

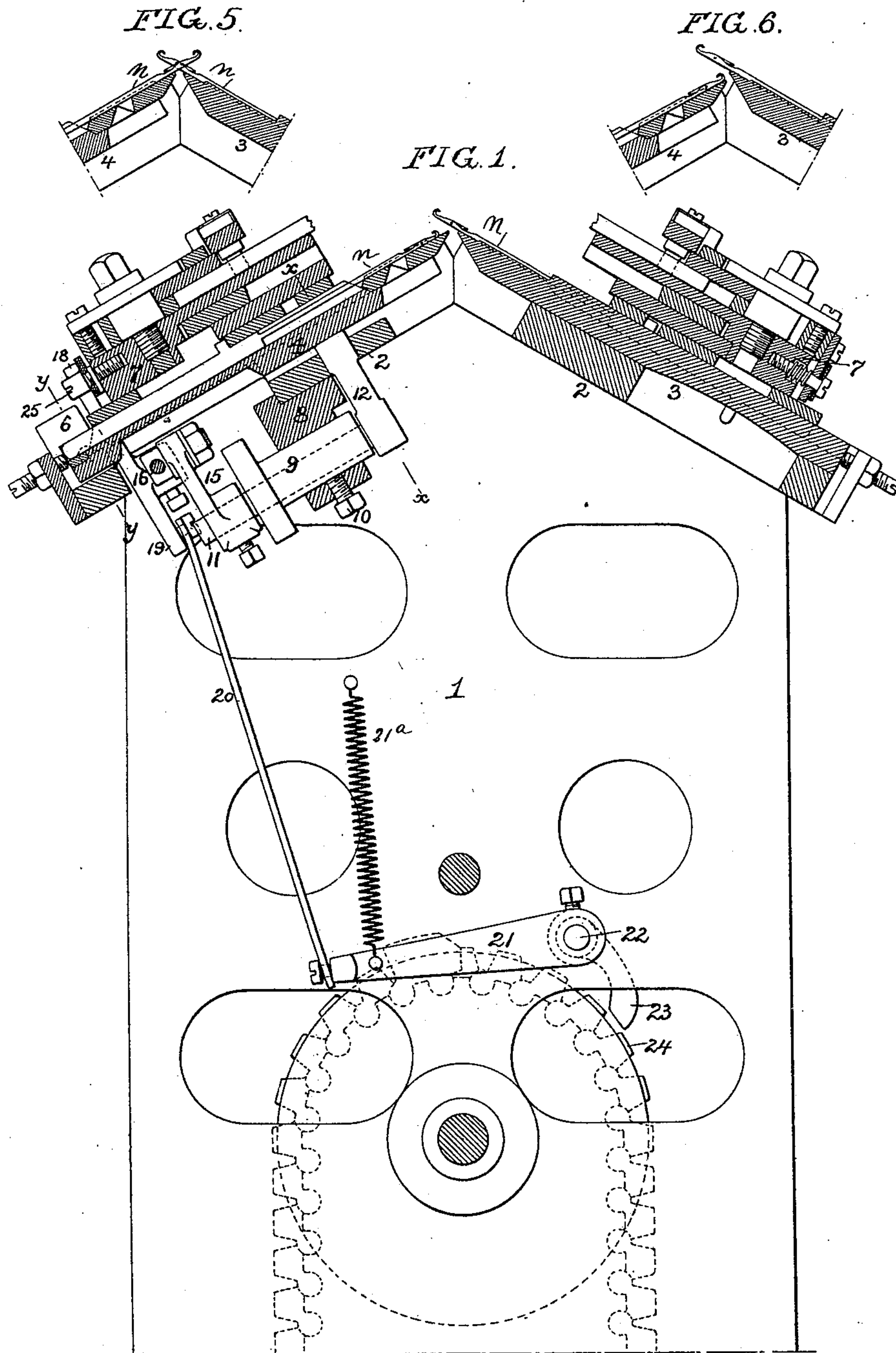
(No Model.)

2 Sheets—Sheet 1.

J. G. POWELL.
STRAIGHT KNITTING MACHINE.

No. 582,547.

Patented May 11, 1897.



Witnesses:
Hamilton D. Turner
J. E. Bechtold

Inventor:
John G. Powell
by his Attorneys
Howson & Howson

(No Model.)

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FIG. 2.

