

(No Model.)

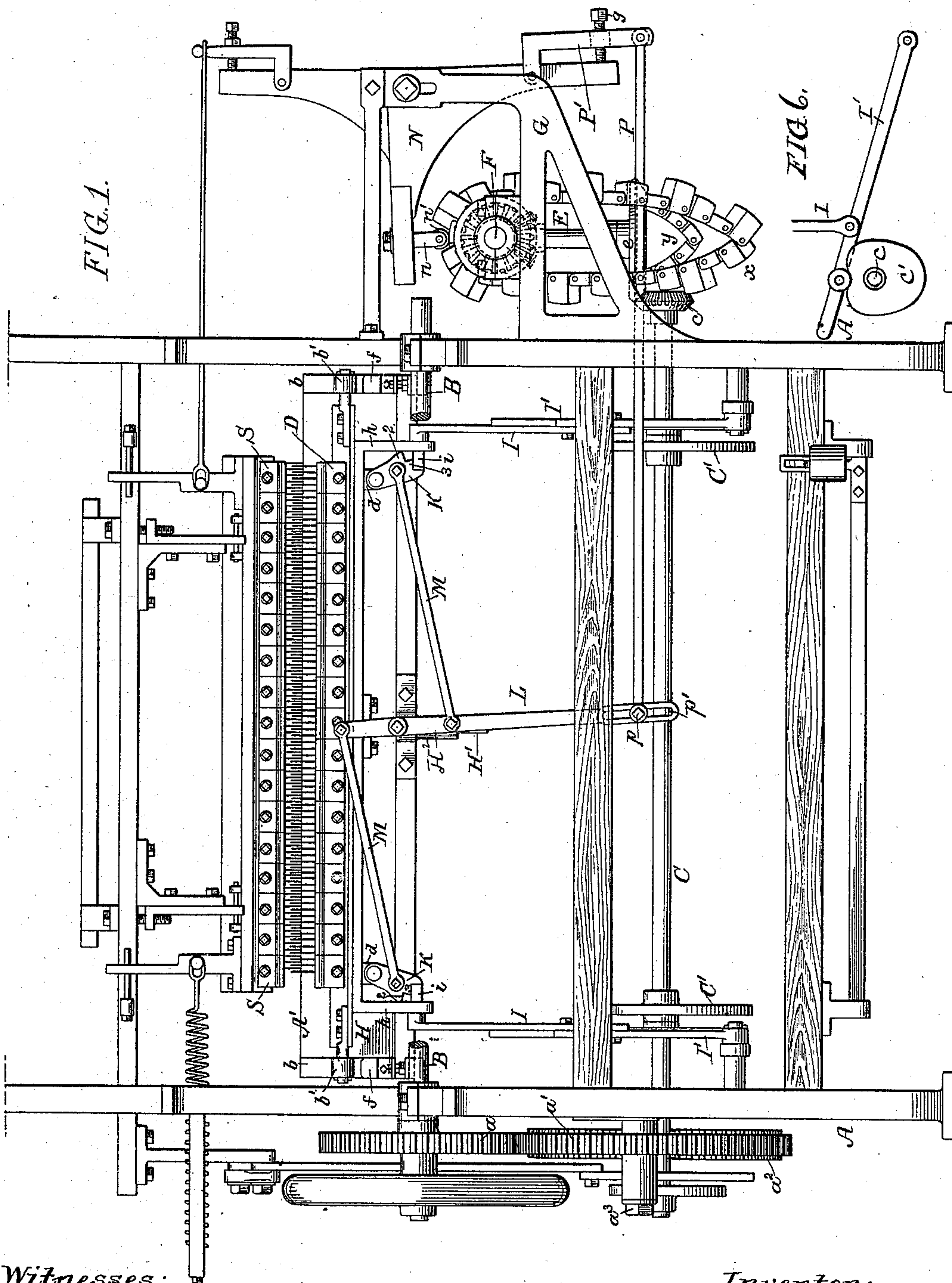
2 Sheets—Sheet 1.

S. N. GOODMAN.

STRAIGHT FRAME KNITTING MACHINE.

No. 412,495.

Patented Oct. 8, 1889.



Witnesses:

William D. Bonner.

Geo. E. Parker

Inventor:

Samuel N. Goodman

by his Attorneys

Howson & Howson.

(No Model.)

