(No Model.) 2 Sheets—Sheet 1.

W. J. McDEVITT.

CIRCULAR KNITTING MACHINE.

No. 376,328. Patented Jan. 10, 1888.

FIG. 6.

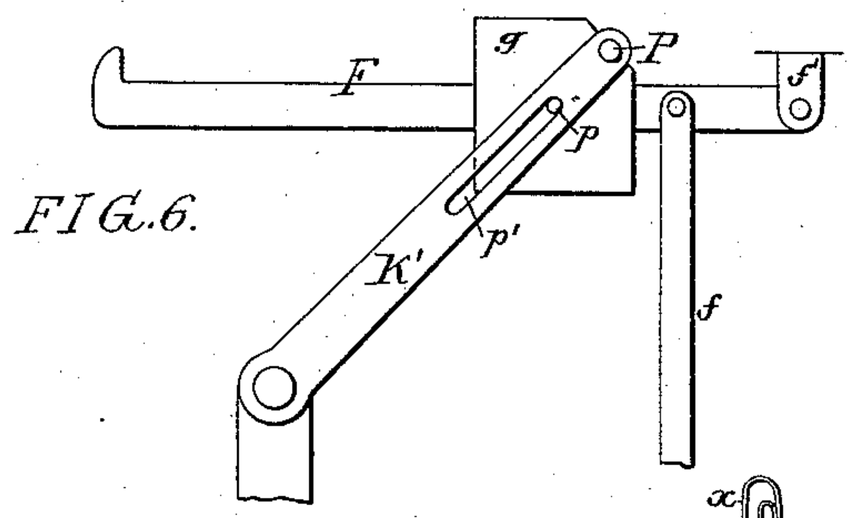


FIG. 1.

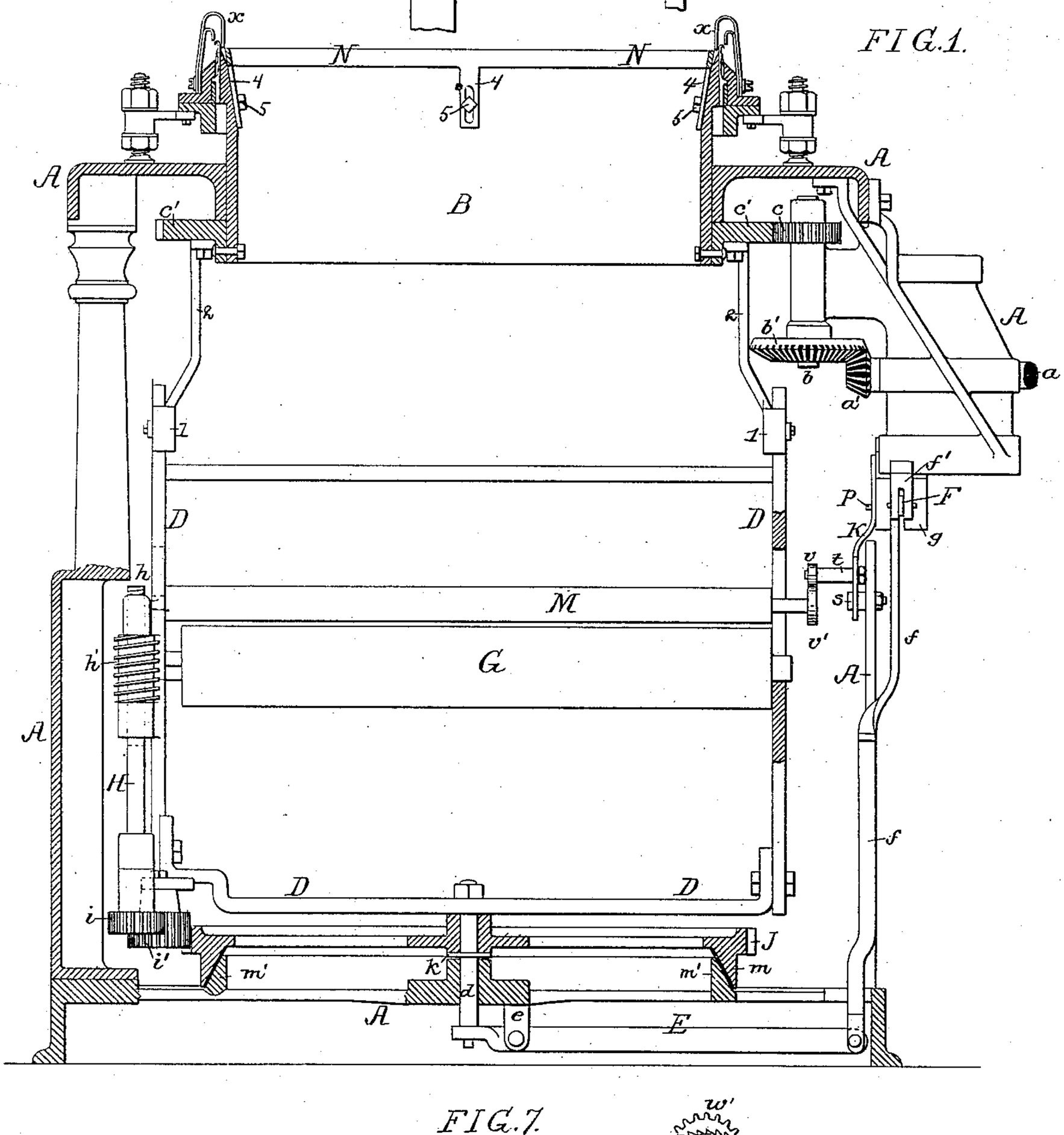
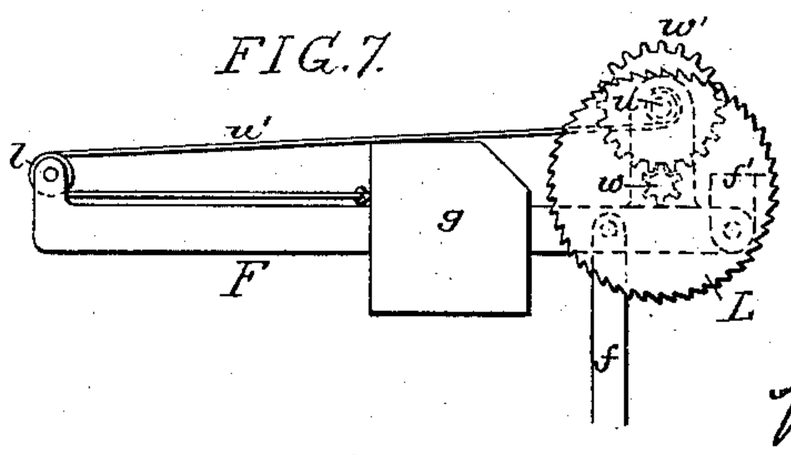