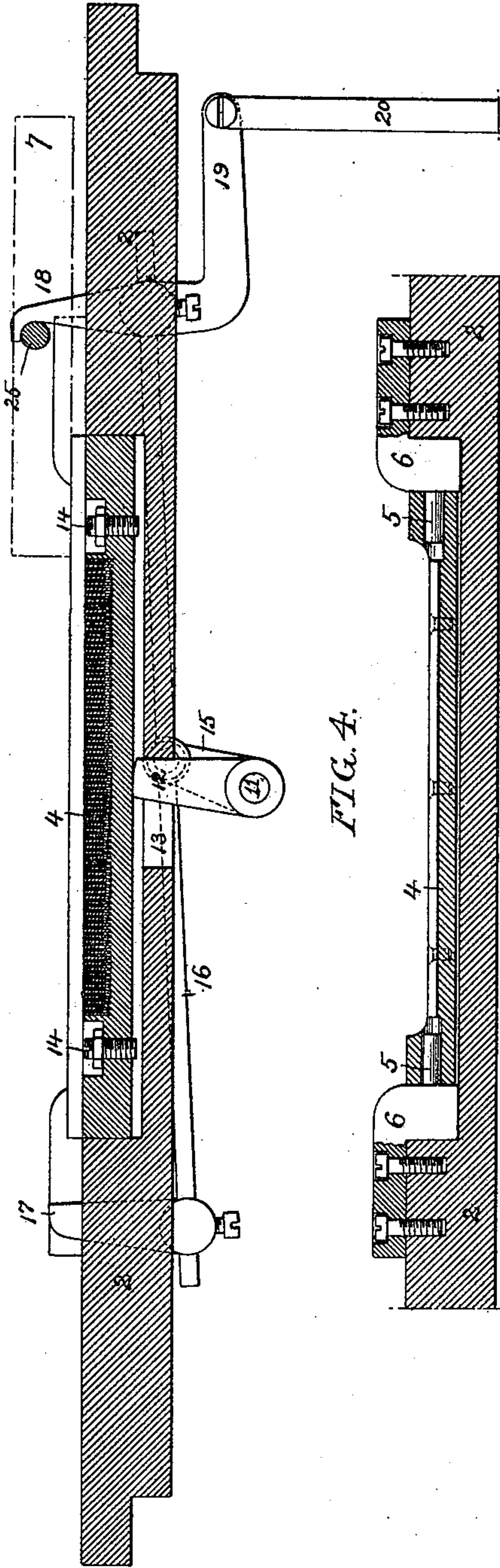


FIG. 4.