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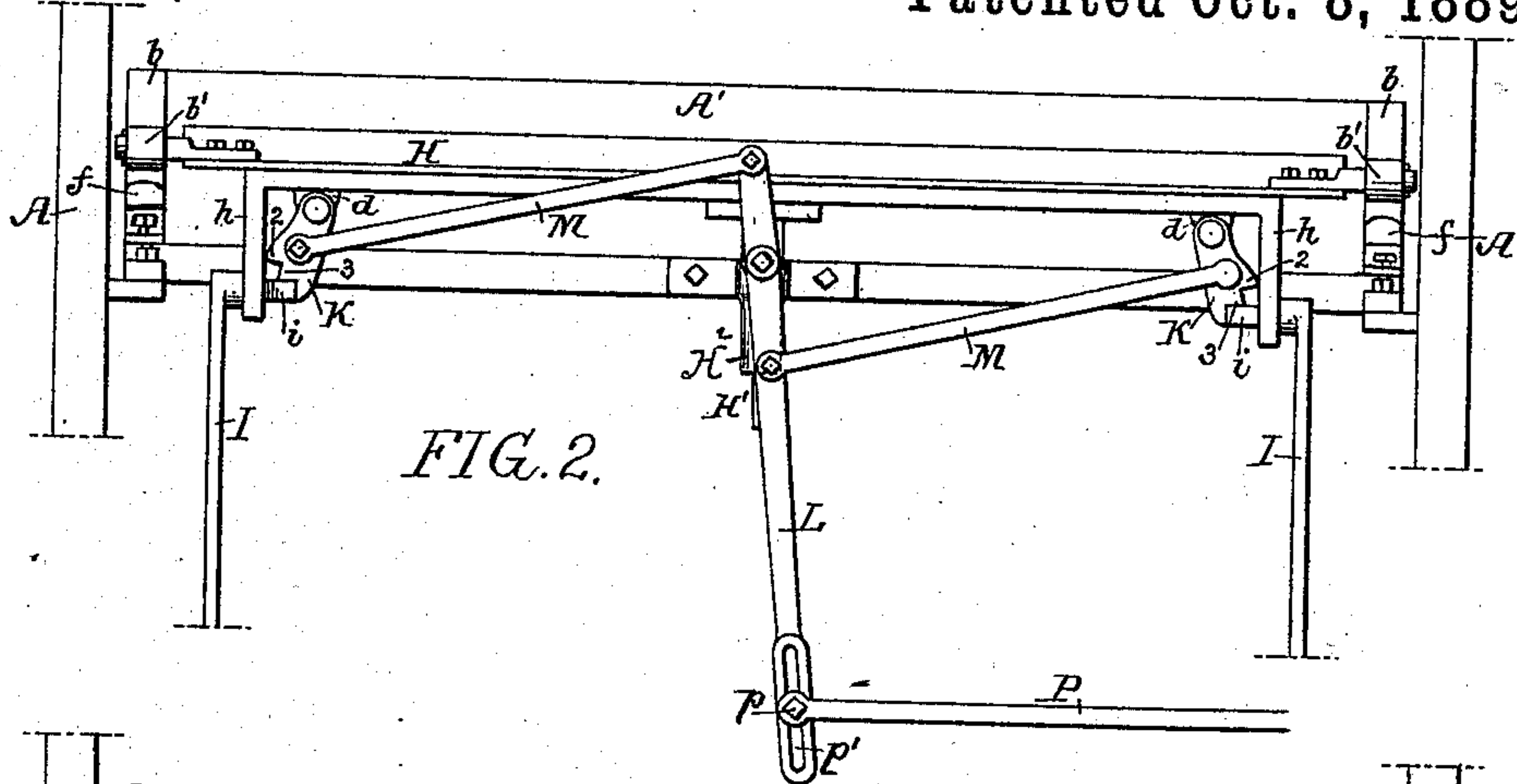


FIG. 2.

