

M. L. Roberts.  
Knitting Mach.

No. 93,008.

Patented Jul. 27, 1869.

Fig. 1.

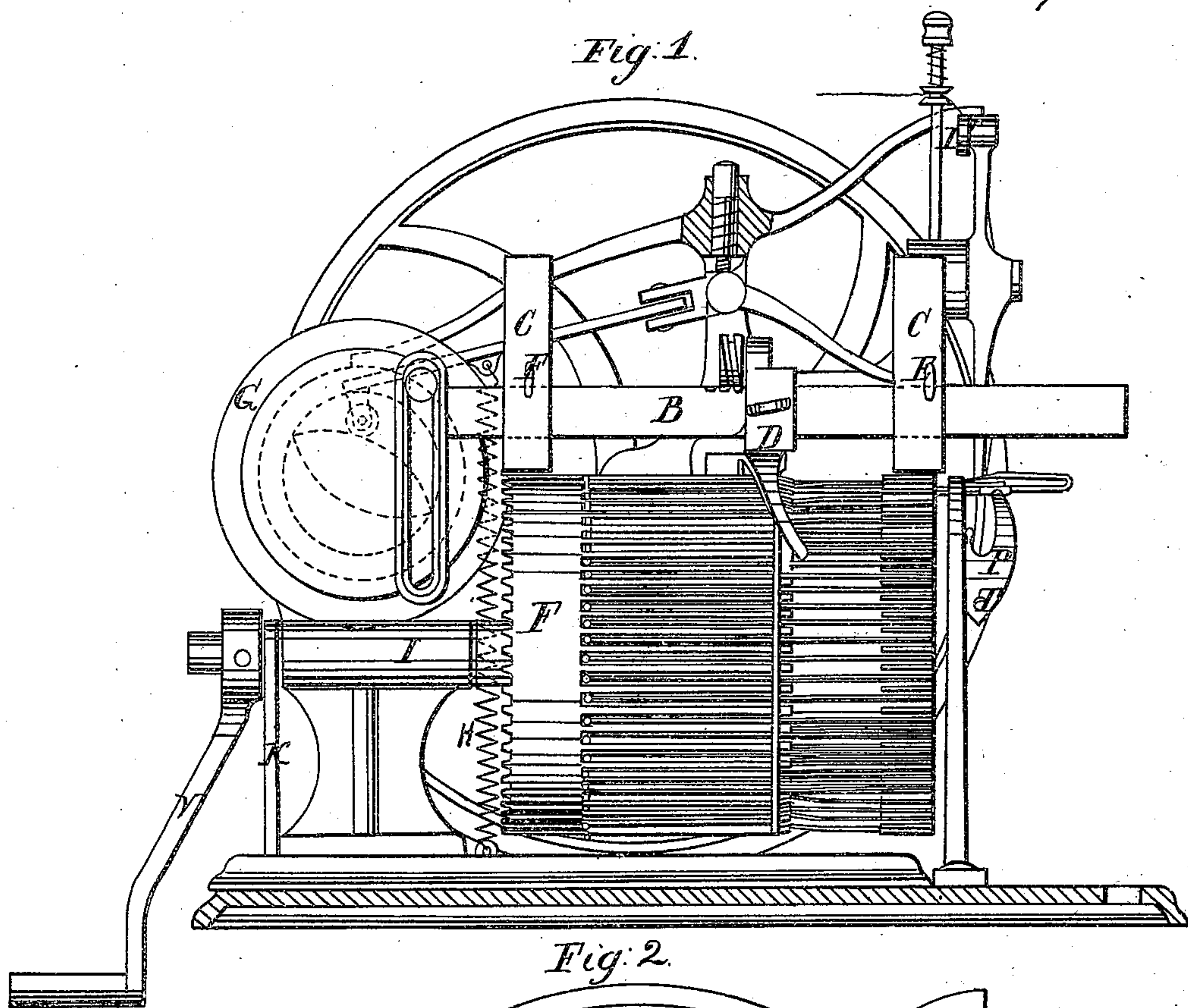
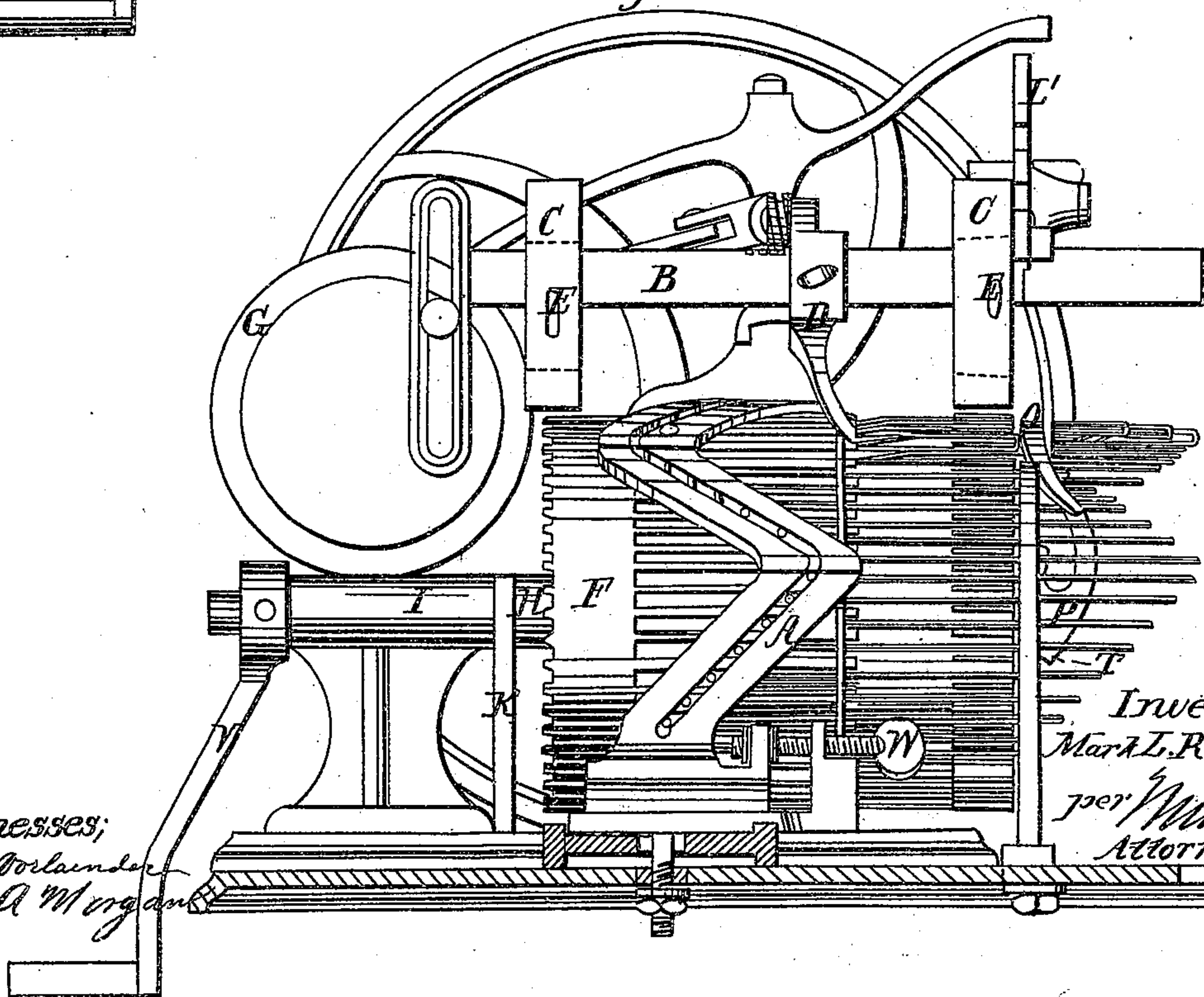


Fig. 2.