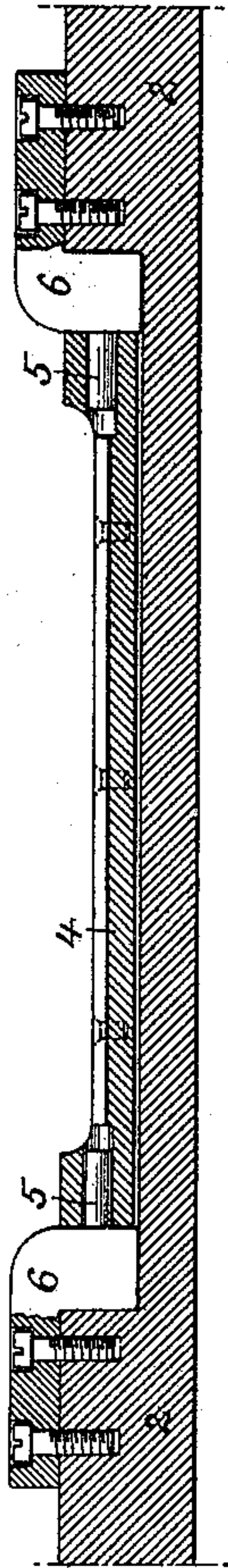
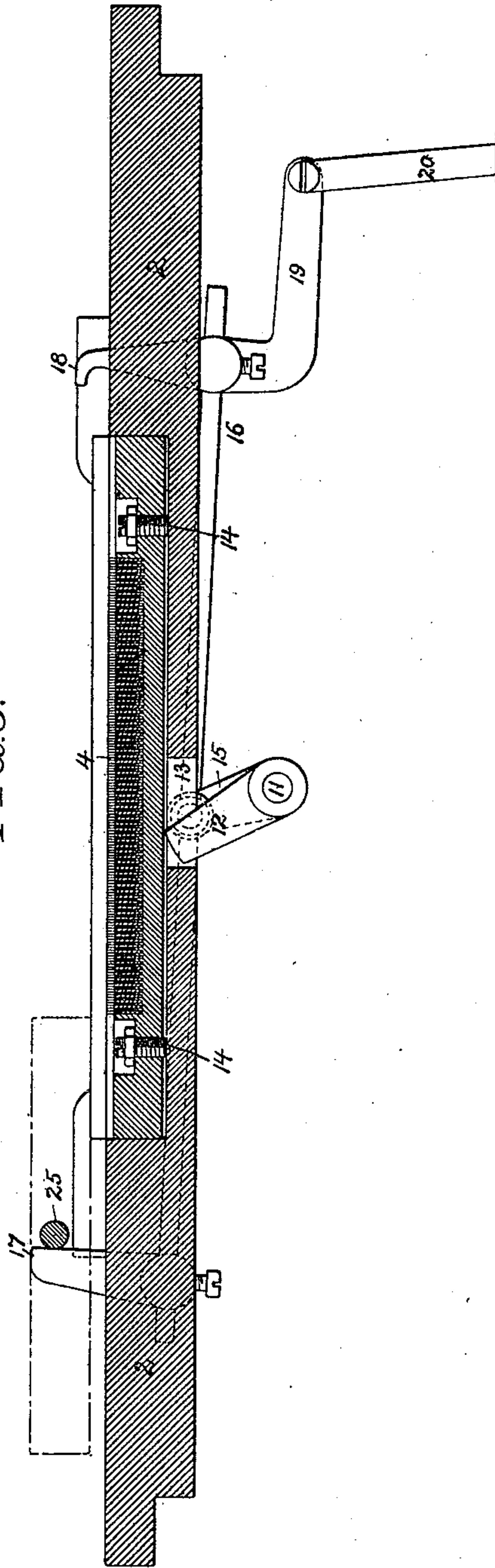


FIG. 3.



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UNITED STATES PATENT OFFICE.

JOHN G. POWELL, OF PHILADELPHIA, PENNSYLVANIA.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 582,547, dated May 11, 1897.

Application filed June 1, 1896. Serial No. 593,866. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. POWELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Straight-Knitting Machines, of which the following is a specification.

My invention consists of certain improvements in that class of knitting-machines having two opposed needle-beds disposed at an
10 angle to each other and to the horizontal and capable of knitting simultaneously upon the needles of both beds, or of knitting upon the needles of one bed only for a succession of courses, or of knitting first upon the needles
15 of one bed to form one course and then upon the needles of the other bed to form the next course. Machines of this character are used for the production of stockings, it being the common practice to start the stocking at the
20 toe by forming what is called a "setting-up" course upon the needles of both beds, then throwing the needles of one bed out of action and knitting to and fro upon the needles of the other bed to form a toe-pocket, upon the
25 completion of which tubular web is produced by knitting first in one direction upon the needles of one bed and then in the other direction upon the needles of the other bed, the formation of this tubular fabric being arrested
30 after a time in order to permit of the formation of a heel-pocket by knitting to and fro upon the needles of one bed only, and the production of tubular fabric upon the needles first of one bed and then of the other being
35 then resumed in order to form the leg of the stocking, after the completion of which another setting-up course is formed simultaneously upon the needles of both beds in order to start another stocking, and these operations are repeated indefinitely. It has
40 been found in practice that the stitches upon that set of needles which is thrown out of action after the formation of the setting-up course are subjected to severe strain during the formation of the earlier courses of the web for the toe-pocket upon the other set of needles, for it should be understood that the needles of the first set retain their stitches during the entire time that this toe-pocket is
45 being formed, the result being that said stitches are frequently broken and a large percentage of the stockings have to be mended

by hand after being delivered by the machine.

The object of my invention is to overcome
55 this defect; and this object I attain by mounting one of the needle-beds in such manner that its inner end can be so adjusted in respect to the inner end of the adjoining needle-bed that the setting-up course of stitches
60 is relieved from excessive strain and the breaking of said stitches from this cause is prevented.