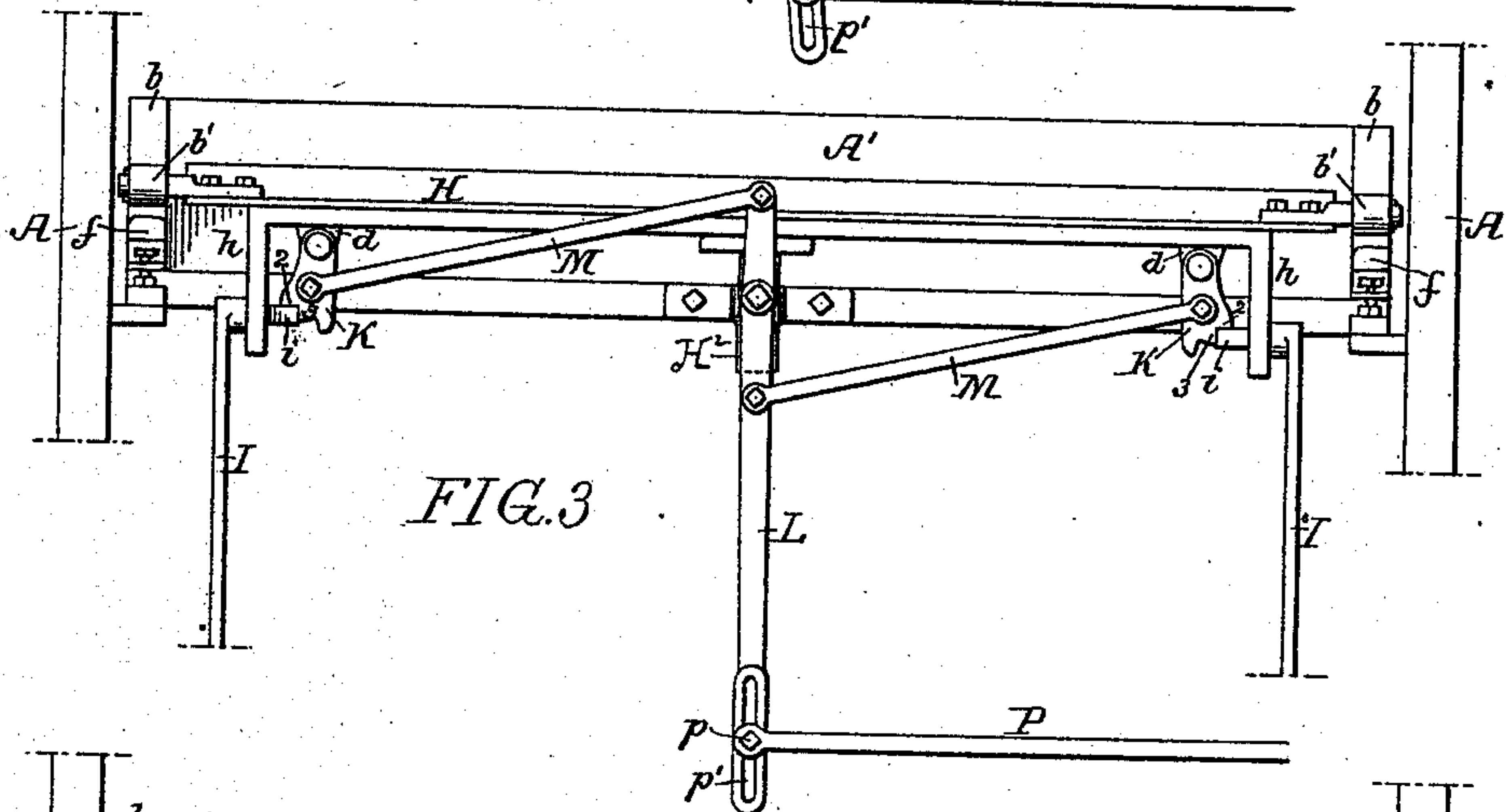


FIG. 3.

