

J.M. Howe

Knitting Machine.

117886

PATENTED AUG 8 1871

Fig 1.

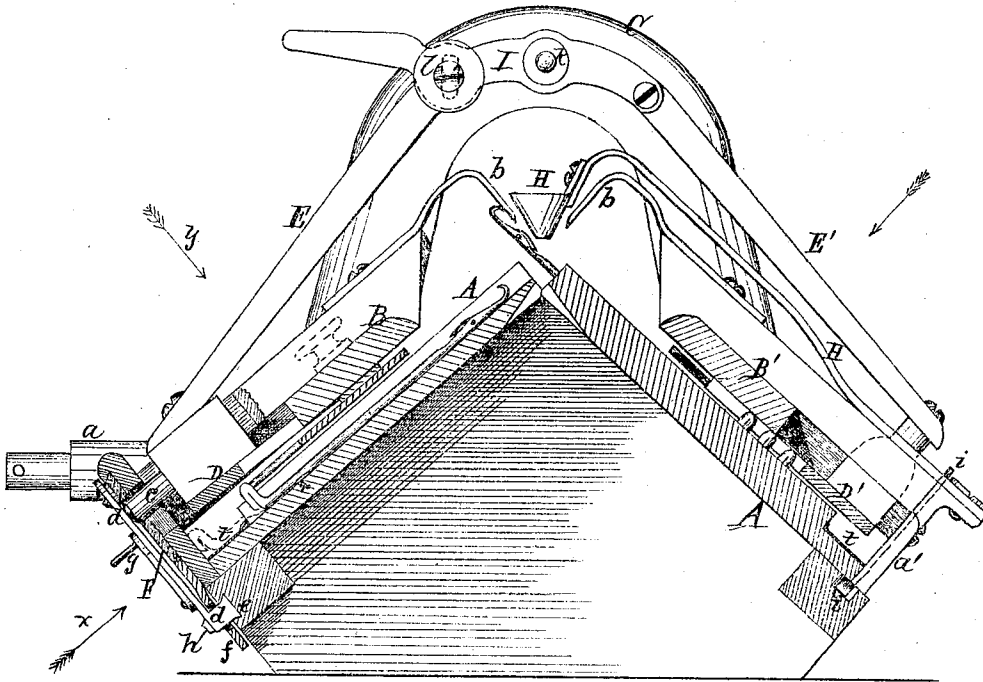


Fig 2.

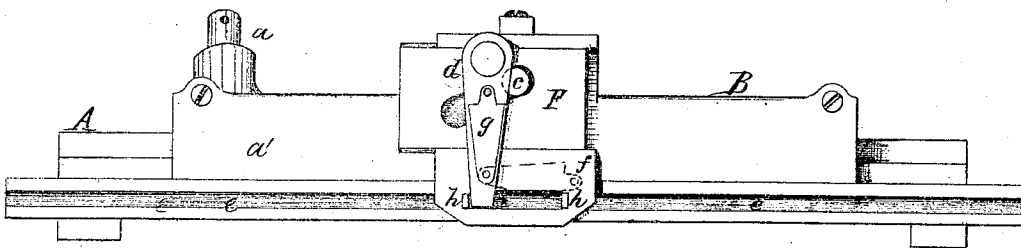
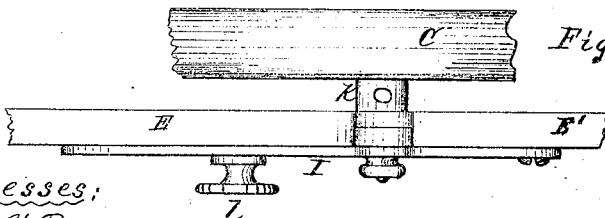


Fig 3.



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Fig 4.

