

H. Bögel.

Knitting-Machine

N<sup>o</sup> 75353

Patented Mar. 10, 1868.

Fig. 2.

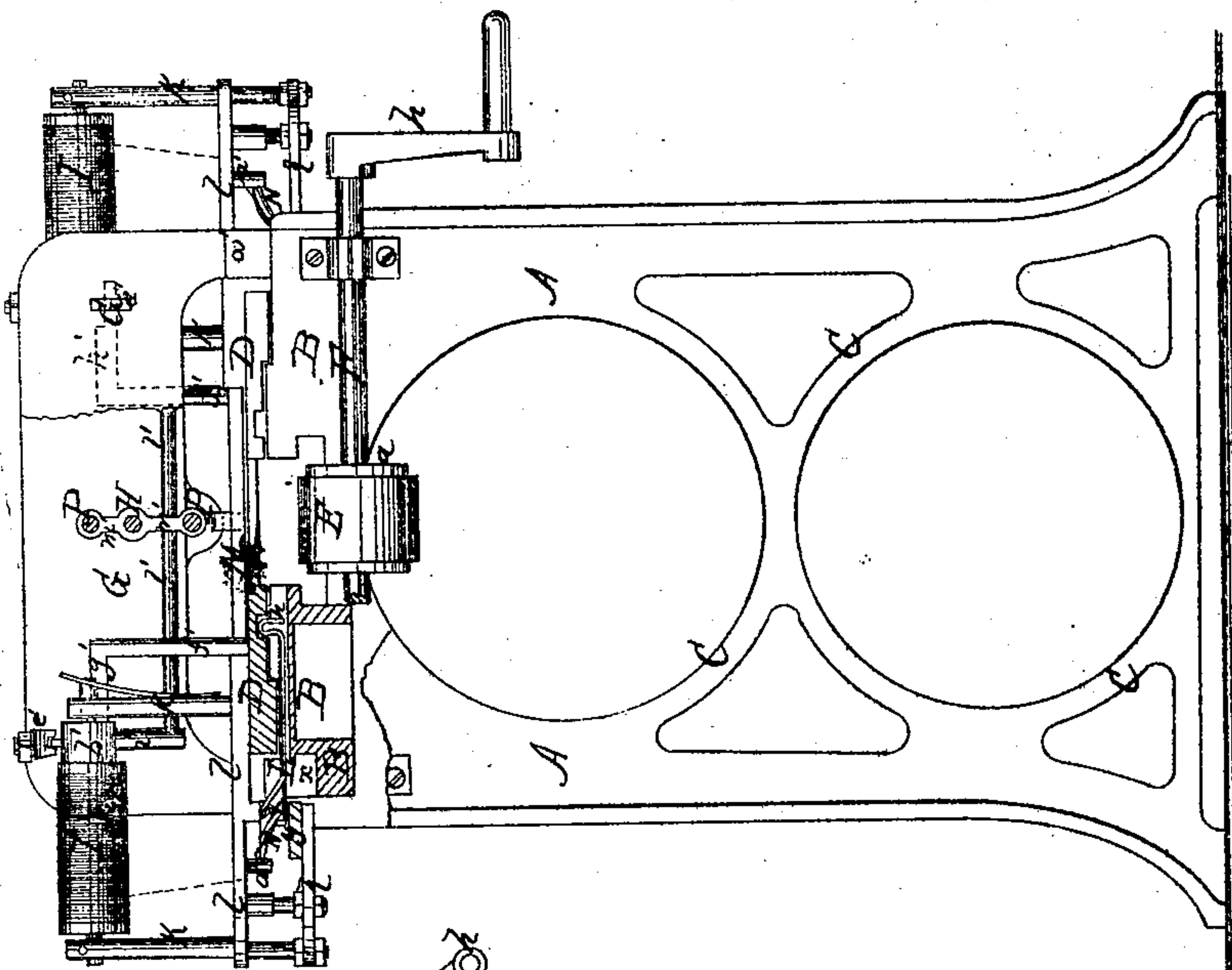
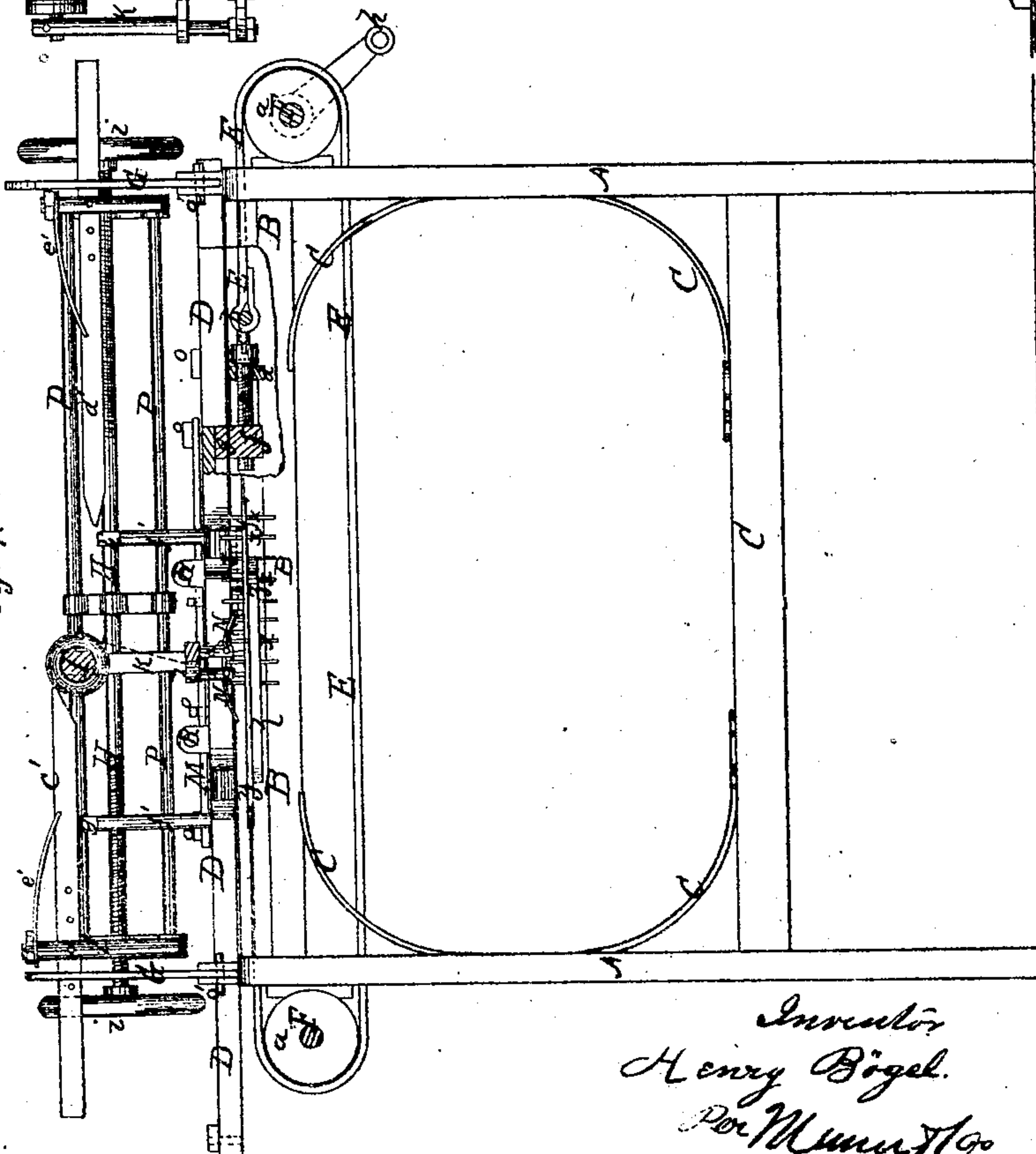