FIG. 7.



Witnesses:
George O. Gibson
Harry Drury

Inventor:
W. J. McDevitt
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Howson & Sons

(No Model.) 2 Sheets—Sheet 2.

W. J. McDEVITT.

CIRCULAR KNITTING MACHINE.

No. 376,328. Patented Jan. 10, 1888.

FIG. 2.

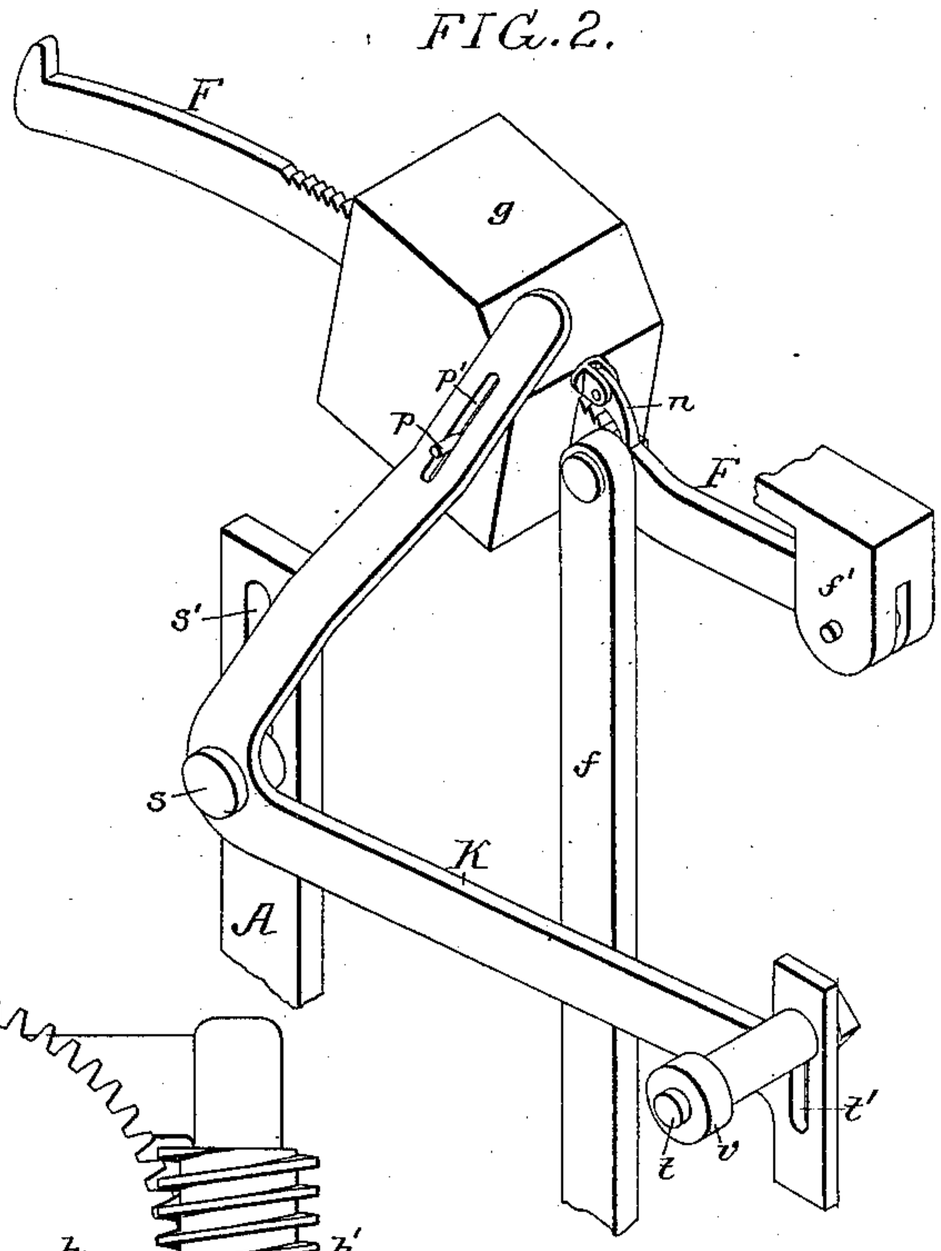


FIG. 5.