In the accompanying drawings, Figure 1 is a transverse section of sufficient of a knit-
65 ting-machine of the character to which my invention relates to illustrate the subject-matter of said invention. Fig. 2 is a longitudinal section on the line $x x$, Fig. 1, showing in elevation the means employed for ef-
70 fecting the raising and lowering of the needle-bed. Fig. 3 is a similar section, showing the parts in different position from that shown in Fig. 2. Fig. 4 is a longitudinal section on the line $y y$, Fig. 1; and Figs. 5 and 6 are sectional diagrams illustrating the purpose of
75 the invention.

Upon the opposite end frames 1 of the machine are secured fixed frames 2, which carry
80 the opposite needle-beds 3 and 4, these needle-beds occupying any desired inclination in respect to each other and to the horizontal.

The needle-bed 3 is securely mounted in place upon the frame 2, but the needle-bed 4 is at its outer and lower end hung to trunnions
85 5, carried by blocks 6, secured to the frame 2, so that said bed is free to swing upon the trunnions, whereby its inner and upper end may be caused to rise and fall in respect to the corresponding end of the needle-bed 3.
90 Both needle-beds have the usual needles n , adapted to be operated by suitable cams carried by cam-boxes 7, which are mounted above the needle-beds and are adapted to be reciprocated longitudinally over the same in the
95 usual manner, this part of the machine being constructed in any manner which may be found best adapted for the purpose, as my invention has no reference thereto.

In forming the setting-up course the needle-
100 bed 4 is elevated, as shown in Fig. 1 and in the diagram Fig. 5, but as soon as said course has been completed the needle-bed 4 is permitted to drop to the position shown in

the diagram Fig. 6, so that the hooks of the needles carried by said bed 4 are brought closer to the upper or "knocking-over" end of the needle-bed 3, whereby the stitches carried by said needles of the bed 4 are relieved from strain during the formation of the earlier courses of the toe-pocket. When any desired number of these courses have been completed, the needle-bed 4 may be raised again to its normal position, as the stitches carried by the needles of said bed are then relieved from strain.

Many devices within the scope of my invention will suggest themselves to those skilled in the art to which said invention appertains as available for the purpose of effecting the desired movements of the needle-bed 4.

In the drawings I have illustrated means which I have found to be effective for the purpose and to which I lay especial claim, although I wish it to be understood that my invention is not limited to the employment of the specific means shown and described.

To a bearing 8 on the under side of the frame 2, which carries the needle-bed 4, is adapted a sleeve 9, which can be rotated in said bearing and can be secured in position after adjustment in any suitable way—as, for instance, by means of a set-screw 10, as shown in Fig. 1. In this sleeve 9 is eccentrically mounted a shaft 11, which has at its inner and upper end an arm 12, the free end of which plays in a slot 13 in the frame 2 and bears upon the back or lower side of the needle-bed 4, as shown in Figs. 1 and 2. Hence when said arm occupies the position shown in said figures the needle-bed will be raised or caused to assume its normal position, but when the arm is turned to the position shown in Fig. 3 said needle-bed will be lowered to an extent determined by contact with the frame 2 of set-screws 14, carried by the bed 4, as shown in Fig. 3, the position of the needle-bed 2 when elevated being susceptible of adjustment by turning the eccentric sleeve 9 in the bearing 8, so as to raise or lower the shaft 11 to the desired extent.

To the outer and lower end of the shaft 11 is secured an arm 15, and to the latter is pivoted at or about its center a longitudinal rod 16, upon which is mounted near each end a toe or finger, that at one end of the rod being represented at 17 and that at the other end of the rod being shown at 18. The latter toe is hooked at the upper end and has an extended heel portion 19, to which is connected the upper end of a rod 20, the lower end of said rod being connected to an arm 21, mounted upon a rock-shaft 22, which has another arm 23, adapted to be acted upon by a suitable pattern-chain 24 at one end of the machine. A spring 21^a acts upon the arm 21 and serves to raise the latter, so as to maintain the toe 18 normally in the elevated position shown in Fig. 2. When one of the toes 17 18 is raised, the other will be depressed, said toes being so located that when either of

them is raised it will be carried into the path of some portion of the reciprocating cam-box 7—as, for instance, the projecting pin 25—so as to be struck thereby as the latter approaches the limit of its reciprocating movement.

Normally the parts occupy the position shown in Fig. 2, the toe 18 being raised and being moved to the position shown in said figure by contact with the projecting pin 25 of the cam-box as the latter completes its reciprocation to the right, the effect of this action being to raise the arm 12 and needle-bed 4.