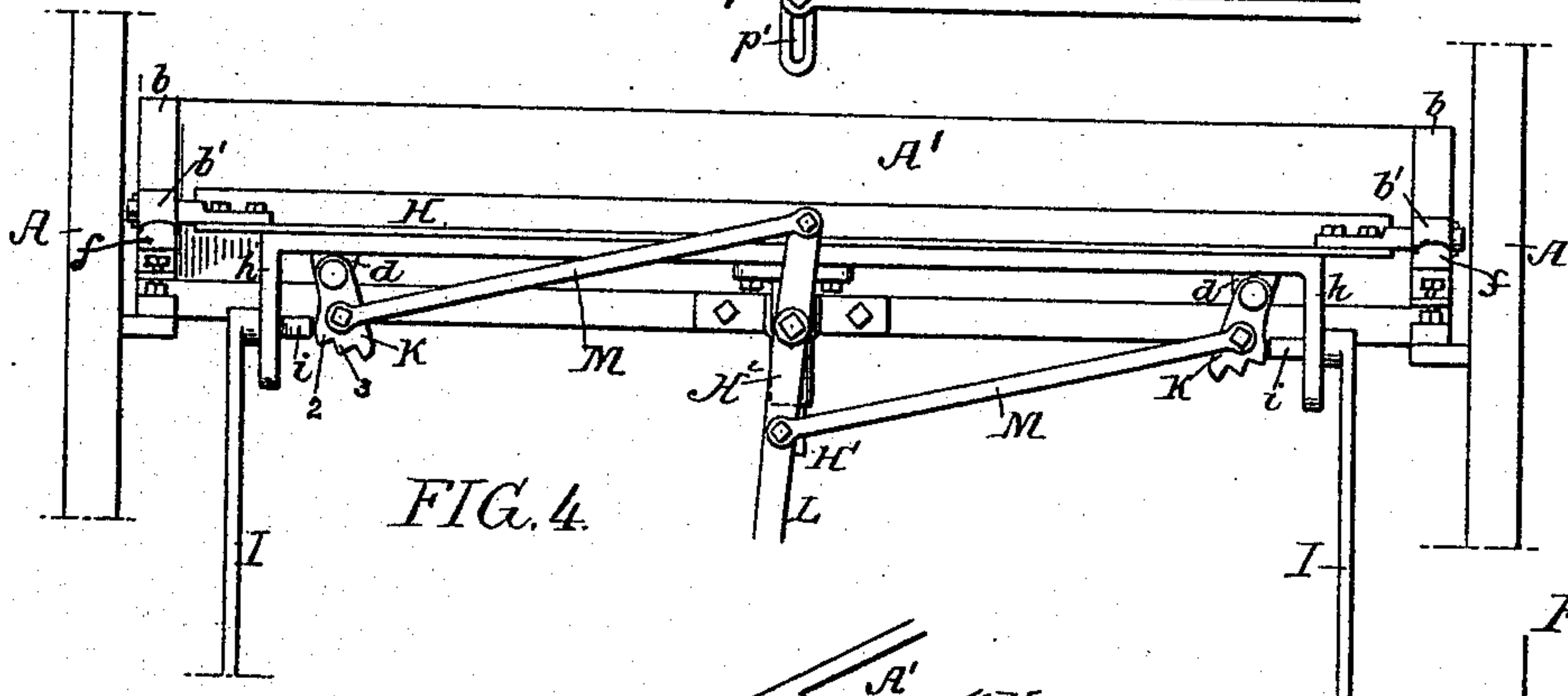


FIG. 4.