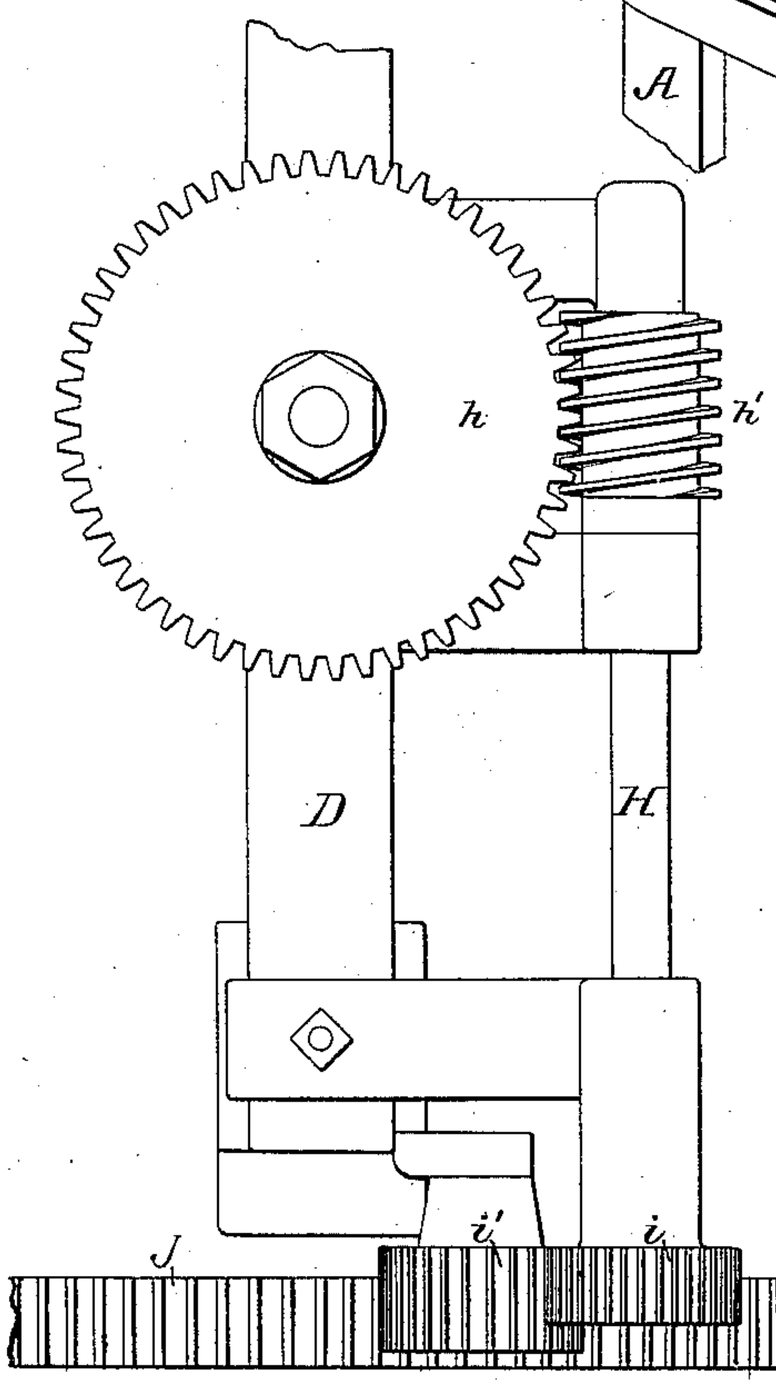


FIG. 3.

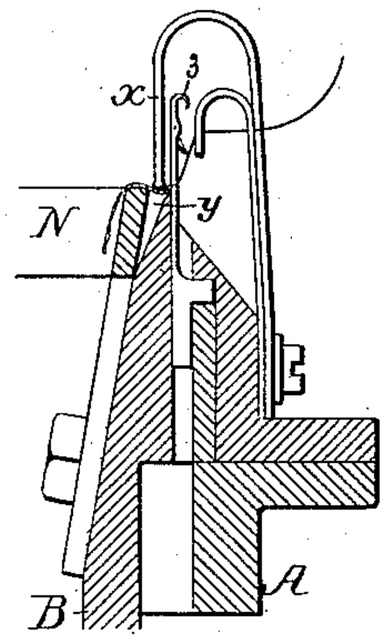


FIG. 1a.

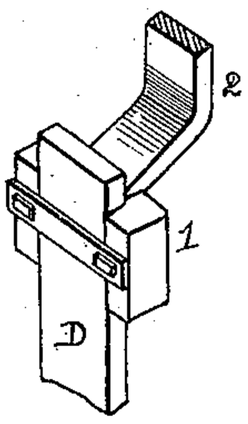
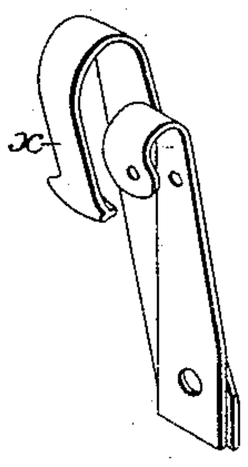


FIG. 4.



Witnesses:
George E. Gibson
Harry Drury

Inventor:
W. J. McDevitt
by his Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

WALTER J. McDEVITT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO HENRY A. TRUITT, OF SAME PLACE.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 376,328, dated January 10, 1888.

Application filed June 20, 1885. Serial No. 169,256. (No model.)

To all whom it may concern.

Be it known that I, WALTER J. McDEVITT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Knitting-Machines, of which the following is a specification.

My invention consists of certain improvements in the delivery and take-up mechanism of a knitting-machine, the objects of my invention being to prevent the work from rising on the needles, and to provide an automatic take-up, so as to insure the production of uniform work.

In the accompanying drawings, Figure 1 is a sectional view, partly in elevation, of a circular-knitting machine of the class known as a "balmoral-machine," and constructed in accordance with my invention; Fig. 1ª, a detached perspective view of one of the joints between the bars of the take-up-carrying frame and those of the cylinder; Fig. 2, a perspective view, on a larger scale, of part of the machine to which my invention relates; Fig. 3, a sectional view, also on a larger scale, of another part of the machine, forming one of the subjects of my invention; Fig. 4, a perspective view of the thread-guide and presser shown in Fig. 3; Fig. 5, a side view of part of the take-up gear of the machine, and Figs. 6 and 7 views illustrating modifications of part of my invention.

A represents part of the fixed frame of the machine, and B the needle-cylinder free to rotate in an opening in said frame, this rotation being derived from the shaft *a*, a bevel-pinion, *a'*, which gears into a bevel-wheel, *b'*, on a shaft, *b*, a spur-pinion, *c*, on said shaft gearing into a spur-wheel, *c'*, on the needle cylinder.

