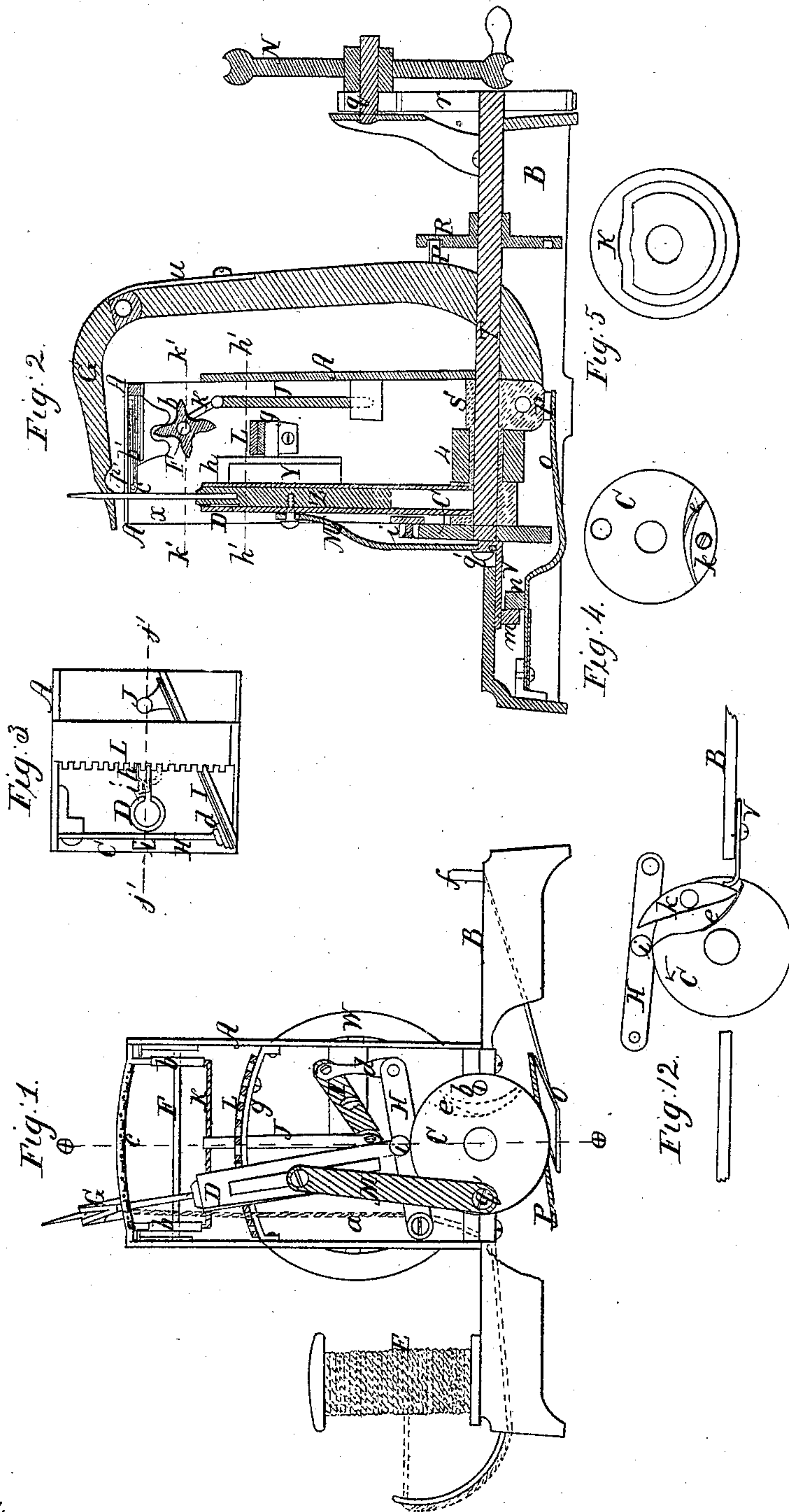


B. Arnold.
Darning.

Sheet 1. 2 Sheets

N^o 86,122.

Patented Jan. 26, 1869.



Witnesses;
Frank H. Arnold
James E. Arnold

Inventor;
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Sheet 2. 2 Sheets.