Witnesses;  
Max. Vorländer  
Wm. A. Morgan

Inventor;  
Mark L. Roberts  
per *[Signature]*  
Attorneys



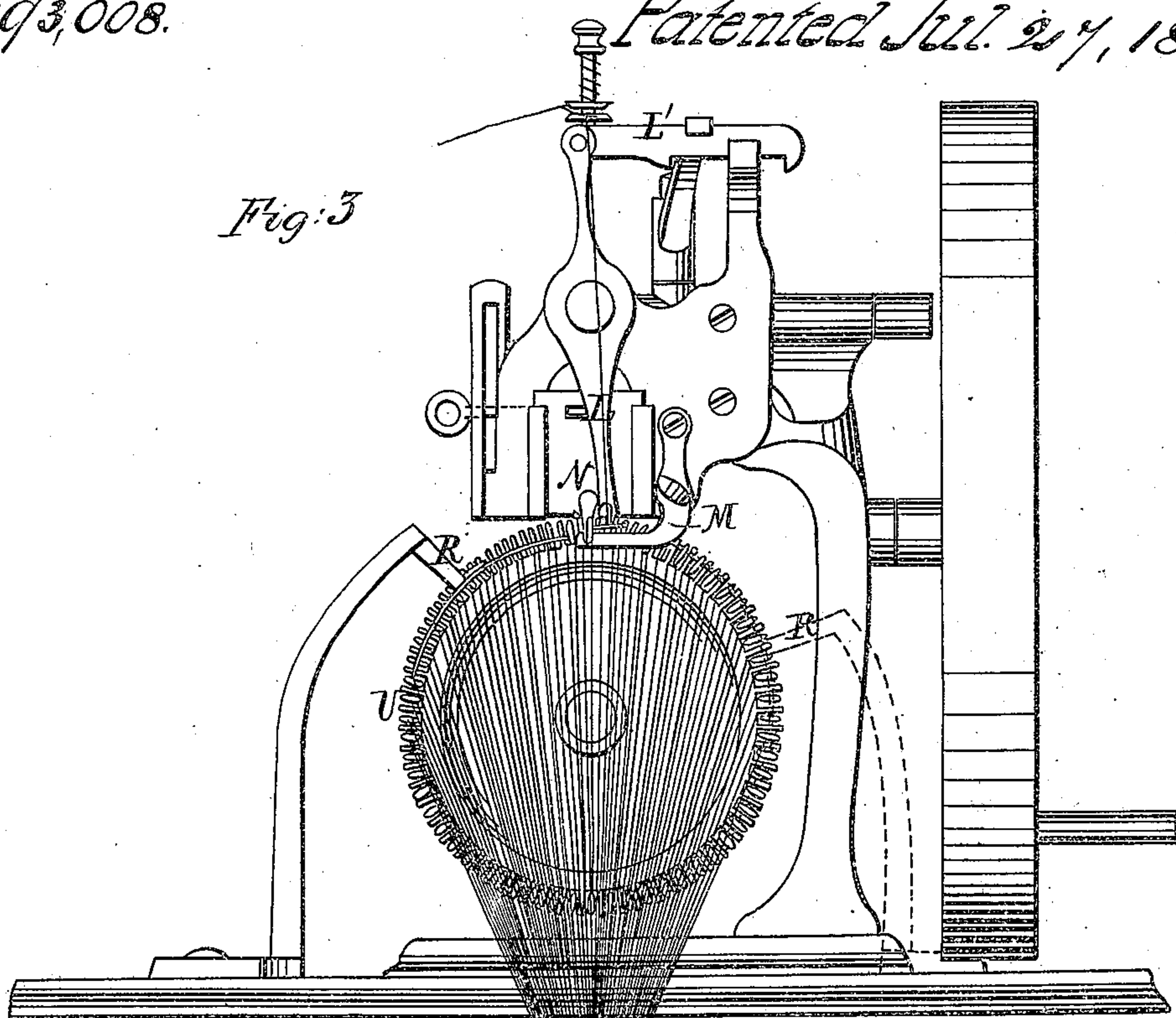
*M. I. Roberts.*  
*Knitting Mach.*

*Sheet 2, 2 Sheets*

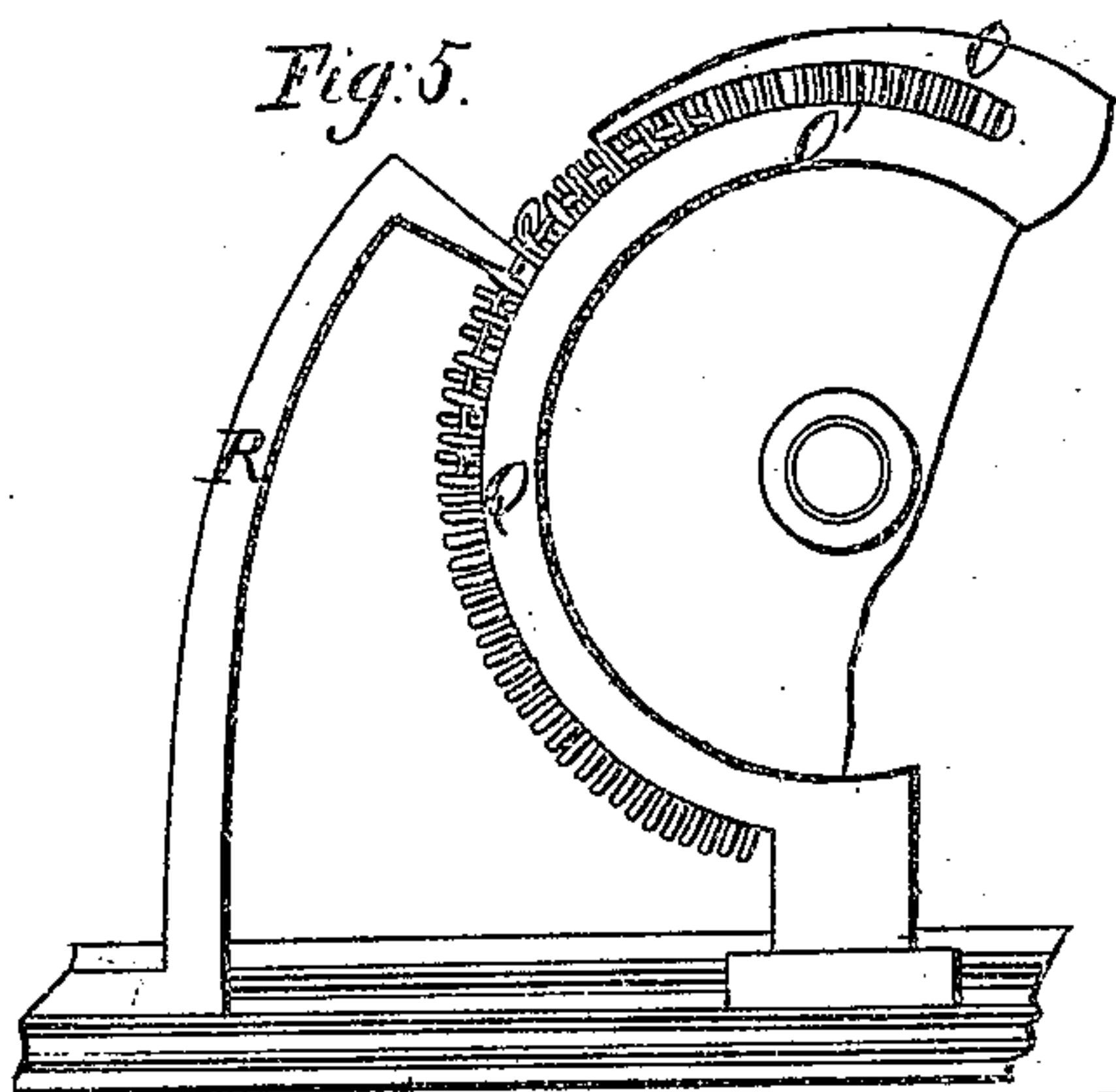
*No 93,008.*

*Patented Jul. 27, 1869.*

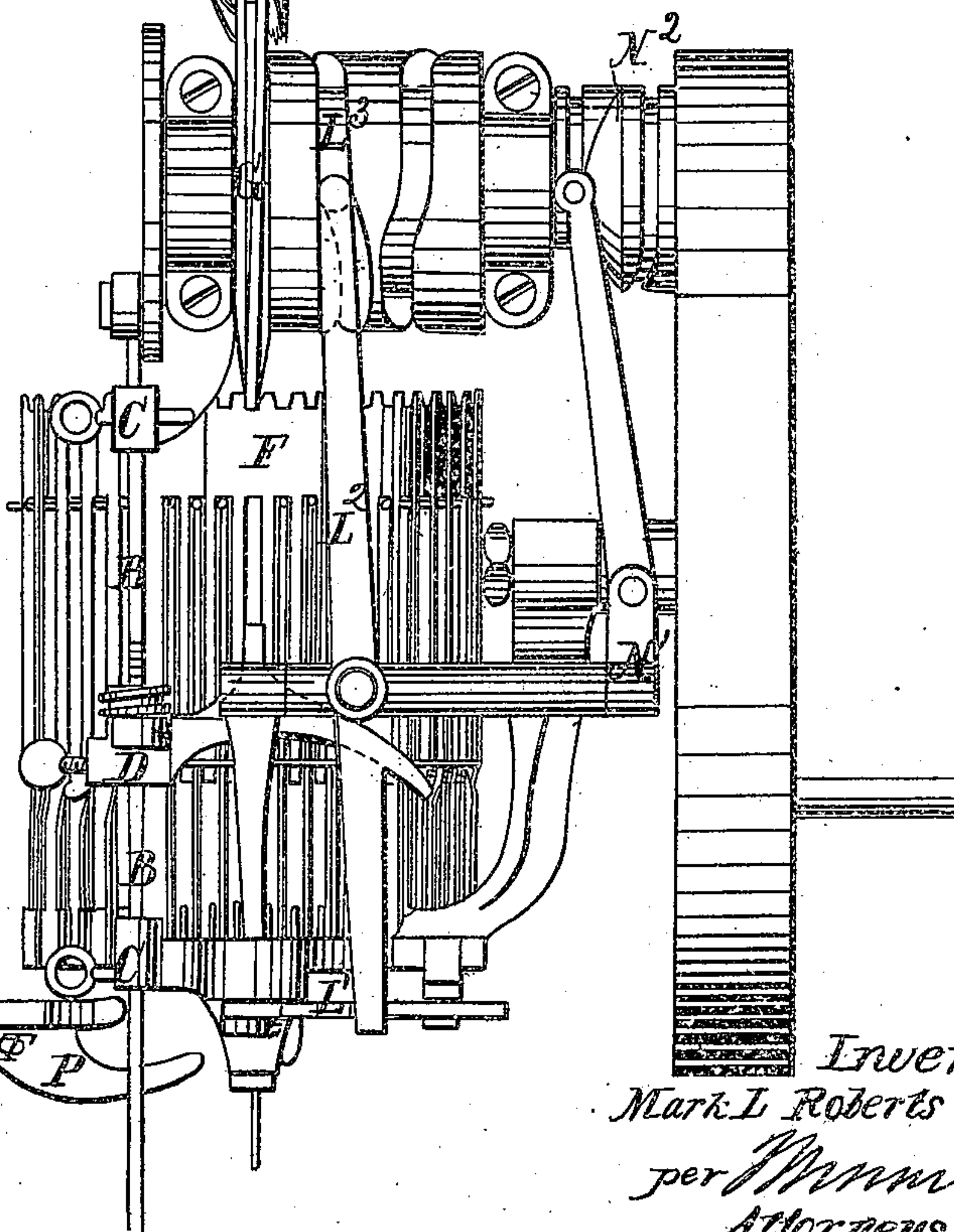
*Fig. 3*



*Fig. 5.*



*Fig. 4.*



*Witnesses;*  
*Max. W. Laender*  
*Anna Morgan*

*Inventor;*  
*Mark L. Roberts*  
*per Munn & Co*  
*Attorneys*



# United States Patent Office.

MARK L. ROBERTS, OF NEW BRUNSWICK, NEW JERSEY.

Letters Patent No. 93,008, dated July 27, 1869.

## 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, MARK L. ROBERTS, of New Brunswick, in the county of Middlesex, and State of New Jersey, have invented a new and useful Improvement in Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in knitting-machines, of that character for which Letters Patent were granted to me for certain improvements therein, dated May 7, 1867, the object of which is to extend the capacity and usefulness of the same; and

It consists in means for adapting such machines to knitting plain tubular goods with great rapidity.