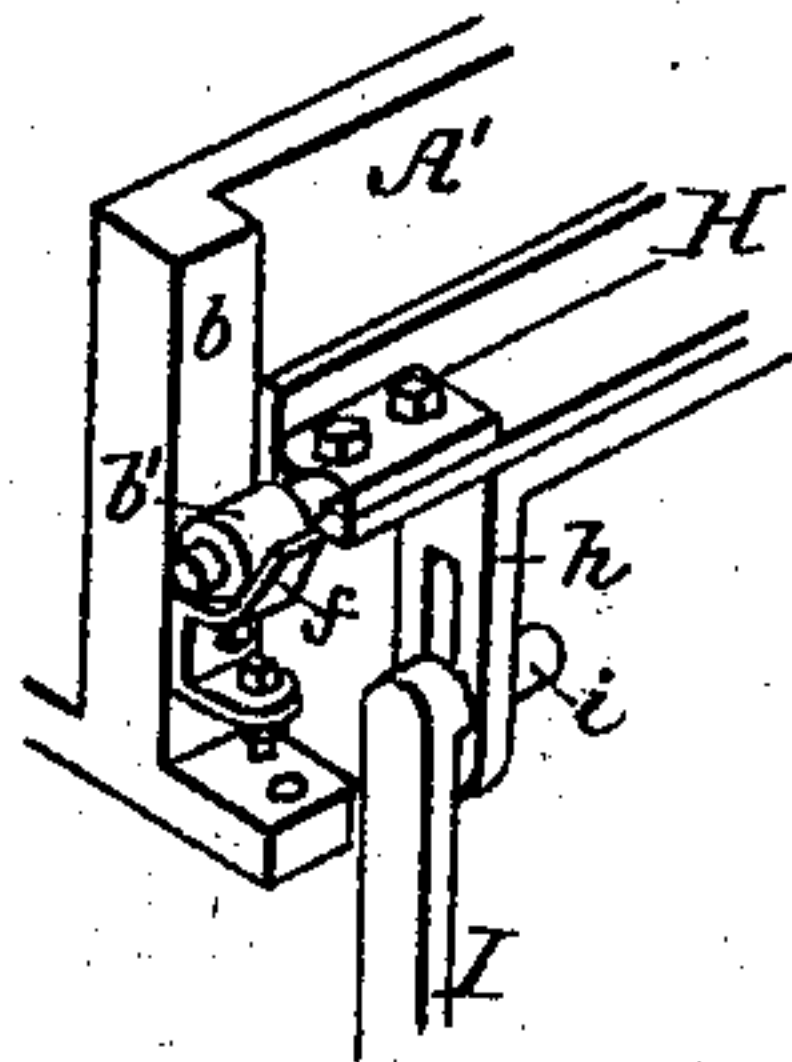


FIG. 5.

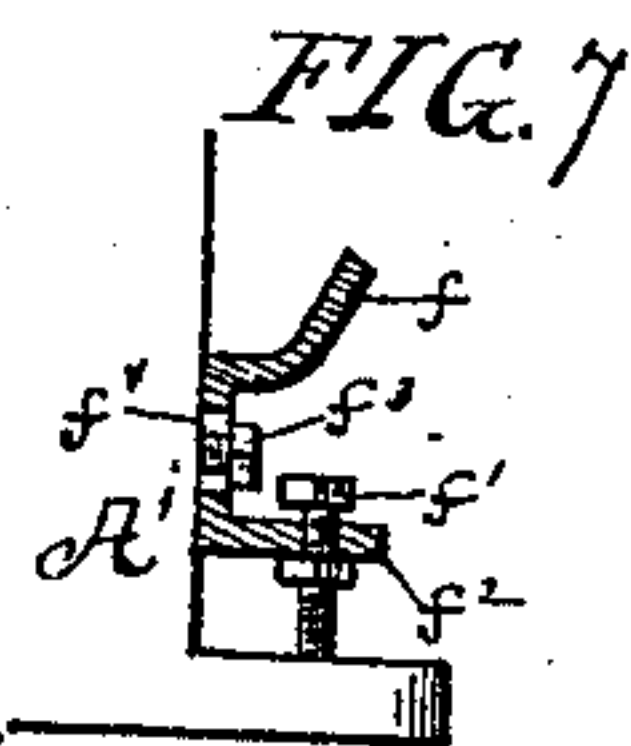


FIG. 7.

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# UNITED STATES PATENT OFFICE.

SAMUEL N. GOODMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
CONYERS BUTTON AND MARTIN L. FINCKEL, BOTH OF SAME PLACE.

## STRAIGHT-FRAME KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 412,495, dated October 8, 1889.

Application filed September 15, 1888. Serial No. 285,465. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL N. GOODMAN, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Straight-Frame Knitting-Machines, of which the following is a specification.

My invention relates to straight-frame knitting-machines in which a longitudinal needle-bar and one or more longitudinal guide-bars are combined for the purpose of producing ornamental knitted fabrics.

The object of my invention is to dispense with the usual complicated mechanism for regulating the movements of the needles, which object I attain by substituting pattern-chain and jack mechanism, as fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of a knitting-machine with my improvements attached. Figs. 2, 3, and 4 are diagrams showing the needle-bar in different positions, and Figs. 5 to 7 are detached views of portions of the machine.

A is the fixed frame of the machine, on which are the bearings for the driving-shaft B, which is shown broken away in Fig. 1, so as to more clearly illustrate the parts constituting my invention.

C is a longitudinal shaft geared to the shaft B through the intervening spur-wheels  $a$   $a'$   $a^2$ , the wheel  $a'$  being mounted on a stud  $a^3$  on the frame of the machine.