Fig. 1.



Witnesses  
Chas. Gussak.  
W. Brown.

Inventor  
Henry Bögel.  
Per Munn & Co  
Attorneys.

# H. Bögel.

## Knitting-Machine.

N<sup>o</sup> 75353

Patented Mar. 10, 1868.

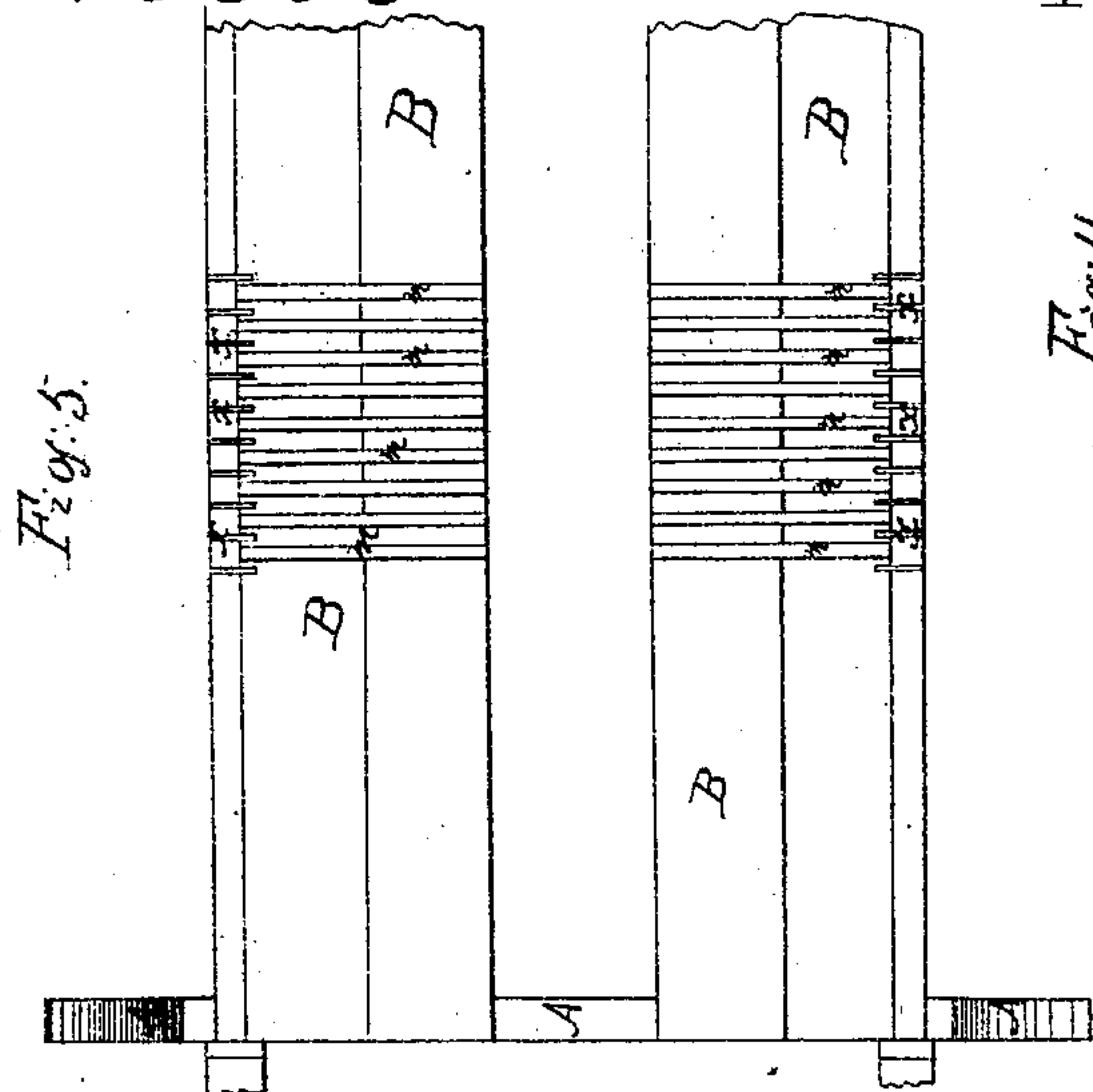


Fig. 5.

Fig. 11.