When it is desired to lower the needle-bed 4, a high link of the pattern-chain acts upon the arm 23 so as to raise the same and depress the free end of the arm 21, thereby pulling down the toe 18 and raising the toe 17. Hence when the cam-box approaches the limit of its reciprocation to the left the projection 25 will strike said toe 17, and thereby move the latter, the rod 16, arm 15, shaft 11, and arm 12 to the position shown in Fig. 3, the parts retaining this position until it is desired to again raise the needle-bed, whereupon the arm 23 drops from the high link of the pattern-chain, lifts the toe 18 and lowers the toe 17, so as to effect restoration of the parts to the position shown in Fig. 2.

The hooking of the toe 18 prevents the same from slipping downward when struck by the pin 25, a tendency which it might otherwise have, owing to the fact that when elevated it has no positive support, but is held up solely by the spring 21^a.

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

1. The combination in a knitting-machine, of the two needle-beds, disposed at an angle to each other and each having needles adapted to play across the edge of the other bed, one of said beds being mounted so as to be movable in respect to the other, and mechanism for effecting the automatic movement of said movable needle-bed so as to slacken the stitches on the needles carried thereby.

2. The combination in a knitting-machine, of the two needle-beds, disposed at an angle to each other and each having needles adapted to play across the edge of the other bed, one of said beds being mounted on its supports so that its inner end can be raised or lowered in respect to the other needle-bed, and a movable support whereby such raising and lowering of said needle-bed is effected.

3. The combination in a knitting-machine, of two needle-beds, disposed at an angle to each other and each having needles adapted to play across the edge of the other bed, one of said beds being pivoted at its outer end so as to be capable of swinging at the inner end, and a movable support for said inner end of the needle-bed whereby the latter can be raised or lowered.

4. The combination in a knitting-machine, of a pair of needle-beds, one of which is mov-

able in respect to the other so as to slacken the stitches on the needles carried thereby, a movable support for said needle-bed, a reciprocating cam-box, and provision whereby the movement of said cam-box is transmitted to said movable support so as to effect the shifting of the movable needle-bed in respect to the fixed needle-bed.

5 The combination in a knitting-machine, 10 of a pair of needle-beds, one of which is pivoted so as to be free to swing in order to slacken the stitches on the needles carried thereby, a movable support adapted to raise and lower the swinging end of said needle-bed, and set- 15 screws for limiting the descent of the bed when the support is removed therefrom.

6. The combination in a knitting-machine, of a pair of needle-beds, disposed at an angle to each other and each having needles adapted 20 to play across the edge of the other bed, one of said beds being pivoted so as to swing, a rock-shaft having an arm for acting upon said pivoted needle-bed so as to raise and lower the same, and means for imparting to-and-fro 25 movement to said rock-shaft.

7. The combination in a knitting-machine, of a pair of needle-beds one of which is pivoted so as to swing, a rock-shaft having an arm for acting on said needle-bed so as to 30 raise or lower the same, means for imparting to-and-fro movement to said rock-shaft, and a rotatable bearing in which said rock-shaft is eccentrically mounted, whereby on turning said bearing, adjustment of the rock-shaft 35 will be effected.

8. The combination in a knitting-machine, of a pair of needle-beds, one of which is movable in respect to the other so as to slacken the stitches on the needles carried thereby, a support for said movable needle-bed, a rock- 40 shaft carrying the same, an arm on said rock-shaft, a rod carried by said arm and having at each end a projecting toe, a reciprocating cam-box, and means for rocking said rod upon the arm of the rock-shaft, whereby either of its 45 toes may be projected into the path of a projecting portion of the reciprocating cam-box.

9. The combination in a knitting-machine, of a pair of needle-beds, one of which is movable in respect to the other so as to slacken 50 the stitches on the needles carried thereby, a support for said needle-bed, a rock-shaft carrying the same, an arm on said rock-shaft, a rod carried by said arm and having at each end a projecting toe, a reciprocating cam-box 55 having a projection adapted to act upon said toes, and means for rocking the rod upon the arm of the rock-shaft, whereby the toes are moved alternately into the path of said projection on the cam-box, one of the toes being 60 hooked so as to overlap said projection, substantially as specified.

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

JOHN G. POWELL.

Witnesses:

WILL. A. BARR,
F. E. BECHTOLD.