Beneath the needle-cylinder, and secured to the same so as to rotate therewith, is an open frame, D, a spindle, *d*, at the bottom of which is adapted to a bearing in the lower cross-bar of the frame A, and is supported by the short arm of a lever, E, hung to a stud, *e*, on said frame, the long arm of the lever being connected by a rod, *f*, to a lever, F, hung to a bracket, *f'*, on the frame A, said lever F carrying an adjustable weight, *g*.

To bearings in the frame D is adapted the spindle of a take-up roller, G, on which the fabric is wound, a projecting end of this spindle having a worm-wheel, *h*, gearing into a worm, *h'*, on a vertical shaft, H, turning in bearings on the frame D, and having at the lower end a spur-wheel, *i*, which is geared through the medium of an intermediate spur-wheel, *i'*, to a spur-wheel, J, the hub of which is confined between the bottom bar of the frame D and a collar, *k*, on the spindle *d* of said frame.

The spur-wheel J has a projecting flange, *m*, which is clothed on the inner side with rubber, leather, or other frictional material, and on the lower cross-bar of the frame A is an annular flange, *m'*, adapted to form a seat for the flange *m* of the wheel J.

As long as the frame D and wheel J are supported so that the flange *m* of said wheel is free from contact with the flange *m'*, the wheel rotates with the frame D, and there is consequently no movement of the wheel *i'*, shaft H, or take-up roll G on their respective axes; but when the frame D is depressed so that the flange *m* of the wheel J comes into contact with the flange *m'* of the frame A the wheel J is prevented from turning, owing to the frictional contact between the two flanges, and said wheel thus becomes, in effect, a fixed annular rack, so that motion is imparted to the wheel *i'*, shaft H, and take-up roll G, and the fabric is wound upon the latter.

As long as there is tension upon the fabric the frame D is held up and the wheel J is free from the influence of the flange *m'* and rotates with the frame; but as soon as the fabric becomes slack the frame D falls, and the wheel J is locked by the flange *m'* until the slack is taken up and the frame D again lifted, so as to free the wheel from the influence of the flange *m'*.

The bars of the frame D are adapted at their upper ends to sockets 1 at the lower ends of bars 2, secured to and projecting downward from the spur-wheel *c'* of the needle-cylinder, so that while the frame D is compelled to rotate with the needle-cylinder it is free to rise and fall, as above set forth.

The weight *g* on the lever F is intended to partially counterbalance the weight of the frame

D and its attachments and of the fabric upon the take-up roller, and as the winding up of the fabric proceeds and its weight increases, the weight *g* must be moved out upon the lever F, so that there is a corresponding increase in the lifting influence of the latter upon the frame D. This is a common form of take-up and counterbalance in balmoral-machines; but in such machines as usually constructed the duty of shifting the weight *g* devolves upon the attendant, who must closely watch the operation of the machine and shift the weight at proper intervals in order to insure the production of uniform work. One of the objects of my invention is to effect the automatic shifting of this weight, and this object I attain by placing the weight under control of the rotating frame D, whereby said weight will be gradually shifted upon the lever F as the frame rotates and the fabric is wound upon the take-up roll. Many different devices may be used for causing this automatic adjustment of the weight by the rotating take-up frame, the means which I prefer being those shown in Figs. 1 and 2, on reference to which it will be observed that the weight *g* carries a pivoted pawl, *n*, which is adapted to the ratcheted upper edge of the lever F, a pin, *p*, projecting from the side of the weight and into a slot, *p'*, in one arm of a bell-crank lever, K, which is hung to a stud, *s*, adapted to a slot, *s'*, in the frame A and vertically adjustable therein, the other arm of the lever carrying a pin, *t*, which is adjustable in a slot, *t'*, near the end of the lever, and is provided with an anti-friction roller, *v*, adapted to be struck by a similar roller, *v'*, on the spindle of a roll, M, which rests upon the fabric wound upon the take-up roll G, the side bars of the frame D being slotted for the reception of the spindle of said roller M, so that the latter is free to rise as the fabric is wound upon the roller G. The shifting of the weight *g* is thus due to the rotation of the frame D, and the position of the weight on the lever F is dependent upon the number of layers of fabric upon the take-up roll, each additional layer lifting the roll M, so as to cause its roller *v'* to strike the roller *v* of the lever K, and thus move the latter in order to shift the weight farther outward upon the lever.

As indicating modifications in the construction of the weight-shifter within the scope of my intention, I may refer to Figs. 6 and 7.

