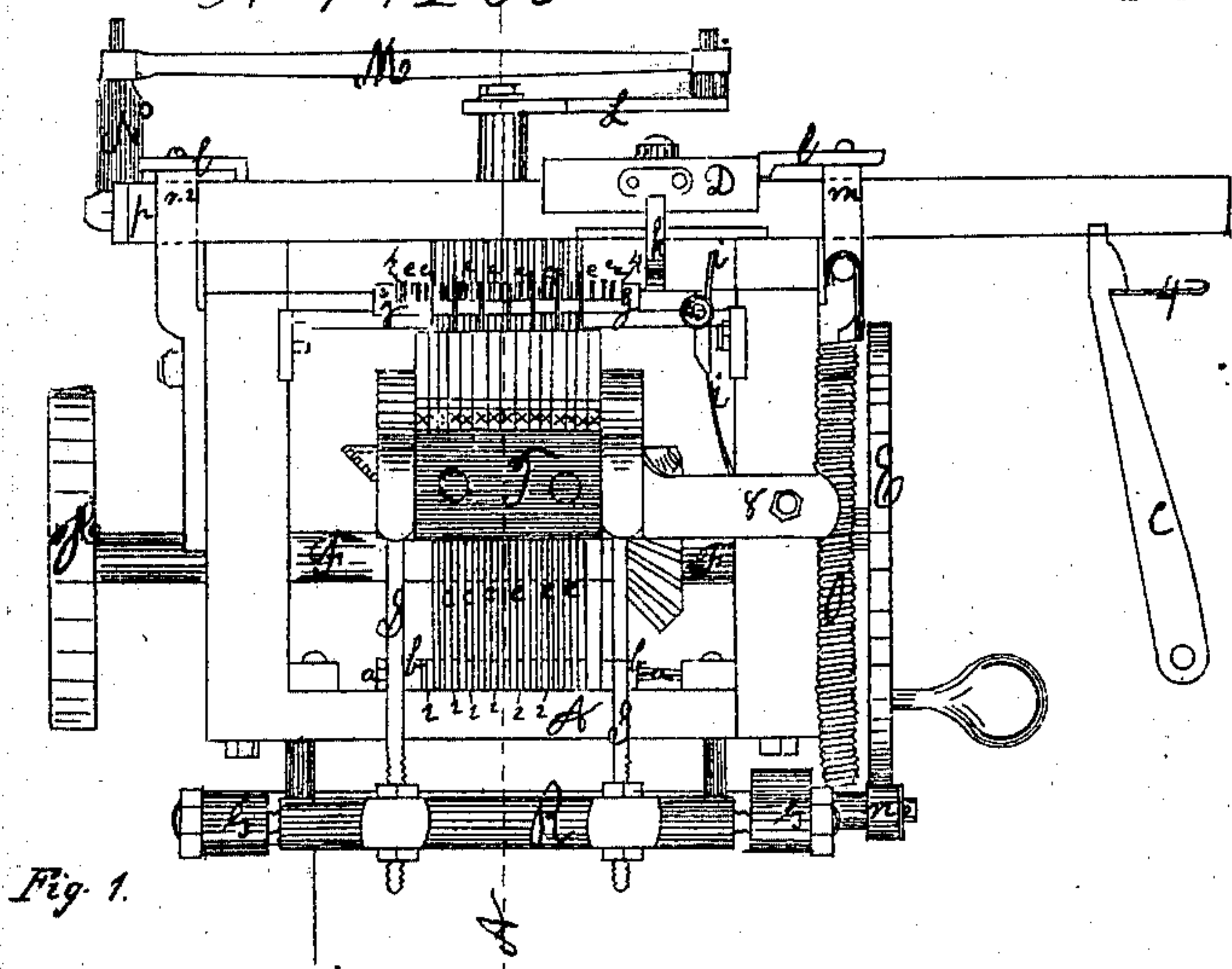


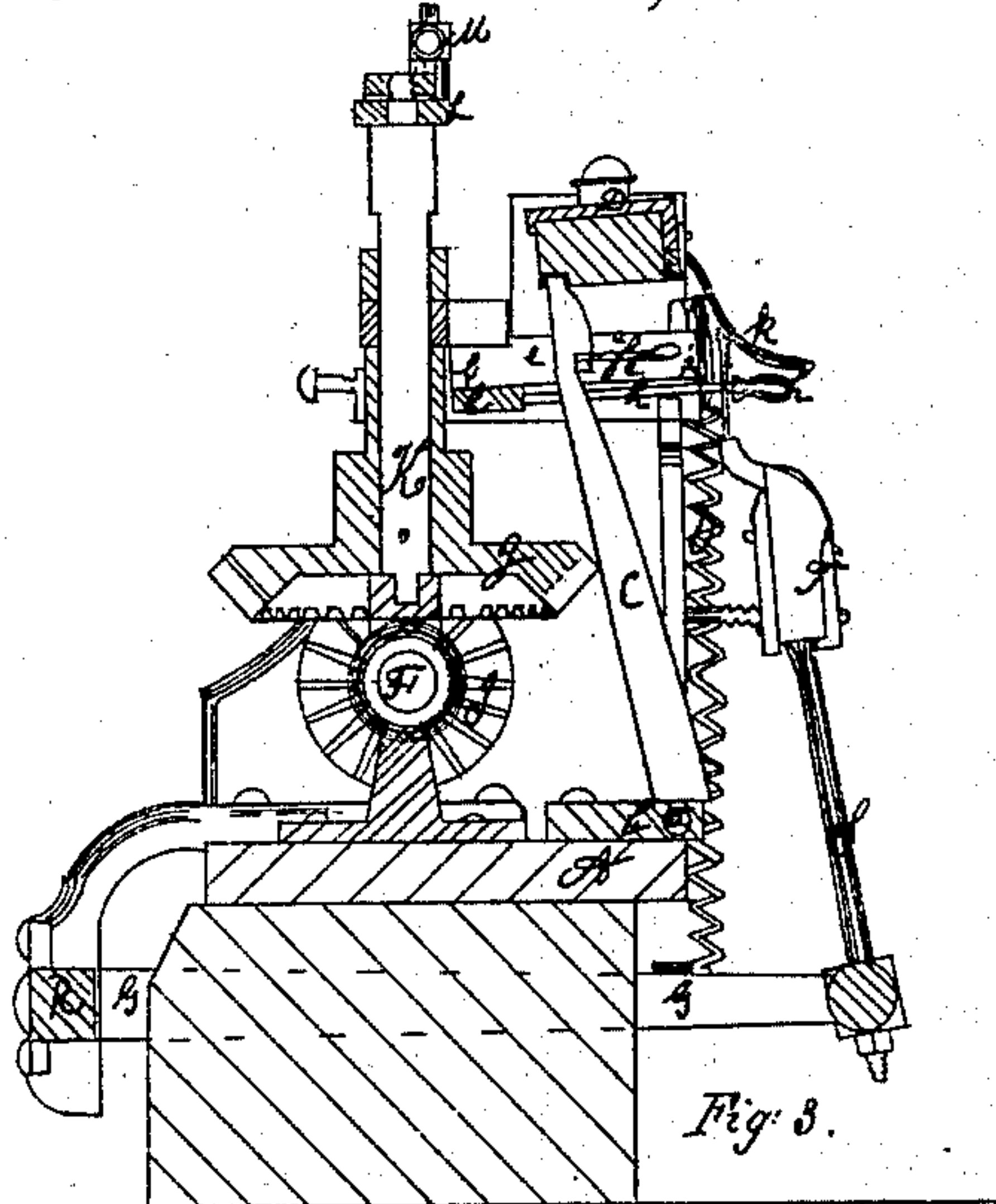
*W. H. Abel.*  
*Knitting-Machine.*

*N<sup>o</sup> 74286*

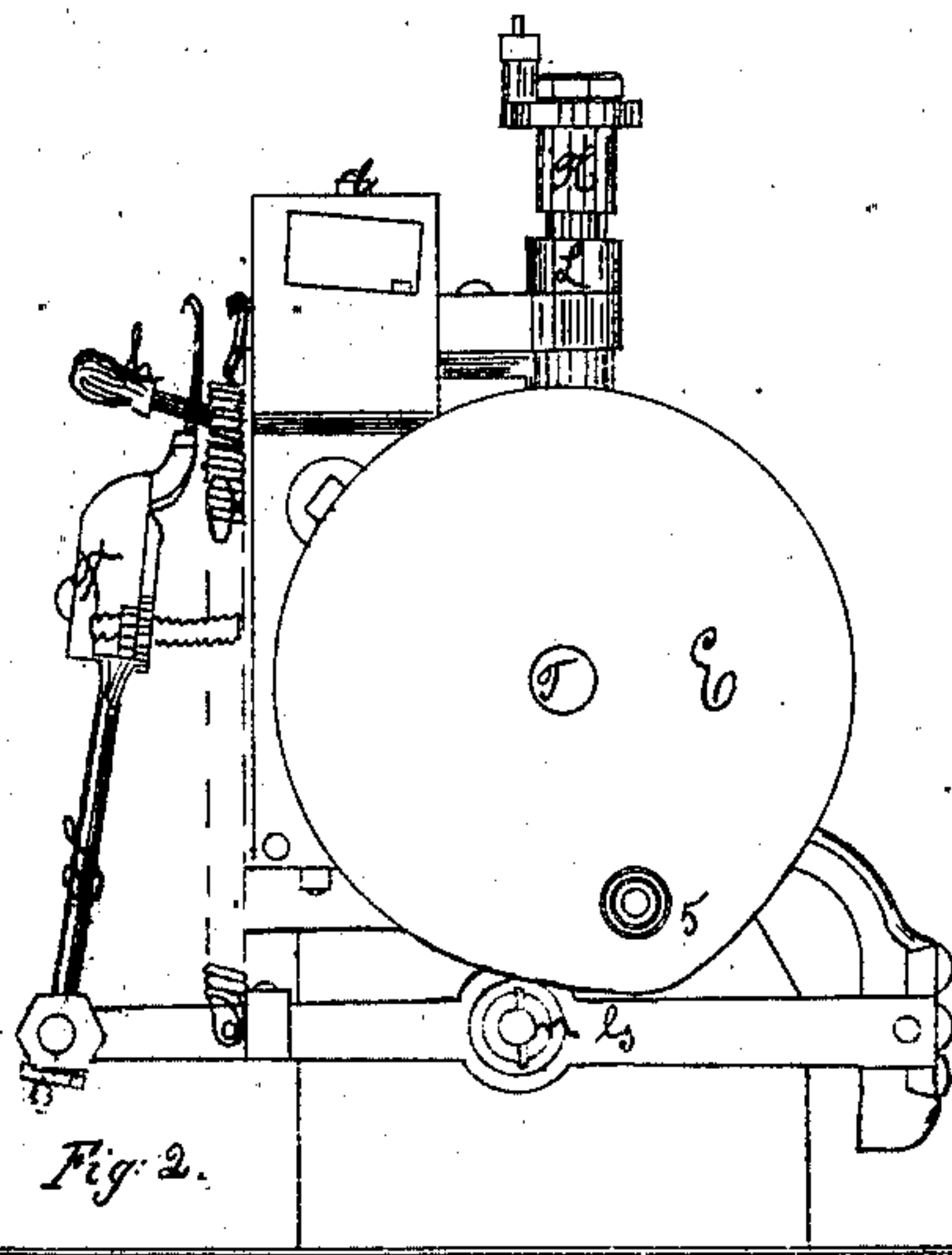
*Patented Feb. 11, 1868.*



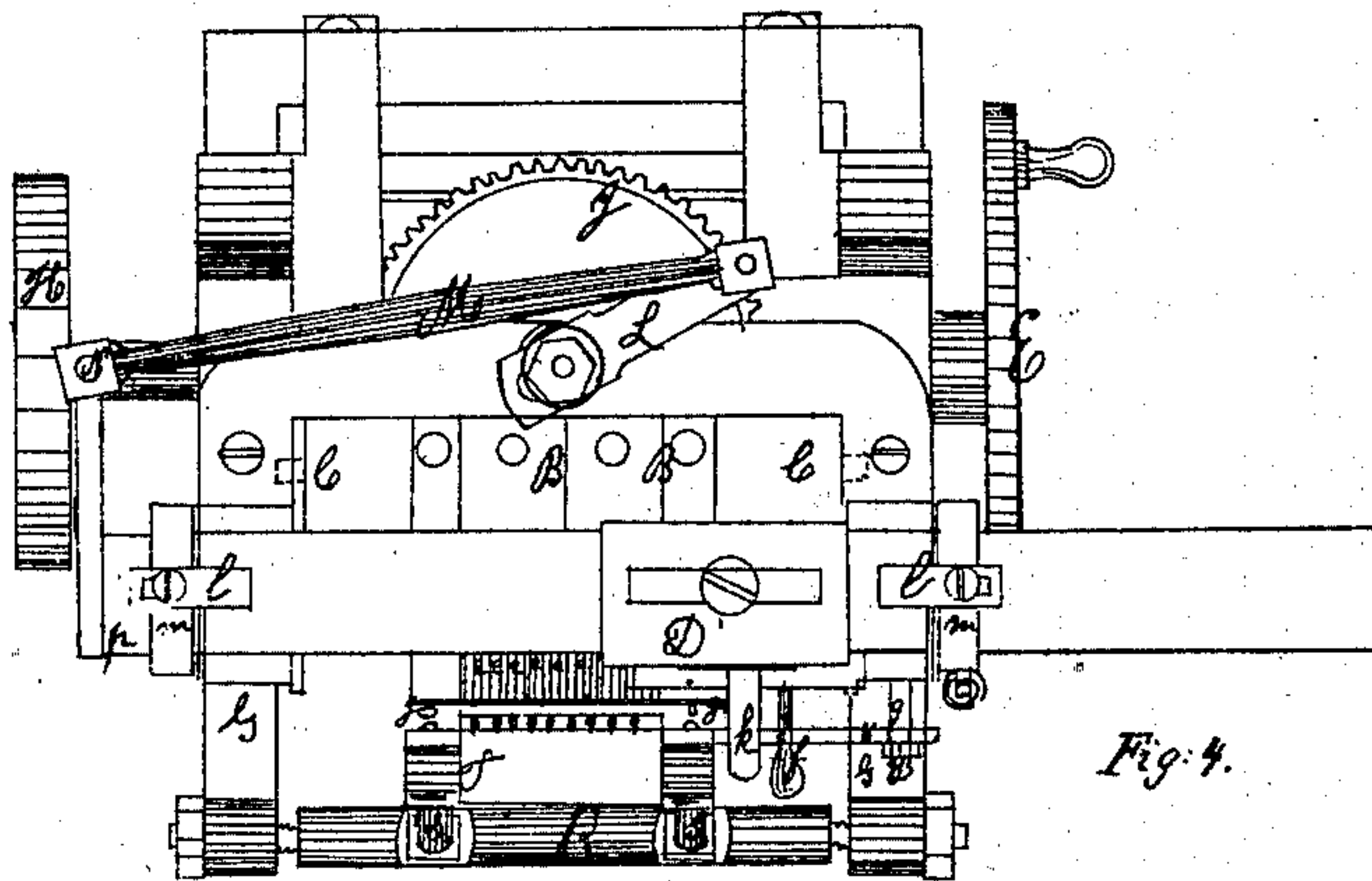
*Fig. 1.*



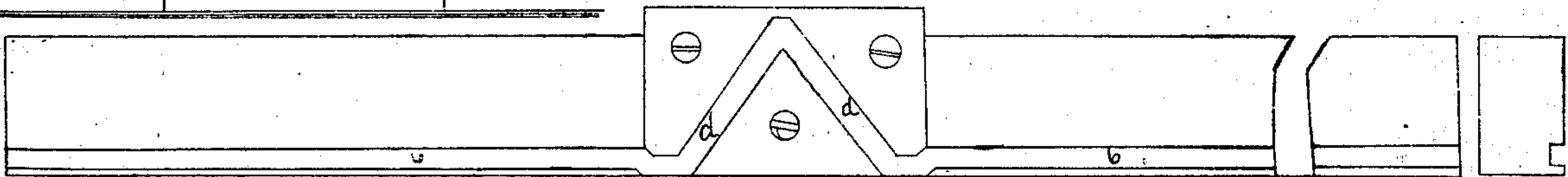
*Fig. 3.*



*Fig. 2.*



*Fig. 4.*



*Witness*

*John C. Crann*

*Nathan Brown*

*Inventor*

*William H. Abel*



# United States Patent Office.

WILLIAM H. ABEL, OF GREENVILLE, RHODE ISLAND.

*Letters Patent No. 74,266, dated February 11, 1868.*

## IMPROVEMENT IN KNITTING-MACHINE.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM H. ABEL, of Greenville, in the county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation.

Figure 2, a right-hand end view.

Figure 3, a transverse section on the line A B of fig. 1.

Figure 4, a plan or top view; and

Figure 5 shows the bottom side of a detached slide bar.

Figure 6, a detached lever and selvedge-hook, all pertaining to the said invention.

This invention consists, first, in the employment of a series of levers or jacks, *c*, which swing or oscillate on a rod, *a*, passing through their lower ends, and through supports *b*, secured to the base, *A*, of the machine. The lower ends of these jacks are otherwise retained in position by bars or plates *2* between them, and a series of comb-bars, *e*, arranged near the top of said jacks, serving to guide the latter as they are moved forward and back by the slide-bar provided with the straight and angular grooves. The extreme forward ends of these comb-bars *e* serve for what are generally called knocking-over bars, to bring the old or already-formed loops over the newly-formed loops in the process of knitting. The horizontal needles *f* are inserted in the front edge of the jacks, and there secured, so that the forward and back motion of the jacks or levers gives the same motion to the horizontal needles.