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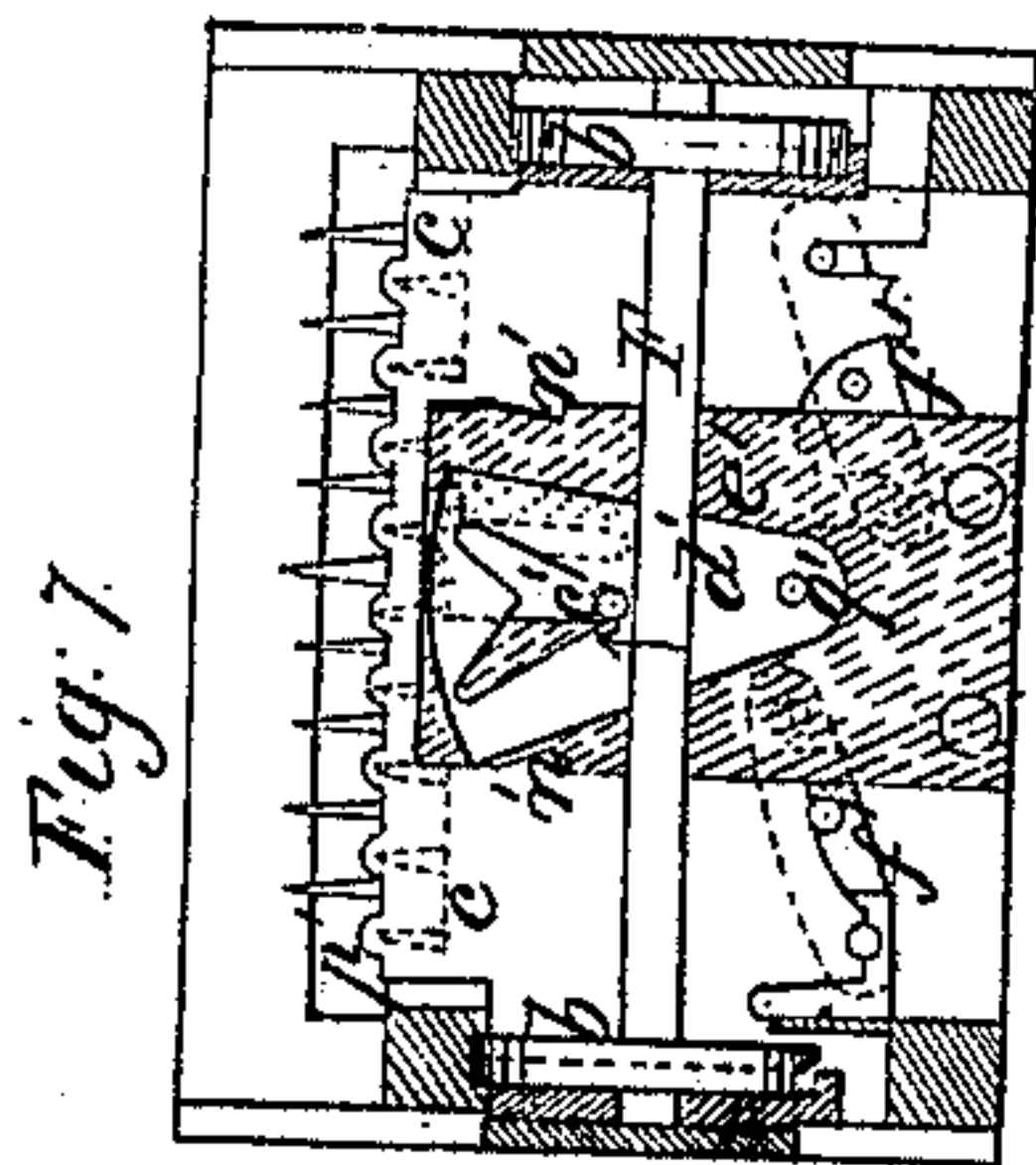