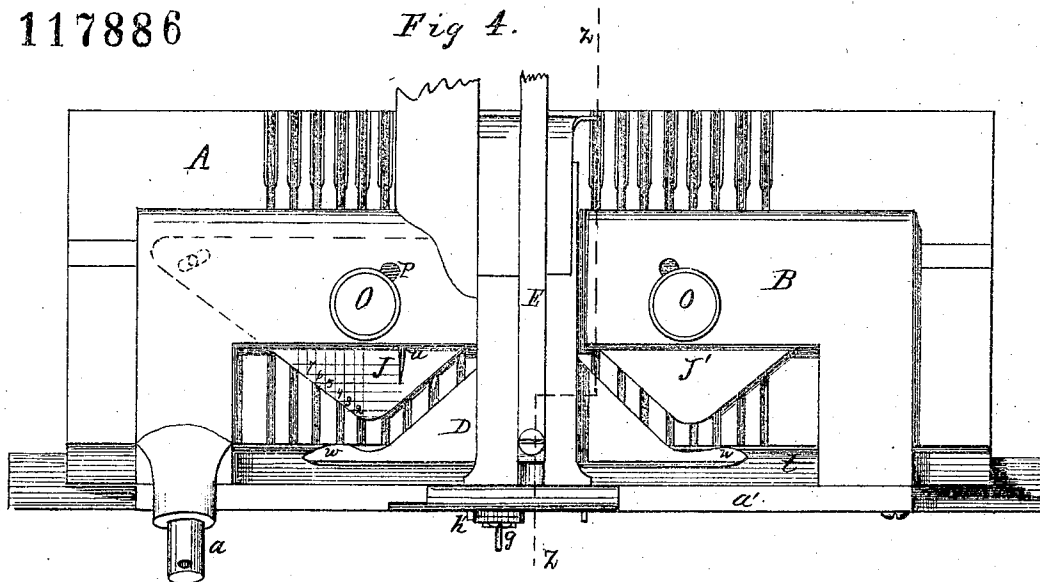


Fig 5.

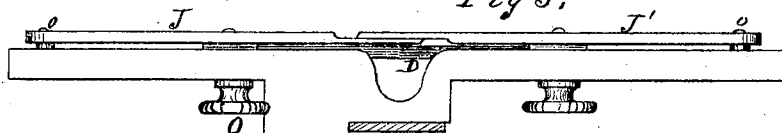


Fig 6.

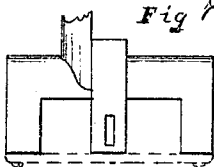
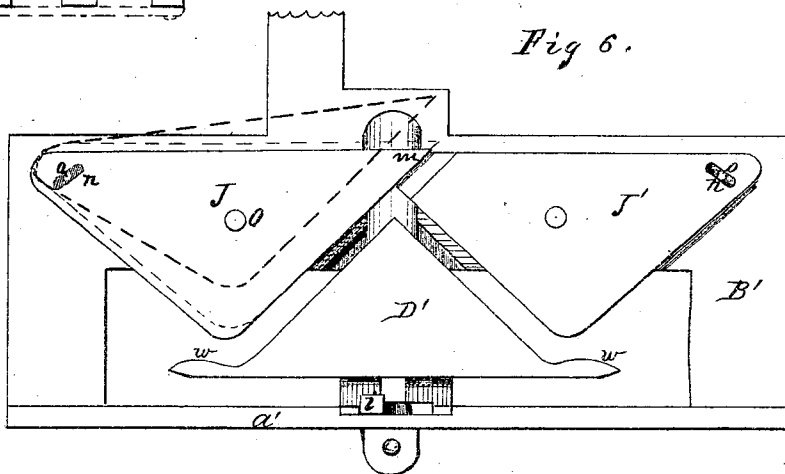


Fig 6.



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UNITED STATES PATENT OFFICE.

JOHN M. HOWE, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 117,886, dated August 8, 1871.

To all whom it may concern:

Be it known that I, JOHN M. HOWE, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Knitting-Machines, of which the following is a specification:

My invention relates to that class of knitting-machines in which two parallel rows of needles work at an angle to each other upon inclined beds; and it consists more especially in a novel means of adjusting alternately the cams that operate each row of needles, and in the construction and arrangement of the wing-cams and other minor parts of the machine.

In the drawing, Figure 1 is a sectional elevation of those parts to the left of the dotted line *z*, Fig. 4. Fig. 2 is a side elevation in the direction of the arrow *x*, Fig. 1. Fig. 3 is a top view of a portion of my invention. Fig. 4 is an elevation of one side of the machine in the direction of the arrow *y*, Fig. 1. Fig. 5 is an edge view of the lock-plate *B*, Fig. 4. Fig. 6 is an obverse view of the lock-plate *B'*.