Also, in an arrangement of means whereby they may be readily changed from the conditions of a machine, such as represented in the said patent, to the condition more especially adapted for knitting the said plain tubular goods, and from that to the said first-mentioned condition.

Figure 1 represents a side elevation of my improved machine, when in the condition for operating as represented in the said patent, for knitting either tubular, flat, or other formed articles.

Figure 2 represents a side elevation, when adjusted to work according to the present invention, for knitting plain tubular goods.

Figure 3 represents an end elevation, when in the same condition as represented in fig. 1.

Figure 4 represents a plan view, when in the same condition.

Figure 5 represents a detail end view, as in fig. 2.

Similar letters of reference indicate like parts.

In order to greatly increase the capacity of this machine for knitting plain tubular goods, I propose to arrange it so that instead of operating only one needle at a time, as heretofore, with an intermitting motion of the cylinder, I may, by the application of the cams A, cause a greater number of needles to be under action at once, and under such an arrangement that a very rapid continuous motion may be communicated to the cylinder, which said arrangement is designed also, in the case of the employment of large cylinders for knitting tubular material, to be formed into grain and other similar sacks, to admit of increasing the number of such needle-operating cams, applied to the cylinder, and their adjuncts, to a considerable number, as for instance, to the number of ten, or even twenty, in one machine, and the capacity thereof correspondingly increased, the knitting-operation being effected thereby simultaneously by each set of apparatus.

To this end I arrange the slide B of the needle-carrier in its supports C, so that it can be readily raised

sufficiently above the said cylinder to support the needle-carrier out of the way of the cam A, when applied, which I accomplish by extending the supports and the slots therein, through which the slide B works, sufficiently upward to admit of raising the latter above the pins E, which may be inserted below the slide, and maintain it in its elevated position.

I also arrange the needle-cylinder F in bearings, so as to allow it to have a longitudinal movement, sufficient to throw it out of gear with the actuating spiral flange G, which is accomplished, in this instance, by arranging the shaft H so as to slide in the bearings I, and employing a bent rod, K, which may be hooked around the said shaft, between the shoulders of the same and either end of the bearing, to maintain the cylinder in either position.

Instead, also, of the vibrating needle-beard opener L, the stationary needle-support M, and the presser N, I employ the improved needle-guide Q, which also serves to cause the loops to be pressed back on the shanks of the needles and the needle-beard opener and yarn-guide P.

The said guide Q is so formed as to receive the needles as soon as they are forced out beyond the end of the cylinder, between its upper and lower parts O and O', and guide them with great exactness to the needle-beard opener and yarn-guide P.