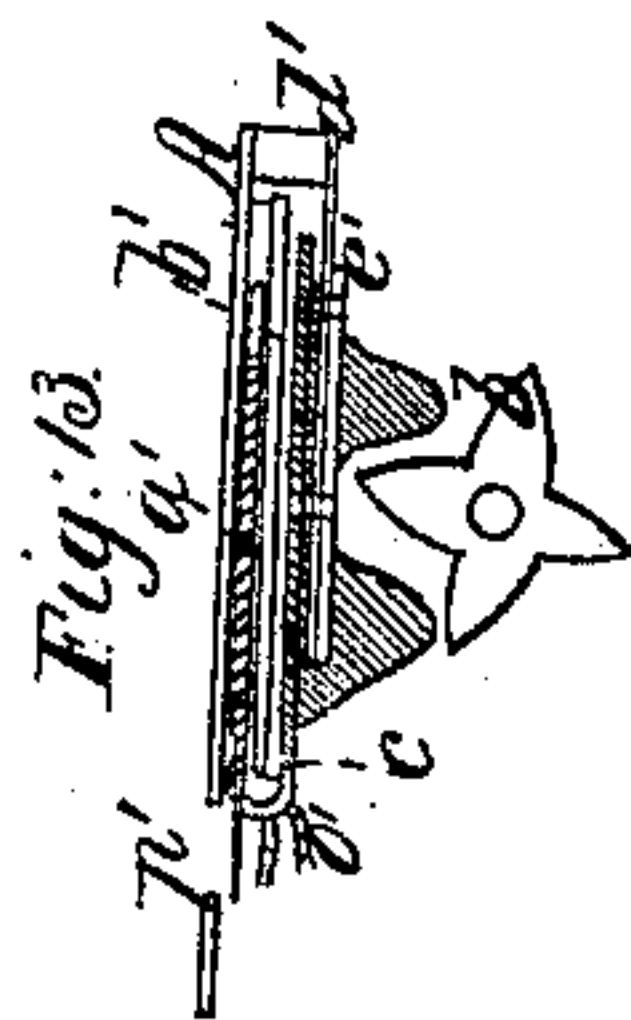
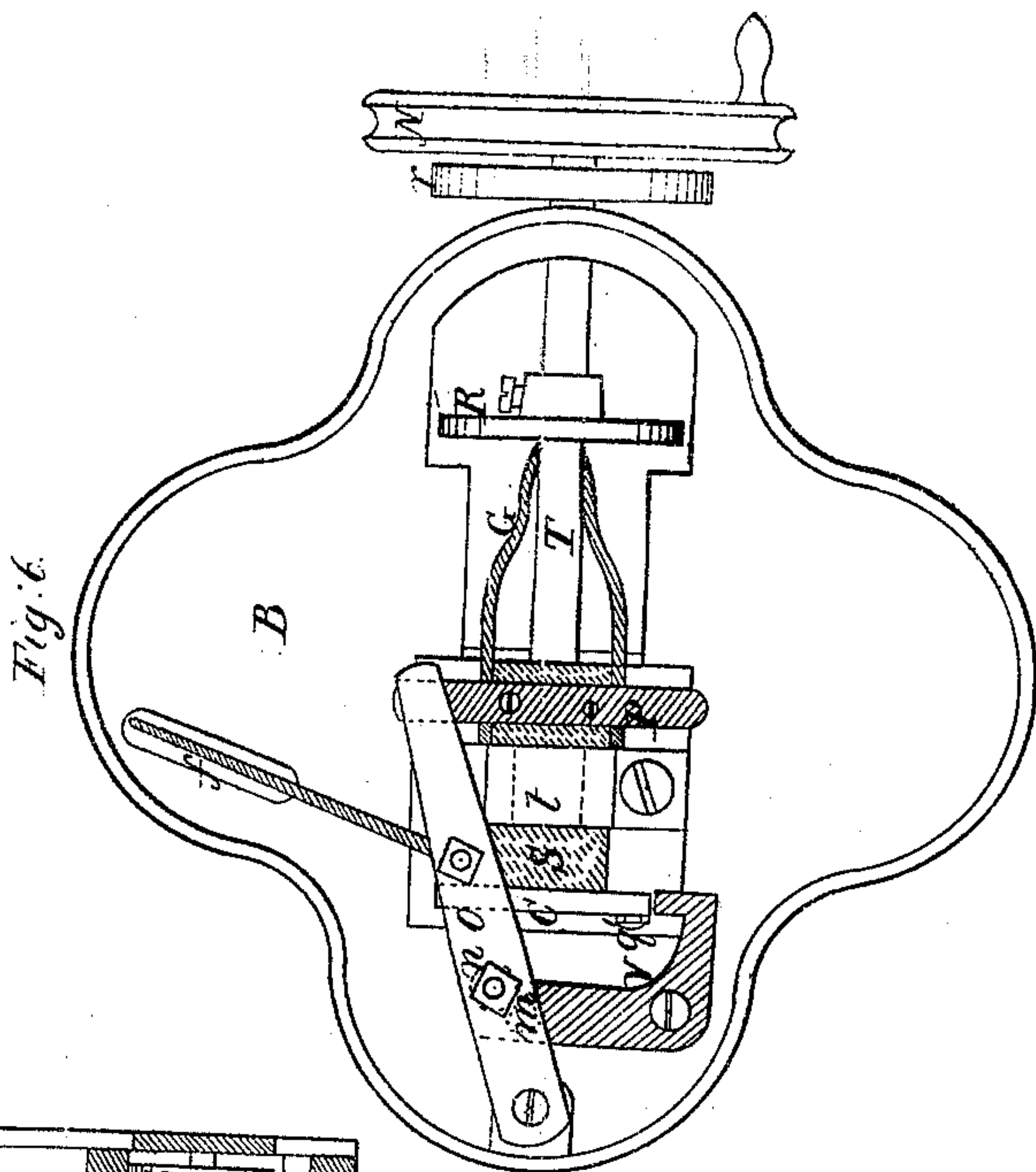