The shaft C has a bevel-pinion  $c$ , which engages with a bevel-wheel  $e$ , on a vertical shaft E, which is geared by means of bevel-wheels, as shown by dotted lines, to a shaft F, mounted on a bracket G, secured to the frame of the machine. This shaft F carries the drums over which the pattern-chains  $x$  and  $y$  pass. The pattern-chain  $y$  dictates the movement of the guide-bars S in the ordinary manner, while the pattern-chain  $x$  dictates the vertical movement of the needle-bar.

A' is a longitudinal frame secured to the fixed frames A in any suitable manner, and on the frame A' is a frame H, which is located in front of the frame A', extends from end to end of the same, and has a downwardly-

projecting bar H', passing through a suitable guide H<sup>2</sup> on the lower bar of the frame A', as shown in Figs. 1 to 4. Hung to the under side of the frame H are arms  $h$ , slotted for the passage of lifter-pins  $i$ , which project from the upper ends of bars I, the latter being hung to arms I', pivoted to studs on the frame of the machine and acted upon by cams C' on the shaft C in order to give each bar a definite vertical movement. (See Fig. 6.)

Mounted on the frame H is the needle-bar D, having secured to it a series of needles of the usual pattern.

At each side of the frame H are rollers  $b'$ , bearing against ways  $b$  on the frame A', and adjustable guiding pockets or stops  $f$  are secured to the frame A', so as to limit the downward movement of the frame H, the adjustment being governed by a set-screw  $f'$ , carried by a flange  $f^2$  of the pocket and bearing on the base of the frame A', a set-screw  $f^3$ , adapted to a slot  $f^4$  in the front of the pocket-plate, serving to lock the latter in position after adjustment. (See Fig. 7.) Lugs  $d$  project from the underside of the frame H, and to these lugs are pivoted jacks K, which are stepped at their lower ends, forming projections 2 and 3, one or other of which can be thrown into engagement with the lifter-pins  $i$  of the vertically-reciprocated bars I. These jacks K are connected by rods M to a lever L, pivoted to the frame A'. The lever L is connected to a lever N by a connecting-rod P, which has at one end a pin  $p$ , adapted to a slot  $p'$  in the lever L, so that it can be adjusted to different positions on the lever in order to regulate the throw of said lever. The rod P is connected to the lever N through the medium of the pivoted arm P', having a set-screw  $g$ , which can be adjusted so as to vary the position of the lever L, as desired. The lever N is pivoted to the frame and has a depending pin  $n$ , carrying a friction-roller  $n'$ , with which the lugs on the pattern-chain  $x$  engage, so as to impart movement to the jacks K through the medium of the levers N and L and rods P and M, the weight of the overhanging arm of the lever N and its depending pin and roller keeping the latter in contact with the pattern-chain. Thus, if the



highest lug of the chain comes in contact with the roller the jacks will be moved out of engagement with the pins *i*, as shown in the diagram, Fig. 4, and the pins *i* will play in the slots of the arms *h*, so that no lift will be imparted to the needle-bar, while if a lug of medium height comes in contact with the roller *n'*, as shown in Fig. 3, the jacks will be moved to a position to bring the pins *i* in contact with the stops 2, when the boss *I* is raised and the lost movement of said pins will be restricted and a partial lift imparted to the needle-bar, while if the plain link of the chain comes in contact with the roller *n'* the jacks will be moved to such an extent that the stops 3 will engage with the pins *i*, and the needle-bar will be lifted to the full height, as shown in Figs. 1 and 2. The desired changes in the lifting of the needle-bar are thus effected by much simpler mechanism than the usual cams or Jacquard devices and much greater variation in the pattern produced is possible than when cams are employed, owing to the greater extent of the chain.

In double-bar machines the governing

mechanism may be applied to one or both bars, as required.

I claim as my invention—

1. The combination of the needle-bar of a knitting-machine, a reciprocating lifter therefor, a stepped jack, through the medium of which the lifter acts on the bar, a pattern-chain, means whereby the same is caused to adjust the jack, and mechanism for operating the pattern-chain and lifter.

2. The combination of the needle-bar of a knitting-machine, a guide-frame therefor, vertically-reciprocated lifters, stepped jacks carried by the needle-bar and adapted to engage with said lifters, a pattern-chain, and mechanism actuated thereby for adjusting the jacks, and means for operating said pattern-chain, substantially as described.

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

SAMUEL N. GOODMAN.

Witnesses:

HENRY HOWSON,  
WILLIAM D. CONNER.