Fig. 7 represents a device intended to be operated, on each rotation of the take-up frame D, by a pin or projection on said frame. In this device the pin acts upon a ratchet-wheel, L, the shaft of which is adapted to a bearing on the lever F, and carries a spur-pinion, *w*, the latter gearing into a spur-wheel, *w'*, secured to or forming part of which is a drum, *u*, upon which is wound a cord, *u'*, passing round a pulley, *l*, at the outer end of the lever and connected to the weight *g*. By this means there is a very slight movement of the weight on each rotation of the frame D, and for this reason the device is inferior to that shown in Figs. 1 and 2, for in the latter case the weight is moved only in accordance with the increase in diameter of the roll of fabric upon the take-up roll, the weight of the latter being thus accurately counterbalanced, whereas with a shifting device the movement of which is definite on each rotation of the frame there is in a given time a movement of the weight to a given extent whether the work which is being produced is light or heavy.

Where the weight is shifted by a projecting portion of a presser-roll, such as shown in Fig. 1, however, the transmitting devices shown in Figs. 1 and 2 need not necessarily be employed. For instance, in Fig. 6 I have shown a construction in which the pin *p* of the weight is adapted to a slot, *p'*, in an arm, K', a pin, P, on which is intended to be struck by the projecting end of the spindle of the roll M or by the roller *v'* thereon.

The arm K' is so hung that as it is moved in the direction of the arrow the pin P is elevated, so that each movement of the arm is only sufficient in extent to carry the pin P out of the path of the roll-spindle or its roller, the arm then remaining fixed until the presser-roll has been raised sufficiently to again bring the pin under its influence. It will be evident, also, that a bar, lever, or other device for bearing on the work may be substituted for the roller M, and in the claims I have given this device the general term of "presser."

In machines of the class to which my invention relates there is no continuous tension tending to hold the work down upon the needles 3; hence a presser, *x*, must be used for acting on the work close up to the needles, in order to prevent the rise of the stitches thereupon. When the work, however, passes from the needles directly down over the internally-beveled upper edge of the cylinder B, it has a tendency to rise between the presser and the needles, owing to the fact that it is drawn off at an angle but slightly inclined in respect to the vertical. To overcome this objection, therefore, and to provide a flat bearing-surface for the presser *x*, I secure to the inner side of the cylinder B a ring, N, the upper edge of which is some distance inside the upper edge of the cylinder, but preferably in about the same horizontal plane, a recess, *y*, thus intervening between the cylinder and the ring, which recess is bridged by the fabric, the latter being forced down into the recess by the presser, and being effectually prevented by the latter from rising on the needles.

The ring has projecting arms 4, slotted for the reception of bolts 5, whereby they are secured to the needle-cylinder, the slots permitting the vertical adjustment of the ring.

The different forms of weight-shifter which I have shown indicate that my invention covers a wide range of devices for this purpose, this portion of my invention consisting, mainly, in placing the adjustable weight under the control of the rotating take-up frame.

I claim as my invention--

1. The combination of the rotating cylinder of a knitting-machine, its frame D, the take-up mechanism carried thereby, a friction device for governing the rotation of said take-up mechanism, a counterbalance-lever having an adjustable weight, means whereby the counterbalance-lever is caused to act upon the frame D, so as to free the take-up mechanism from the control of the friction device, and mechanism, substantially as described, whereby the shifting of the weight on the counterbalance-lever is effected by the rotating frame D of the machine, all substantially as specified.

2. The combination of the rotating cylinder, its frame D, the take-up mechanism carried thereby, a friction device for governing the rotation of said take-up mechanism, a counterbalance-lever, F, having an adjustable weight, means whereby said lever is caused to act upon the frame D, a presser, M, bearing upon the work on the take-up roll, and mechanism, substantially as described, whereby said presser is caused to effect the shifting of the weight on the counterbalance-lever, all substantially as specified.

3. The combination of the rotating cylinder, its frame D, take-up mechanism carried thereby, a friction device for governing the rotation of said take-up mechanism, a counterbalance-lever having an adjustable weight, *g*, means whereby said lever is caused to act upon the frame D, and a lever, K, connected to the weight *g* and acted on by a projection on the frame D, as set forth.

4. The combination of the needles and the presser *x* with the needle-cylinder having a ring, N, forming an inner bearing for the work, and means for adjusting said ring vertically on the cylinder, all substantially as specified.

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

WALTER J. McDEVITT.

Witnesses:

WILLIAM F. DAVIS,

HARRY SMITH.