Fig. 11

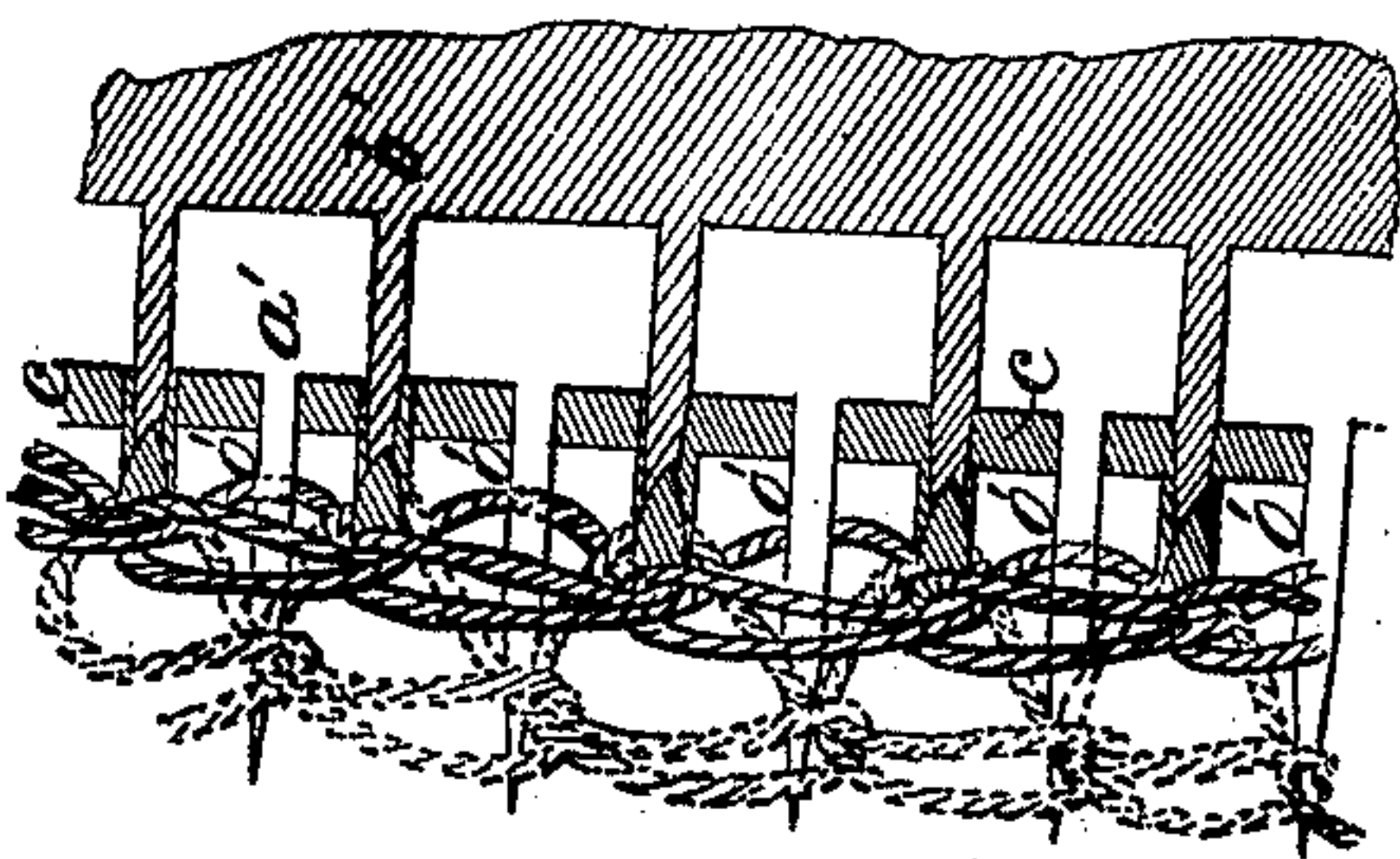


Fig. 8

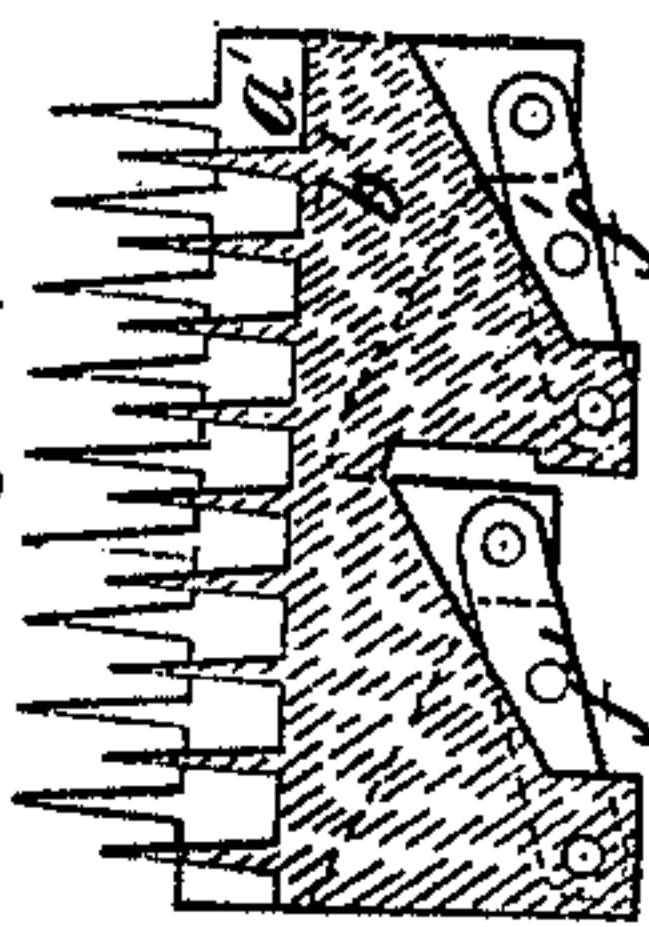