The lock-plates *B* and *B'* are made in one piece with the connecting-arch *C*, and together form the sliding frame, which is reciprocated upon the needle-bed *A* by a crank and pitman attached to the stud *a*, Figs. 1 and 4, or by other convenient means. The lock-plates *B* *B'* carry each a cam, *D* *D'*, and two wing-cams, *J* *J'*, which operate the needles, as is usual in this class of machines. Latch-openers *b* are also provided upon the sliding frame, acting upon the needle-latches in the ordinary manner. The *V*-cams *D* *D'* are rigidly attached to supporting-arms *E* *E'*, which are hinged at their upper extremities to a stud, *k*, fixed to the arch *C*. For the purpose of adjusting these cams to engage with each set of needles alternately, as is required in knitting tubular work, I provide a sliding plate, *F*, Figs. 1 and 2, through or into an inclined slot in which a stem, *e*, upon one of the *V*-cams projects. The slotted plate *F* moves in ways formed upon one of the lock-plates *B* or *B'*, and by its reciprocation alternately elevates and depresses the *V*-cams, as fully described in my patent of March 15, 1870. I, however, adopt other means of operating said slotted plate and of connecting the *V*-cams together than those therein described. A friction-clutch or dog, *d*, is pivoted at one extremity to the plate *F*, and its lower end is formed to pro-

ject into a longitudinal groove, *e*, in the bed *A* of the machine, as indicated in Figs. 1 and 2. The groove *e* is preferably made dovetailing in section, as shown in Fig. 1, whereby the tendency of the clutch to work out laterally when hung in an inclined position is removed. It will be observed that when the sliding frame is reciprocated upon the bed the clutch *d* rocks over slightly in the groove *e*, and thus becomes clamped by the friction upon the sides of the groove, and holds the plate *F* while the movement of the sliding frame is continued. This operation oscillates the arms *E* *E'* and *V*-cams *D* *D'* by means of the slot in *F*, as above mentioned. Thus, at each reversal of the sliding frame, the clutch *d* moves the slotted plate in its ways sufficiently to adjust the *V*-cams upon each side in and out of contact with the needle-shanks, and this movement takes place through the peculiar action of the clutch, no matter what the position of the sliding frame upon the bed at the time of the reversal. The advantage of this arrangement is, that the stroke of the sliding frame need be only sufficient to allow the cams to pass those needles that are in use, instead of extending entirely across the needle-bed for the purpose of changing the locks at the extremities, as has heretofore been customary. If necessary, the length of the crank driving the sliding frame may be made adjustable for different lengths of work, or the operator may simply oscillate it backward and forward for this purpose. A carrier-plate, *f*, Figs. 1 and 2, is fixed to the sliding frame, and is slotted or cut away opposite the groove *e* in the bed to permit its longitudinal movement over the clutch *d*, the lower extremity of which passes through the opening in the carrier, such movement being sufficient to shift the slotted plate *F* and *V*-cams, as before described. Thus the friction of the clutch *d* against the sides of the groove *e* is relieved by the carrier-plate when the requisite movement of *F* is completed in either direction, the clutch moving smoothly along in the groove *e* till the motion of the sliding frame is again reversed, when the clamping operation takes place as before. When it is desired to knit a flat web by the use of one row of needles, the locking-plate *g* pivoted to the clutch *d* is turned down to the position shown in dotted lines in Fig. 2, catching behind lugs *h* upon the carrier-plate, and retaining the clutch and slotted plate *F* at either extremity of

their movement, according as the right or left-hand V-cam and set of needles are used. The yarn-guide H, Fig. 1, is also reciprocated by a friction-clutch *i*, Figs. 1 and 6, constructed and operating similarly to *d*, its movement being limited by the length of the recess in which it works. The yarn-guide is thus adjusted simultaneously with the V-cams, whereby, by means of the clutches *d* and *i*, both the former devices are made ready for action at the instant of the reversal of the sliding frame at any point upon the bed. It is plain that the arrangement of these clutches and the grooves in which they move may be reversed, by providing a tongue upon the bed and notching the lower extremity of the clutches to fit over it, the operation being the same as in the case of the groove. For the purpose of locking together the supporting-arms E E', and thus communicating to both cams the movement imparted by the slotted plate F, I provide the clamp-bar I, Figs. 1 and 3, which is hinged upon the same stud *k* with said arms, one extremity being securely attached to one arm, E', and the other slotted vertically, as indicated in dotted lines, Fig. 1, to receive a clamping-screw, *l*, screwed into the other arm E. The length and shape of the arms E E' are such, that when the clamp I is at the central adjusting-point each V-cam is alternately raised out of contact with the needle-shanks by the movement of the slotted plate F, and when at one extreme position both cams are lifted away from the needles, while at the other extreme the cams are let down so as to operate both rows of needles simultaneously, producing a double flat web.

