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PATENTED APR. 24, 1906.

H. C. FISCHER.
MACHINE FOR EXTRACTING THREADS FROM FABRICS.
APPLICATION FILED DEC. 6, 1905.

2 SHEETS—SHEET 1.

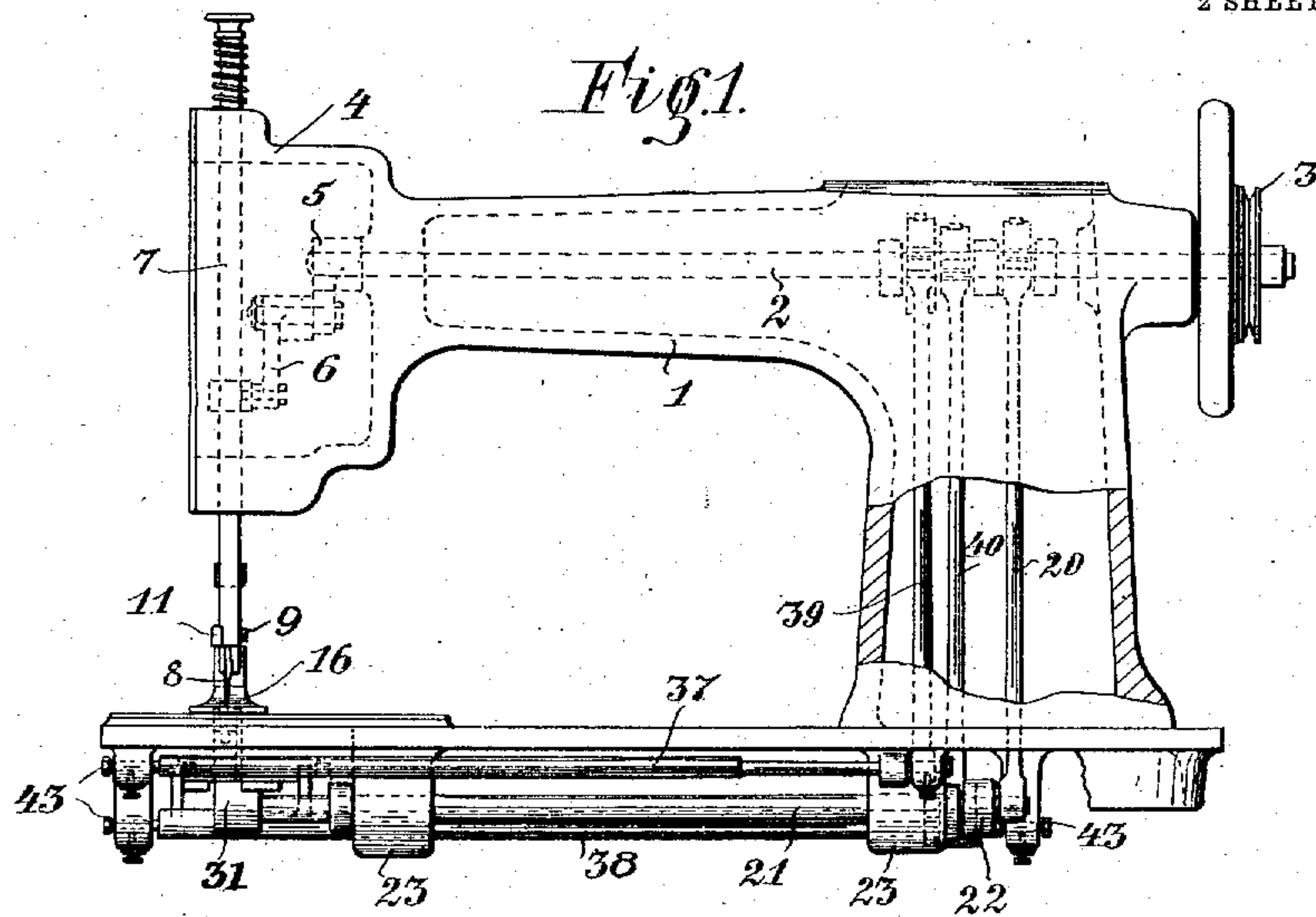


Fig. 1.