Fig. 9

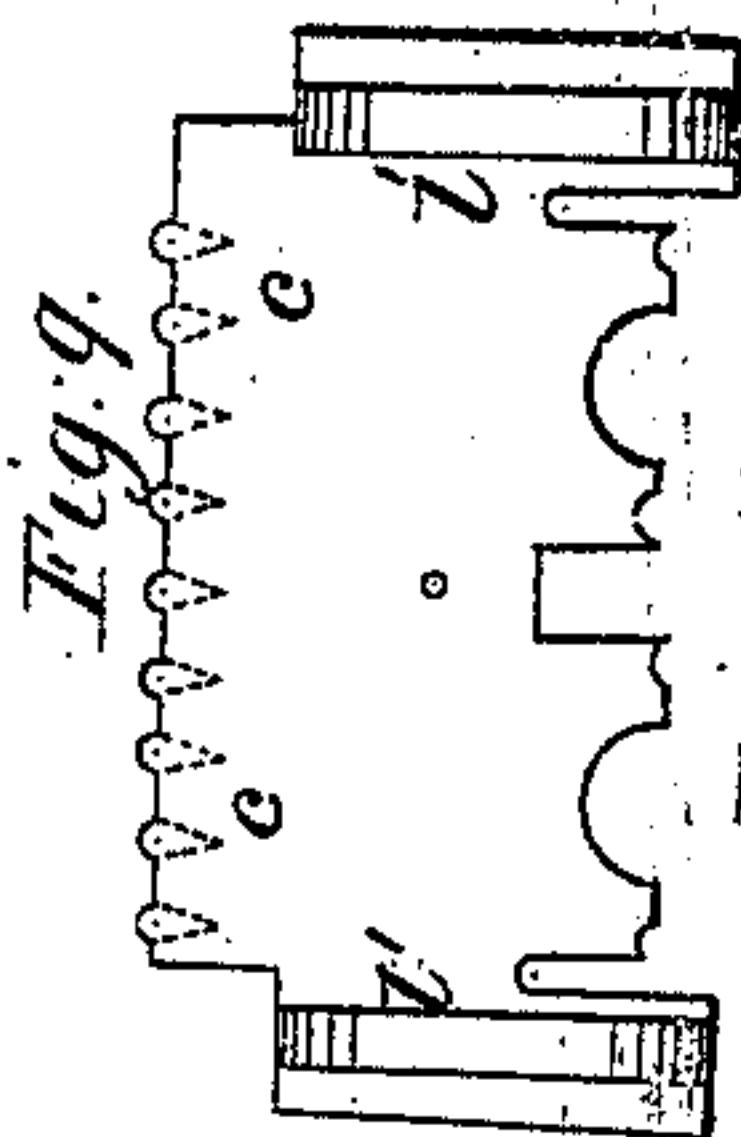
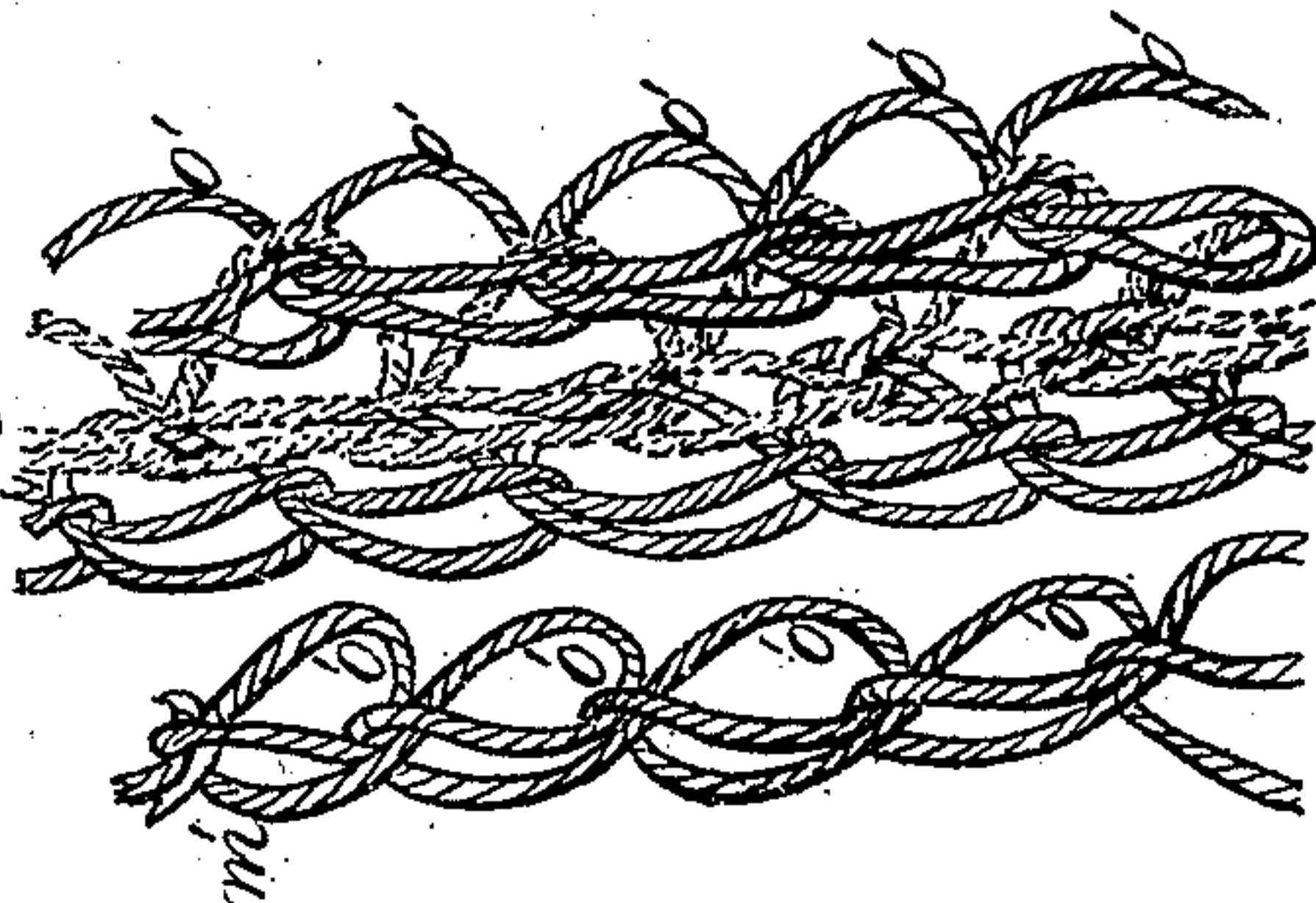