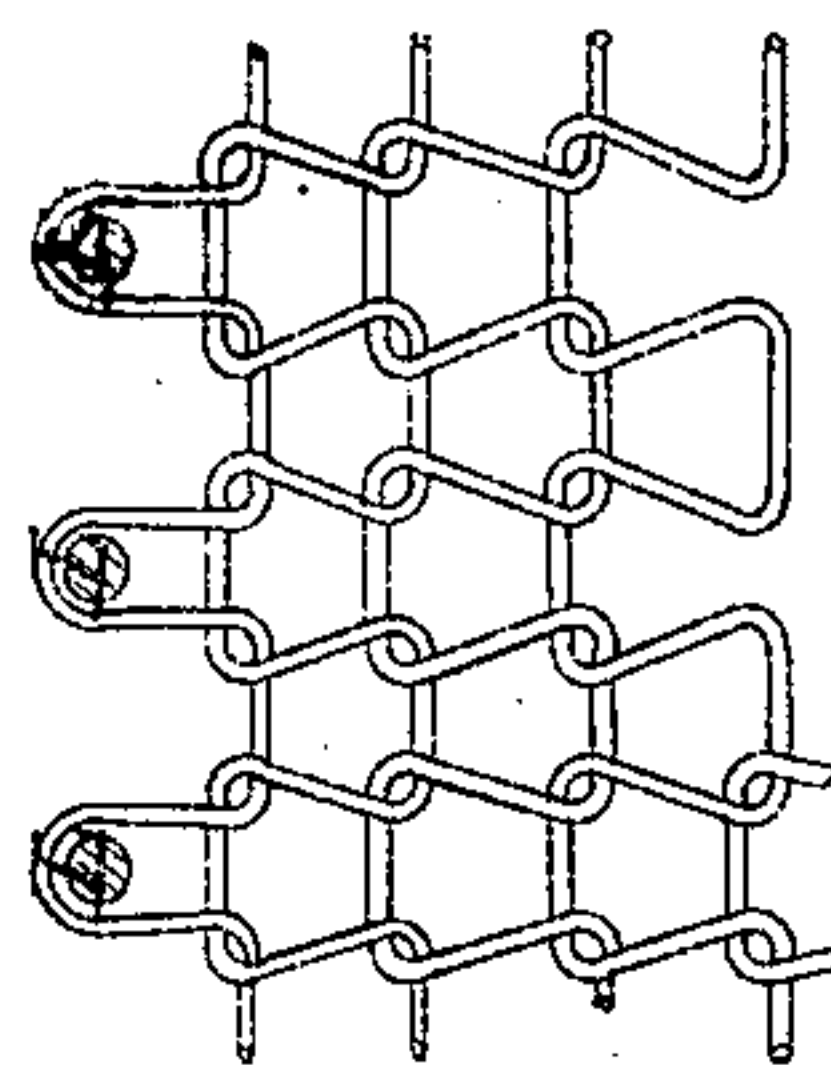


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.

