.

3. The combination in a knitting machine, of the needles, cams for raising the needles to inoperative position, a presser plate whereby the needles are moved to operative position, a cylinder capable of both to and fro and rotating movement, a rock shaft carrying the presser plate and having an arm with projecting pin, a reciprocated bar having a notch for engaging said pin, and means for lifting said bar out of engagement with the pin.

4. The combination in a knitting machine, of the needles, cams for raising said needles to inoperative position, a presser plate for moving the needles to operative position, a cylinder capable of both to and fro and rotating movement, a rock shaft carrying the presser plate and having an arm with projecting pin, a reciprocated bar having a notch for engaging said pin, means for lifting the bar so that the pin is free from the notch, and provision for moving the arm when so freed so that its pin is carried out of the path of the notch in the bar as the latter reciprocates.

5. The combination in a knitting machine, of the needles, cams for raising the needles to inoperative position, a presser plate for moving the needles to operative position, a cylinder capable of both to and fro and rotating movement, a rock shaft carrying the

presser plate and having an arm with projecting pin, a reciprocated bar having a notch for engaging said pin, means for lifting the bar so that the pin is free from the notch, means
5 for moving the pin out of the path of the notch, and provision for restoring the arm to position for re-engagement of the pin with the notch.

6. The combination in a knitting machine,
10 of the needles, cams for raising the needles to inoperative position, a vibrating presser plate for moving the needles to operative position, a cylinder capable of both to and fro and rotating movement, mechanism for vibrating
15 the presser plate, a pattern chain drum hav-

ing a ratchet wheel, as 43, a cam on the drive shaft of the machine, means whereby said cam is caused to operate said ratchet wheel, a pattern chain on the drum, and devices whereby said pattern chain is caused to effect the throw- 20 ing into and out of action of the mechanism whereby the vibration of the presser plate is effected.

In testimony whereof I have signed my name to this specification in the presence of 25 two subscribing witnesses.

LOUIS N. D. WILLIAMS.

Witnesses:

WILL. A. BARR,

FRANK E. BECHTOLD.