Fig. 10



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BENJAMIN ARNOLD, OF EAST GREENWICH, RHODE ISLAND.

Letters Patent No. 86,122, dated January 26, 1869.

IMPROVEMENT IN MACHINE FOR MENDING STOCKINGS.

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, BENJAMIN ARNOLD, of East Greenwich, in the county of Kent, and State of Rhode Island, have invented a new and useful Machine for Mending Stockings and other fabrics; and do hereby declare the following to be a full and correct description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters and numbers of reference marked thereon, similar letters and numbers being used in all the figures to denote the same part.

In the drawings—

Figure 1 is a front elevation, with one side of the case removed.

Figure 2 is a vertical section, taken through in the direction of the red line $\oplus \oplus$ in fig. 1, and red line $j j$ in fig. 3.

Figure 3 is a horizontal cross-section, taken through the case in the direction of the red line $k k$ in fig. 2, looking down.

Figure 4 shows the inner side of cam C.

Figure 5 shows the working side of cam R.

Figure 6 represents the under side of the machine.

Figure 7 is a horizontal section of case A, taken through in the direction of the red line $k k$ in fig. 2, looking upward.

Figure 8 shows the relative position of the plates a' and b' , with the levers $f f$.

Figure 9 shows the hook-plate c , separate.

Figure 10 shows an enlarged view of the rows of stitches, and the way in which they are connected.

Figure 11 shows an enlarged drawing of the hook-plate c , holding the under bight or loop between the stitches whilst the needle passes through them.