A stationary horizontal bar, *g*, is arranged between the forward ends of the comb-bars and the vertical needles, and in front of the webbing. This bar is for bringing over the loops from the vertical needles, and performs the same operation with the loops on the vertical needles that the forward ends of the comb-bars do with the loops on the horizontal needles. This bar *g* takes the place of what is called the slide on the ordinary rib-knitting machine.

The rear ends of the comb-bars *e* are secured to any suitable clamping-device or other support *B*, which is fastened to a longitudinal bar, *C*, pivoted at each end. By means of this pivoted bar the forward ends of series of comb-bars may be depressed by liberating the rod *h* from the spring *i*, and then bearing the end of the rod *h* downward. This lowering of the forward ends of the comb-bars exposes the ends of the horizontal needles, so that a portion or all of the loops on said needles may be replaced or adjusted at any time.

To the top or either edge of the slide-bar, I arrange a sliding friction thread-carrier, *D*, which has a feeding-arm, *k*, projecting from its front edge, and curving downward to near the ends of the horizontal needles, when said needles are farthest out, to receive the thread which passes through the end of said arm to the needles. It will be observed that the slide-bar has more motion longitudinally than is necessary for the thread-carrier, and to bring the latter into the right position to deliver the thread to the needles in proper time, the longitudinal motion of the thread-carrier must cease before the same motion of the sliding-bar ceases. To accomplish this object, I employ an adjustable stop, *l*, on the top of the stand *m*, at each end of the machine-frame, so that when the thread-carrier has moved a sufficient distance in either direction, the end of the same comes in contact with the adjustable stop, which stops said thread-carrier in the right place.

At each extremity of the series of horizontal needles, and parallel with the same, I employ a selvedge-hook, *4*, shown in fig. 6, the object of which is to hold and guide the thread over the outside needle and form the selvedge. A cam, *E*, secured to one end of the main shaft *F*, acts upon a roller-stud, *n*, projecting from the side of the rocking-lever *G*, and at each revolution of the shaft and cam, the rocking-lever *G*, pivoted shaft *R*, adjustable rods *S*, clamp *T*, and the vertical needles, receive a slight upward motion by means of a short and easy curve, *5*, in the operating-edge of the cam and spiral spring *O*. This upward motion frees the old or already-formed loops from the latches of the vertical needles, then a downward motion brings the already-formed loops over the newly-formed ones, and produces a rib in the web knit. By throwing the loops off the vertical needles and turning the clamp *T* and connections downward, the horizontal needles alone will perform plain knitting.



Motion is imparted to the machine by a belt on pulley H, shown in fig. 1, or by any other suitable device, and through the bevel-gears I and J on the shaft F, and the vertical shaft K, to the crank L, connecting-rod M, and the vertical stand or post N, attached to the end *p* of the slide-bar, which is thereby moved longitudinally with the friction thread-carrier over and in contact with the top ends of the jacks or levers *c*, which top ends fit into straight grooves *6*, and angular grooves *d*, in the under side of the slide-bar. The angular grooves act upon the top ends of the levers *c*, to carry the horizontal needles and the selvedge-hooks out or forward to near the end of the feeding-arm, where the selvedge-hook at each side holds the yarn or thread, till the first needle passes under the thread to hook on, draw back, and form a loop, each needle performing the same operation every time the slide-bar receives its full motion in either direction. The arm 8, which forms the back of the clamp T, projects to accommodate a set-screw, 9, the point of which bears against the front of the frame to adjust the clamp and vertical needles, and keep the latter at the proper distance from the ends of the needles *f*.

What I claim as new, and desire to secure by Letters Patent, is—

1. The employment of the stationary bar *g*, in the manner and for the purpose set forth.
2. Liberating and depressing the comb-bars, and replacing the same by means of the rod *h*, and the spring *i*, substantially as and for the purpose specified.
3. Combining the needles *f* and the selvedge-hooks with the jacks *c*, in the manner and for the purpose specified.
4. The combination of the cam E, roller-stud *n*, rocking-levers G, pivoted shaft S, clamp T, arm 8, set-screw 9, with the vertical needles, all arranged to operate substantially as and for the purpose set forth.
5. The combination of all the parts, arranged to operate substantially as and for the purpose set forth.

WILLIAM H. ABEL.

Witnesses:

E. S. BOWEN,  
R. J. BROWN.