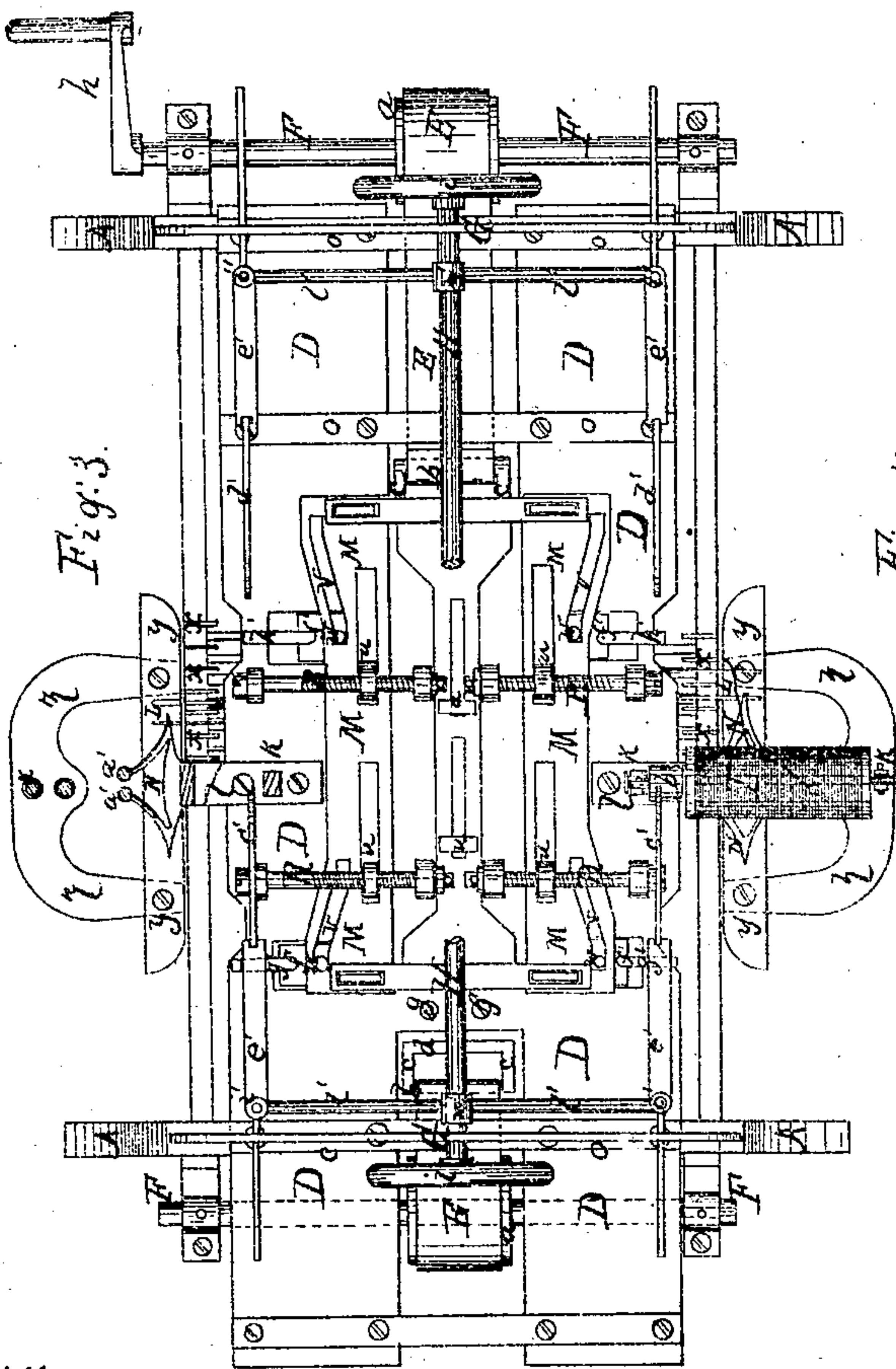
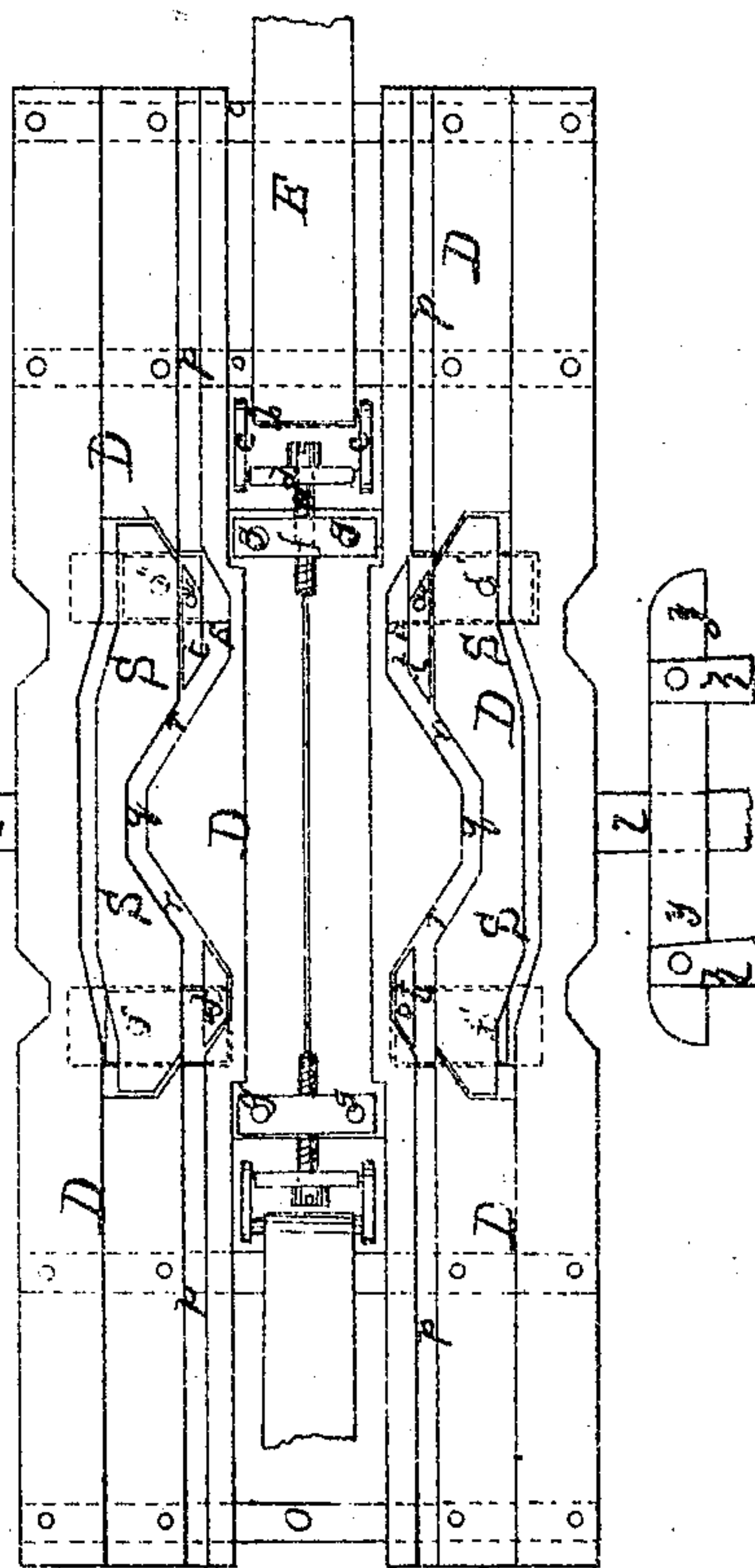