Figure 12 shows how the lever V operates on the loose piece on cam C.

Figure 13 is a vertical section of the plates at the top of the case A, taken in same direction as fig. 2.

The nature of my invention consists in mending a hole in a stocking or other fabric, by making successive rows of chain-stitches from side to side across the aperture, at the same time joining or interlocking these rows by holding the bights or loops between the stitches by means of an apparatus underneath the fabric, so that the needle, in making the next row, shall pass successively through these bights, and connect all the rows into one web, joining it to the sides of the aperture by the chain-stitch on one side, and the bights, through which the stitches pass, on the other; one of its main features being, that whenever you wish to stop the operation and remove the fabric from the machine, you have only to draw the end of the yarn through the last stitch, and all will be secure against ravelling out.

I will now proceed to describe the construction and operation of the mechanism and formation of the web.

Fig. 1. B is a hollow platform, holding the upright case A, over which the stocking is to be drawn.

A block, S, shaded red, one end of which holds the needle-bar case D, and the other end, the looper-arm

G, lies in a bearing, t , near the centre of the platform, the main shaft T passing through and turning in it.

A gear-wheel, r , on the outer end of the shaft, is driven by a smaller one, q , fastened to the crank-wheel N.

On the other end of the shaft is a cam-plate, C, which has a stud, g , on its face, which gives motion, up and down, to the needle-bar z , by the connecting-bar M.

There is a movable piece, k , on the back of this plate, which moves the lever H by means of the friction-roll i .

The needle-bar case D is fastened to the block S, and has slots in two sides opposite to each other, one of which slots is used for the pin in the needle-bar to slide in, and the other is occupied by the slide Y.

The looper-arm G is pivoted to the other end of the block S, so as to have the same rocking motion as the needle-bar, and has a back-and-forward motion given to it by the cam R, which has a groove in its face (see fig. 5) in which the pin p in the looper-arm works.

A joint is made in the looper-arm (see fig. 2) to allow the part of the arm that projects over the work to be moved out of the way, when the stocking is put on or taken off of the case A.

A bar, P, is fastened across the under side of block S, for the feed-spring O to press upon. This spring can be swung around, so as to press on either end of the bar, by the rod f , the outer end of which comes up through an opening in the platform, so that it can be operated on the upper side of the machine.

Fig. 12 shows how the cam C and lever V operate to pass the hooks c forward and back, to cast off one row of bights or loops, and transfer the other from the bars to the hooks c , to be held in proper position for the needle to pass through them.

When the spring O is changed from one end of the bar P to the other, to cause it to feed in the other direction, the stud n on the spring O strikes against the stud m on the lever V, (see fig. 6,) and throws the end of that lever against the cam C, so that when the loose piece k comes around, the lever presses against one end of it, and causes the other end to project out and catch the friction-roll i in lever H, (see fig. 12,) which is drawn down, and thus operates the hook-plate c through the connecting-rod d , lever I, connecting-bar J, rod k , and wheels $b b$.

After the loose piece k has passed by, the lever V is thrown back to place by the solid part of cam C, which continues to revolve, without moving the lever H, until the lever V is again pressed in, in changing the direction of the feed.

The feeding of the needle-bar, one stitch at a time, a certain number of stitches either way, is accomplished by means of the rack L placed on the bridge g , and the slide Y on the needle-bar. (see fig. 2,) the needle-bar being pressed in either direction, according to which end of the bar P the spring O may be pressing. As the needle-bar Z goes down, the slide Y is drawn out of the notch in the rack L, and the spring h , remain-

ing in the rack, allows the needle-bar to move the distance of one notch to one side, (being pressed by spring O,) so that, when the slide Y rises again, it enters another notch in the rack, (see fig. 3,) thus feeding the needle one stitch, whenever the bar descends.

The rack L is allowed to slide on the bridge g the space of one-half a notch, so that, when feeding in one direction, it will bring the needle half way between the spaces it occupied when feeding in the other direction, the purpose of which will be explained hereafter.

Figs. 7, 8, 9, and 13, show the relative positions of the hook-plate c, bar-plates a' b', and their connections.

The plate c lies underneath a' and b', and is moved in and out by the wheels b b working in two short racks, I I, on the end of the plate.

As the plate c is drawn in, it carries with it one of the plates, say b', by pushing against the pins in the ends of the levers f' f', that are attached to that plate, while the other ends of the levers push the plate a' out, so that the bars on that plate will be in position to receive the bights of the yarn, and as the plate c goes out again, it changes over to one side, so as to bring its hooks in front of the bars on plate a', so that, as it goes in, it will catch under the bights on the bars, and hold them as loops for the needle to pass through while making the next row of stitches.