It will be noticed that the results obtained by this arrangement of devices are identical with those set forth in my former patent, but that the construction of the parts is more simple, and the operation more direct and positive.

The wing-cams J J', Figs. 4, 5, and 6, as ordinarily constructed, do not meet at the adjacent corners *m* except when at their lower adjustment; consequently, when raised, the needles are liable to be thrown up between them and either become broken or damage other parts of the machine. To obviate this difficulty, I cut away one face of each cam at the points mentioned, whereby they are permitted to lap over one another, as indicated in Figs. 5 and 6, the corners *m* being extended sufficiently to present a checking-surface to the needle-shank in whatever position the cams may be set. The wing-cams are triangular in form, and are provided at their outer corners with slots *n*, nearly or quite parallel with the working-face of the cams, which slots embrace pins *o* fixed to the lock-plate. A clamp-screw, O, is screwed into the wing-cam and moves in a segmental or nearly segmental slot, *p*, Fig. 4, in the lock-plate, and when the cams are raised they follow the direction of the slots *n* and *p* till the pins *o* reach the end of the former, when the further movement of the cams becomes circular about the points *o* as centers. By this means, either wing-cam is adjustable to vary the stitch as required in ordinary work; but when it is de-

sired to knit the double or "Cardigan" stitch, either may be elevated and turned about the center *o* so far that the needles will not be withdrawn sufficiently to cast off the stitch till the second one is formed upon them, both being cast off by the return stroke of the sliding frame. This plan obviates the necessity of changing the wing-cams for Cardigan work, as is required in the machines heretofore in use.

A good deal of difficulty is usually experienced in operating machines of the class herein mentioned by the dropping of the needles in the slots below or into the track of the points *v* of the V-cams, and thereby either not working at all or causing breakages of the parts. I prevent this trouble by means of a check or stop, *t*, Figs. 1 and 4, secured to the bed at the base of the needle-slots. This stop-plate has a raised flange or ledge over which the needles cannot pass unless sprung upward by the operator. A slight depression, *r*, Fig. 1, is also formed in the under side of the needles near the shank, into which the stop enters when the needle is drawn down, as indicated by dotted lines in Fig. 1. The needles may thus be thrown out of operation at pleasure, without danger of their becoming displaced in either direction. Those portions of the lock-plates B B' which are not necessary to support the adjacent parts are cut away, as shown in Figs. 4 and 7, the lower bar *a'* being bolted or otherwise secured to them, and forming the gibs which guide the sliding frame in its movement.

This construction not only lightens the last-named device, but also allows access to the cams, needles, and needle-bed, at all times, the operator being able to see all the parts in action, and to correct displacements of the needles when they occur. It entirely avoids the trouble experienced with this class of machines in ascertaining the causes of displacements or breakages of needles or division-ribs, by which the sliding frame is frequently caught and held, and which, therefore, cannot be easily found. By this means, also, I am enabled to apply the scale necessary to indicate the adjustment of the wing-cams for determining the length of the stitch directly to the face of the cam, as shown at J, Fig. 4, a fixed index, *u*, being provided upon the lock-plate. This is a much simpler and cheaper construction than that heretofore used.

What I claim as my invention is—

1. The friction-clutch or dog *d*, applied and operating substantially as described, to adjust the V-cams of a knitting-machine by the reversal of the movement of the sliding frame in either direction, at any point in the stroke of the latter, for the purposes set forth.

2. The supporting-bars E E' of the V-cams, hinged upon a common fixed center, in combination with the adjusting clamp-bar I, operating substantially in the manner set forth.

3. The V-cams D D', provided with the supporting-bars E E', when said bars are rigidly attached thereto and hinged to the sliding frame, substantially as and for the purposes set forth.

4. The frictional clutch-bar *d*, slotted plate F,

and V-cams D D', in combination with the carrier-plate *f*, arranged to operate substantially as set forth.

5. In combination with the frictional clutch-bar *d* and sliding cam-plate F, the locking-latch *g* and stops *h*, substantially as and for the purposes set forth.

6. The wing-cams J J', provided with graduations upon their faces, which are exposed through the openings in the lock-plates, substantially as and for the purposes set forth.

7. In combination, with the clamping-screw *o* and slot *p*, the wing-cam J provided with a slot, *n*, and the guiding-pin *o* upon the lock-plate, arranged to operate conjointly, for the purposes set forth.

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Witnesses:

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