Fig. 3.

Fig. 4.



Witnesses

Ther. Tuschke.  
Wm. Friem.

Inventor Henry Bögel  
Per Munn & Co.  
Attorneys



# United States Patent Office.

HENRY BÖGEL, OF WATERTOWN, WISCONSIN.

*Letters Patent No. 75,353, dated March 10, 1868.*

## IMPROVEMENT IN KNITTING-MACHINES.

*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, HENRY BÖGEL, of Watertown, in the county of Jefferson, and State of Wisconsin, 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 a knitting-machine for making plain knit fabric of any number of stitches. It is of very simple construction, works almost without any noise, and can be easily taken apart, for the purpose of removing or replacing needles, and for repairing and cleaning the whole machine. Two sets of needles, each working independently of the other, are arranged in the machine, both of which, or either one of them, may be operated at a time, and thus one or two pieces of fabric may be knit at once.

The invention consists in the use of a series of horizontal latch-needles, which are moved back and forth by a grooved reciprocating bar, to which motion is imparted by a belt, which passes over two oscillating-pulleys, and both ends of which are attached to the bar. Each side of the bar is grooved, and two sets of needles are thus moved by means of this plate.

To the same reciprocating plate are attached latch-openers, which serve to open the needle-latches, and to lay a new thread on the hook of the needle. Provision is also made for taking up and giving out the proper slack, and also for setting the machine so as to make long or short stitches.

The aforesaid reciprocating plate slides on a well-planed, smooth bed-plate, and moves, consequently, without making any noise. The needles also work noiselessly, and the machine can thus be used without occasioning inconvenience to parties in the same room in which the machine is set up, or in rooms adjoining the same. In the annexed drawing my invention is illustrated—

Figure 1 being a side elevation, partly in section, of my improved knitting-machine.

Figure 2 is an end view of the same, partly in section.

Figure 3 is a plan or top view of the same, partly in section.

Figure 4 is a bottom view of the reciprocating plate, showing the grooves by which the needles are operated.

Figure 5 is a portion of a plan or top view of the bed-plate, showing the grooves in which the needles are placed, and wherein they are guided.

Figures 6, 7, 8, 9, and 10 are detail sectional views of the edge of the bed-plate, showing the needles in their different positions, and also the stitches formed thereon during the different stages of progress.

Figure 11 is a diagram, showing the form of stitches made by this machine, the upper row being represented as hanging on the needles.

Similar letters of reference indicate like parts.

A are four stands or supports, which support the machinery on two plates, B B. The stands are connected and strengthened by braces, C, as shown, and the plates B are secured to them by means of bolts, screws, or in any other suitable manner. The plates are made of steel, or any other suitable material, and are arranged parallel with each other, and alongside of each other, so that an open space or slot is left between them, as shown in fig. 5. Upon the plates B, the upper surface of which is well polished and smoothed, is arranged a horizontal plate, D, which receives its motion from a belt, E, that passes over two pulleys, *a a*, one arranged on either end of the machine, as shown. The ends of the belt are secured to small pins, *b*, each of which is pivoted between two plates, *c c*, the latter being connected by a cross-piece, *d*. By means of screws, *e e*, these frames *b c d* are secured to plates *f*, that slide under the inner edges of the plates B, and each of which plates *f* is secured, by means of two (more or less) screws, *g g*, to the reciprocating plate D. As the plate D is arranged on top of, and the plates *f f* underneath the plates B, the screws *g g* will be sufficient to hold the plate D down, and the latter can be easily removed from the machine, by simply removing the four screws *g*. The pulleys *a a* are hung upon horizontal shafts F, arranged at the end of the machine, to one of which shafts a crank, *h*, is secured. By imparting oscillating motion to the crank-shaft, the plate D is moved back and forth. On the plates B are arranged projecting rails or elevated portions, which form a track for the plate D, and steady the same in a lateral direction.

In case the belt E should become slack, it can be easily tightened again by means of the screws *e*. Two



upright head-pieces, G G, are secured across the respective ends of the machine, and are connected by a long shaft, H, which is provided with a right and left screw-thread, as shown, for purposes to be hereinafter specified, and which shaft is operated by hand-wheels *i i*.

On each side of the plate D are arranged two uprights, K K, which form the bearings for the spool I, that holds the thread. One of these uprights K, on each side of the machine, is arranged considerably beyond the edge of the plate D, and is supported on a rod, *l*, which projects at right angles from the side of plate D, as shown. The plates B B are provided with a series of grooves, *m m*, cut transversely into their upper surfaces, as shown, for the purpose of receiving, holding, and guiding the needles L, of which one is or may be placed into each groove. These needles are latch-needles, of usual construction, and are provided with elevated inner ends, *n*, (see fig. 2,) whereby they are operated. The plate D may be said to consist of two pieces, one sliding upon each plate B, the two parts or halves of D being connected by cross-bars *o o*, as shown in figs. 3 and 4. Each plate B, and that portion of the plate D which slides thereon, and their respective appendages, constitute a machine in themselves, and by removing the needles from the grooves in one plate B, those in the other plate will still continue to work, and if both sets of needles are in their places, they will both work at the same time on different pieces of fabric. The lower surface of each half of plate D is provided with three longitudinal grooves, *p p* and *q*, which are connected by two grooves, *r r*, which meet them at angles of about forty-five degrees. The grooves *r r*, where they meet the grooves *p p*, extend beyond the latter towards the centre line of the machine, as is shown in fig. 4, and serve to form a chamber, *s*, which can be partly filled by a movable plate *t*, as seen in fig. 4. On top of the plate D is arranged a plate, M, which is provided with slots, as shown, whereby it is enabled to slide on pins *u u*, as shown. As the plate D is moved back and forth, the end of plate M strikes alternately against one of the head-pieces G, or against a stop arranged thereon, and the plate M is thereby pushed back towards the direction from which the plate D was moving. Oblique slots *v v* are also arranged in this plate M, through which pins *w*, which are attached to the plates *t*, fit, so that, as the plate M is moved longitudinally, the plates *t* are moved laterally, those two plates *t*, which are at that end of M which strikes against the head G, being moved apart, and the other two moving towards the centre of the machine. The elevated inner ends *n* of the needles L fit into the grooves in the lower surface of the plate D, and as the latter is moved to and fro, the needles are moved in and out, by means of the oblique grooves *r r*. While the inner ends *n* of the needles are in the grooves *p*, their outer ends project beyond the end of the plate B, as shown in fig. 8. The plate D moving, the needles are brought forward in one of the grooves *r*, and into the groove *q*, so that the front ends project as far as shown in fig. 10. The needles are then moved in again in the other groove *r*, and into the chamber *s*, when they are as far in as possible, and as shown in fig. 9. From the chambers *s* each needle is again moved forward on an oblique line into the other groove *p*. The plate D has then finished one stroke, and the plate M strikes against G, whereby the chambers *s*, which are on that end of the plate D on which the needles are, are closed by their plates *t*, so that as the plate D returns, the groove *p* will connect directly with the groove *r*, while at the other end of D the plates *t* have been moved apart, so as to open the chamber *s* and draw the needles in as they come from the groove *q*.