The changing of the plate c from side to side is effected by means of the guide-plate e', (see fig. 7,) which is fastened to the case A, and a swinging plate, d', which is pivoted to e', and is allowed a certain amount of motion each way, until it brings up against the projections n' n' on the sides of plate e.

Guide-plate e' has an oblong recess in it, divided through a part of its length by a tongue.

The plate d' has a V-shaped slot cut in it, and a pin, c', fast to plate c, projects through both plates e' and d'.

Now, as the plate c goes out, its pin c' moves in the direction shown by the arrow, until it comes against the incline of the plate d', which guides it over to the other side of the recess in e', carrying with it the plate c. When plate c moves back again, the pin c' passes in the other side of the tongue, in the slot, and throws the plate d' over to the other side of the plate e', so that, when the pin c' moves out again, it comes in contact with the other incline of the V-slot, and is thrown over on the other side, thus changing the plate c from one side to the other, each time it moves out and back.

In fig. 10, m' is a row of common chain-stitches.

The other part of fig. 10 shows three rows of chain-stitches, interlocked by having the stitches of the second row (red) pass through the bights of yarn between the stitches of the first row, and the third row passing through the bights of the second row.

Fig. 11 shows how the bights o' o' o' (red) are held in the hook of plate c whilst the other stitches pass through them, and how the bights of the last row (black) are caught under the bars of plate a', to be in turn transferred to the hooks the next time they come out and back.

The operation is as follows:

The yarn a is drawn from the spool E, and fed down through the platform, up through the case A, to the eye of the needle x, which is not far from its point. Then the stocking is drawn over the case A, so as to bring the edge of the hole to be mended just back of the slot p' in the top of the case. The main shaft being turned by means of the crank-wheel N, the needle x will be pushed up through the edge of the stocking by the pin q' in the cam-plate C, and the looper G will be thrown forward by the cam R, to catch the loop formed at the side of the needle, as it is drawn back, and hold it so that when the needle comes up again, it will pass through it, and make a chain-stitch, the needle and looper being moved the space of a stitch to one side, between each rise, by the slide Y and its spring h working in the rack L, as before described.

As the needle proceeds from stitch to stitch, it will carry its yarn over the bars, between them, and leave a bight of yarn on each bar. When the needle has made a row of stitches across the hole, the rod f is pushed in, and the spring O thrown over to the other end of the bar P, and the lever V moved by the studs n and m in against the piece k on cam C, (see fig. 12,) and the lever H will be moved down and up, throwing the plate c out and back by the rod d, lever I, rod J, and bar K moving the wheels b b.

When the plate is moved out, it will pass over in front of the bars on which the bights of the last row of stitches are left, and in going back to place, the bights will be transferred to the hooks, and the needle will proceed to make another row of stitches to the other side, which will come between the stitches in the last row in space, so as to bring the needle in front of the hooks, and through the bights or loops on them. The sliding of the rack L on the bridge, makes this difference of one-half a stitch, as before described.

When the hooks go out to take a new row of bights from another row of bars, they drop the old bight, and a slight tension kept on the stocking in front, feeds it over as fast as those loops are cast off.

After making as many rows of stitches as may be required to cover the hole in the stocking, by making a motion each way with the rod f, all the bights or loops will be cast off of the bars and hooks, and the work may be taken from the machine, only taking care to fasten the last stitch, in the usual way, with chain-stitch work.

It is not necessary to make a row of stitches clear across before changing the direction of the feed of the needle, but long or short rows may be made, as the shape of the hole to be mended may require.

I do not confine myself to any particular loops, as any one that will hold the yarn, so as to make a chain-stitch, will do, and does not affect the other parts of my machine.

Having thus described my stocking-mender,

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

1. The combination of row of bars with a needle and looper, making a chain-stitch, substantially as described, and for the purpose set forth.
2. The combination of the looper-arm G and needle-bar case D, both placed on the block S so as to insure to them the same motion, as and for the purpose specified.
3. The cam C with the piece k, in combination with the lever V, substantially as specified, and for the purpose set forth.
4. The shifting feed-spring O, in combination with the block S and bar P, substantially as described, and for the purpose set forth.
5. The rack L, in combination with the slide Y and spring h, substantially as described, and for the purpose herein set forth.
6. The combination of the hook-plate c with the bar-plates a' and b', and levers f' f', substantially as described, and for the purpose set forth.
7. The shifting plates e' and d', in combination with the pin c' and plate c, substantially as specified, and for the purpose set forth.
8. The looper-arm G, constructed with a hinge-joint, substantially as and for the purpose set forth.
9. Mending a hole in a stocking or other fabric, by making successive rows of chain-stitches across it, the rows being interlocked and connected together, substantially as herein set forth.

BENJAMIN ARNOLD.

Witnesses:

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JAMES E. ARNOLD.