The said needle-guide, when constructed to operate singly, may be composed only of the said parts O and O', the one, O', extending at the same curvature as the cylinder, sufficiently to insure the entrance of the opener P into the beards of the needles, while the other, O, is carried outward as far as the point where the needles begin the return movement, in order to cause the loops to slide on to the needle-shanks, and the whole is detachably connected to the frame of the machine.

But in cases where a number of cams is to be arranged around the cylinder, requiring a correspondingly additional number of needle-guides and openers, I prefer to join all the parts O' of the several needle-guides, and thereby form a continuous ring in front of the cylinder, through the central opening of which the fabric will be delivered.

The needle-beard opener P consists of a thin pointed and curved plate of any suitable metal, supported by any suitable rod, R, connected to its outer face, and so adjusted, with reference to the salient angle of the cam A, that when the needles are at their outermost position, their points will pass around the said support R, where it is joined to the needle-beard opener. It is provided with a guide-eye at S, to conduct the yarn to the under side thereof, to be entered into the beards of the needles, and another guide-eye, T, to return it again to the upper side, as it is drawn around by the cylinder in the beards of the needles, for the previously-formed loops to be knocked off over it by the comb



U, the said guide-eyes being connected by a groove on the inner side of the needle-beard opener.

Instead of communicating intermittent rotary motion to the cylinder, as heretofore, by the spiral flange G, I attach a crank, V, or a pulley, to the shaft H; and in order to provide for readily changing the machine from the one condition to another, I attach the cams A, by a detachable connection, and to regulate the closeness of the fabric being knit, they may also be arranged to be adjusted to or from the end of the cylinder by a screw, W.

When the machine is adjusted to the condition for knitting stockings, flat fabrics, or articles of other form, as well as plain tubular goods, as represented in fig. 1, the cylinder is operated, as heretofore described, by the spiral rim G, which gives it a slow intermittent rotary movement, and the needles are operated one at a time, by the carrier D, receiving motion from the slide B, while the needle-beard opener and yarn-guide is carried at the lower end of the vibrating lever L, and M acts as the support of the needles, and to sink the yarn on the needle-shanks, and N acts as a presser.

The vibrating arm L receives motion from the slide L<sup>1</sup>, which in turn derives its motion from the arm L<sup>2</sup> and the cams L<sup>3</sup>, and the presser is actuated from the rock-shaft N<sup>1</sup> and the cam-grooves N<sup>2</sup>, on the main shaft, as is clearly represented in fig. 4.

When adjusted to this condition, the guides Q and the cams A must be detached from their positions in connection with the cylinder, and for this reason they are detachably connected.

But when it is desirable to operate the machine for knitting tubular fabrics only, the cylinder is adjusted on its shaft out of contact with the spiral flange G, by the hook K being placed as shown in fig. 2, the slide B raised to its elevated position above the pins E, the

support M detached, and the vibrating lever L turned up into the position represented in fig. 2.

In this condition the cams A may be attached, and also the needle-guide Q and the needle-beard opener P, all as heretofore described.

By this arrangement it will be perceived that a very useful machine is provided, capable of a great variety of work, and which may be readily adjusted to the condition of a family-machine, for doing miscellaneous work, or to the condition of a very rapidly-operating machine for tubular goods only.

Having thus described my invention,

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

1. The combination of the needle-guide Q and needle-beard opener and yarn-guide P, when all are constructed and arranged substantially as and for the purpose described.

2. The combination of the same with the needles and the needle-cylinder, substantially as and for the purpose specified.

3. The adjustable cylinder F, arranged to be geared with the spiral flange G, or ungeared therefrom, substantially as described, to be operated by the shaft H, for the purpose set forth.

4. The needle-cylinder F and needles, combined in one machine with the two sets of needle-operating mechanisms herein described, as and for the purpose set forth.

5. The combination, with the needle-cylinder and its needles, of the slide B, made adjustable in the supports C C, substantially in the manner and for the purpose set forth.

Witnesses:

MARK L. ROBERTS.

FRANK BLOCKLEY,  
ALEX. F. ROBERTS.