From each bar *l* is suspended a small metal latch-opener, N, which is on a level with the needles, and is pointed at each end, and the points bent down, as shown in figs. 1 and 3, so that when the needles are moved forwards as far almost as shown in fig. 10, the point of the shuttle will enter below the latch, and raise the same, throwing it back, as shown in fig. 10.

A series of upright plates, X, is arranged at the outer edges of the plates B, between the needles, as shown in figs. 1, 3, and 5; these are for the purpose of preventing the fabric, or the upper row of completed stitches, from being drawn in with the needles, as the latter are moved in the grooves S.

A guide-plate, *y*, is secured to arms *z*, which are suspended from the plate *l*, on each side of the machine, to move with the plate D, close to and parallel with the outer edge of the plates B, for the purpose of keeping the fabric in position, in conjunction with the guides X, and to act as supports for the needles, when the same are moved out, as shown in figs. 6 and 10. The thread from the spool passes through a hole in the plate *l*, which acts as a needle-holder, and thence between two pins *a' a'*, from which the latch-opener is suspended, and through a slot in the latch-opener, as is shown in figs. 1 and 3.

Before beginning to operate, the plate D is moved, so that all the needles on one side of the machine are in the groove *p* at one end of the plate D. The usual loops for beginning a fabric are then arranged around each needle, beginning with that needle which is farthest from the latch-opener N. The plate D is then moved, so that the latch-opener moves towards the needles at the same time the needles move forward in the groove *r*. The latch-opener then throws the latch of each needle back, and lays another thread on the hook of each needle. The bar *y* holds the loop in position while the needle is moved through it, and when the latch is thrown back, the loops are in the position shown in fig. 7 before the latch is turned. While the latch-opener moves further in the same direction until the plate D finishes its stroke, the needles are drawn in again, and as the old loops cannot be drawn in with the needles, as they are held by the comb-bars X, they have to move forward on the same and close the latches again, as shown in fig. 8. The newly-laid thread is now confined in the needles. The latter are then drawn in still further, their projecting inner end, *n*, coming into the groove S, and the old loop is thereby thrown over the front end of the needle, as shown in fig. 9. The thread in the needles being slack, is formed into loops by the dropping of the old stitches from the needles, which is easily understood by looking at the diagram, fig. 11. After the old stitches have been thrown off, the needles move forward again, on the inclined outer edge of groove S, so that they are in groove *p* again, and in the original position, as regards the distance of their outer ends from the edge of plate B. By means of the slotted plate M, the movements of which have been already described, the grooves S on that end of the plate D which is above the needles, are closed as soon as the plate D reaches the end of the stroke, so that during the return stroke of D, the needles



are directly moved forward by the grooves *r*, into the front groove *q*, but then they are drawn into the groove *S*, at the other end of plate *D*, as the return stroke is near its end. As the return stroke begins, the needles move forward, and thereby release the latch from the loop. The latter is prevented from moving back by the ends of the combs between which the needles move, and from moving forward by the fixed plate below. The same movements are now made as before described, and thus one row of stitches is made during each stroke of the plate *D* on each side of the machine.

As the spools *I* are secured to the frame *D*, and move with the same, it is necessary to arrange a device for taking up and giving out the required slack. For this purpose, the inner end of each spool is provided with an extension, *b'*, which is covered with India rubber, or some other suitable flexible material. To the stationary heads *G* are secured bars *c'* and *d'*, which extend towards the centre of the machine, in such a manner that the upper or lower edge of one of them may come in contact with the extension *b'* of the spool *I*, as the plate *D* moves towards that head *G*, to which the particular bar is attached. These bars *c'* and *d'* are so arranged on the heads *G* that they can swing up and down, and are depressed by means of springs *e' e'*, whereby the bars *c'*, which are arranged so as to come in contact with the upper surface of the spool, would revolve the said spool, as the plate *D* moved towards that head *G* to which the said bars *c'* are attached.

The bars *d'* at the other end of the machine are arranged so as to come in contact with the lower surface of the spool *I*, and would, by their springs *e'*, be prevented from coming in contact with the spool. To the upper surface of the same plates *t*, which are moved laterally by the plate *M*, as heretofore described, are secured upright bars *f'*, one to each plate *t*. These bars *f'* are provided with horizontal arms *g'* or *h'*, as shown, the former having each a projection, the latter each a depression at its end, as indicated by dotted lines in fig. 2. The arms *g'* are arranged on that end of the plate *D* on which the bars *c'* are arranged, while the arms *h'* are so as to come below the bars *d'*. As the plate *D* moves, say towards that end of the machine on which the bars *d'* are arranged, the arms *h'* are moved out as far as possible towards the edge of the machine, so that the bars *d'* are pressed by their springs *e'* upon the depressed part of the arms *h'*. Thus the part *b'* of the spools will not come in contact with the arms *d'* as long as the latch-opener opens the needle-latches and lays a new thread on the needle-hooks. The thread being tied to the last needle is sufficiently strong to draw the required supply from the spool as the latch-opener moves through the needles; but as soon as the stroke of the plate *D* is at an end, the plate *M* striking the head *G*, the arms *h'* are moved towards each other, and the bars *d'* are raised and pressed against the spool *I* during part of the return stroke. The spool will thus be turned, so as to take up the thread which was given out after the needles were passed in the former stroke. The bars *c'* are operated in a similar manner by the arms *g'*. As the plate *D* moves towards that end of the machine on which the bars *c'* are arranged, the latter are elevated by the projections on the ends of the arms *g'*. During the return movement, the arms *g'* are moved so that the bars *c'* can drop upon the part *b'* of the spools, and the latter will thus be revolved, for the purpose of taking up the slack. From the above it is obvious that either kind of bars, *c'* or *d'*, may be used, the operation being the same in either case.

The arms *c'* and *d'* are provided with a series of holes, as shown in fig. 1, so that they can be pivoted to uprights *i' i'*, which are secured to cross-bars *l' l'*, the latter being fitted around the right and left screw *H*, and provided with arms *m'*, by which they are guided on rods *P*, which extend from one head *G* to the other, as shown in the drawings. By means of the holes in the bars themselves, as well as by the screws *H*, the said bars can be moved forward or backward, so as to be accurately adjusted to the amount of thread to be taken up. The ends of the bars *c'* and *d'* pass through slots in the heads *G*.

The throw of the needles to make long and short stitches can be changed by turning four screws *R*, arranged on the upper surface of the plate *D*, and moving the plates *S*, (see fig. 4,) which are part of plate *D*, and form the outer edge of grooves *r* and *q*. The more these plates *S* are moved towards the centre of the machine, the smaller will be the throw of the plates *t*, and the tighter will be the fabric, and *vice versa*. The needles can be easily removed by taking out the four screws *g g*, and removing the plate *D*. The two heads *G*, and their appendages, can also be easily removed from the frame *A B*, being secured thereto by pins *o'*, (fig. 1.)

From the above description it will be seen that with this machine either one or two fabrics can be knit at the same time. When the plates *B* are well oiled, the machine will operate noiselessly, and its operations will be complete in every respect.

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

1. The arrangement of the grooves *p*, *q*, *r*, and *S*, in the lower surface of the plate *D*, in connection with the movable plate *t*, whereby the groove *S* may be closed, and the grooves *p* and *r* connected directly with each other, all as set forth.
2. The plate *M*, sliding on the plate *D*, and operating the plates *t* and arms *g'* and *h'*, substantially as and for the purposes herein shown and described.
3. The device for taking up the slack of the thread, consisting of the bars *c'* (or *d'*), in combination with springs *e'* and arms *g'* (or *h'*), the latter being operated by the plate *M*, all made and operating substantially as herein shown and described.
4. The elastic extension *b'* of the spools *I* and the bars *c'* (or *d'*), for taking up the slack of the thread, substantially as described.
5. The slotted latch-opener *N*, in combination with the thread-holder *l* and supports *K K* of the spool, all made and operating substantially as herein shown and described.

The above specification of my invention signed by me, this 13th day of December, 1866.

HENRY BÖGEL.

Witnesses:

CHARLES M. DUCASSÉ.

CHRISTOPHER SCHRODER.