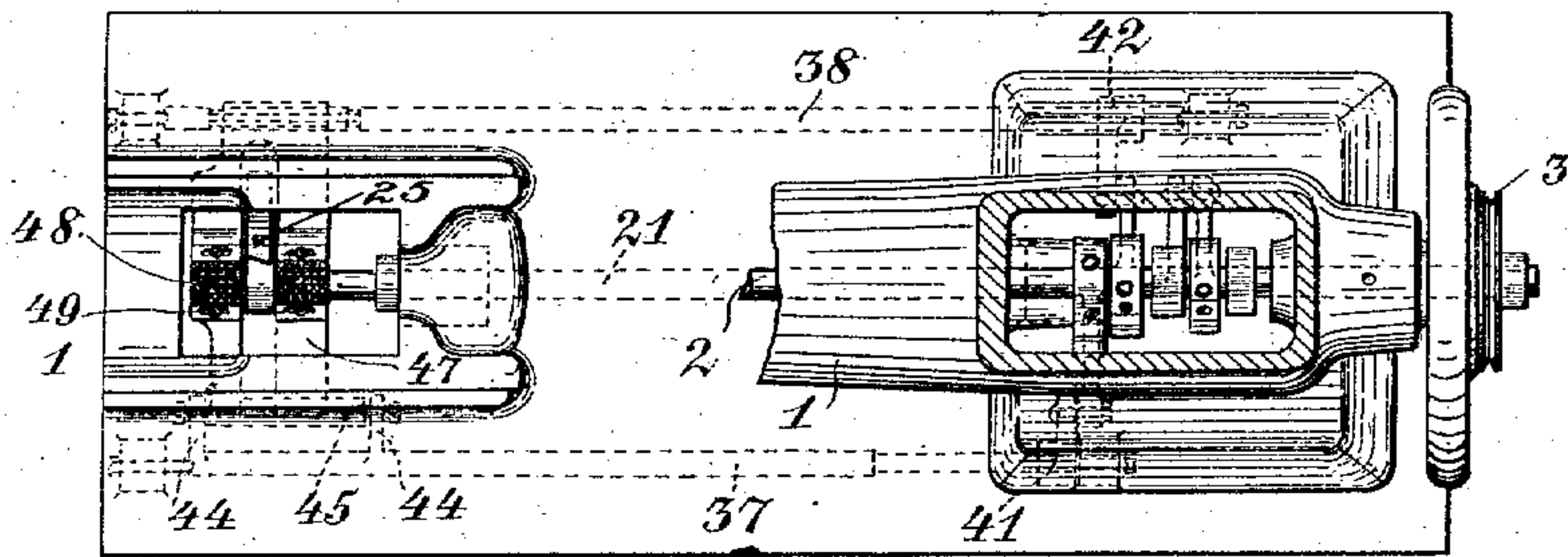
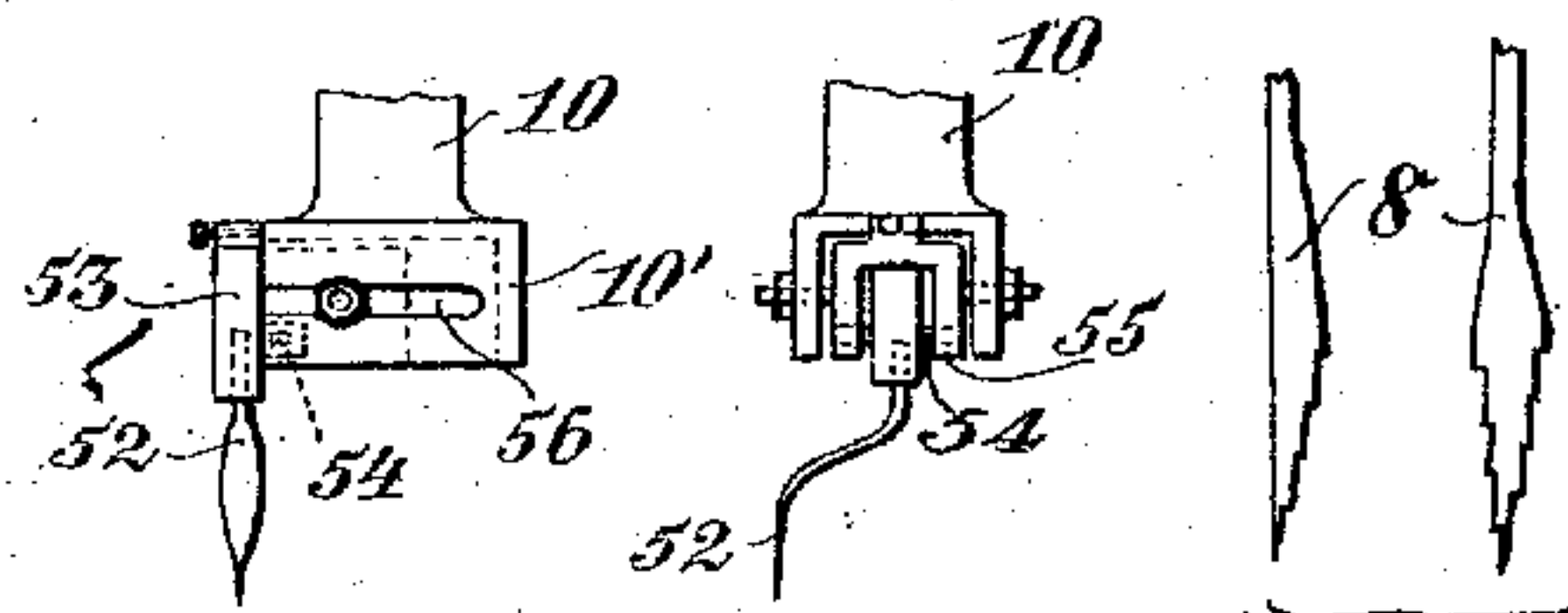
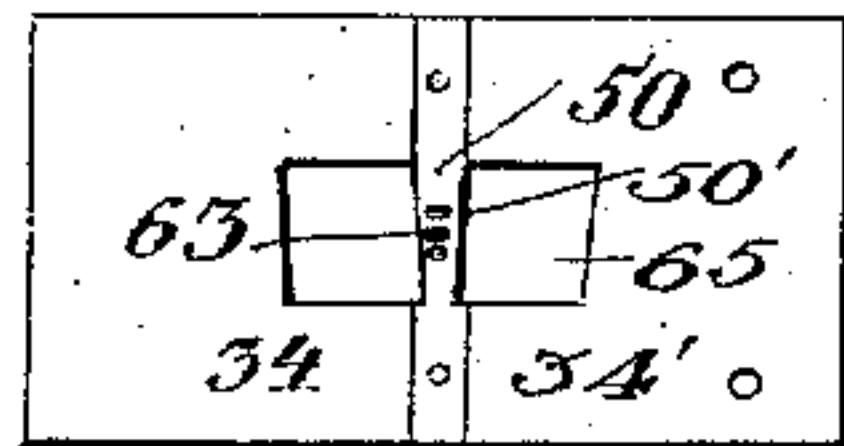


Fig. 2.

Fig. 3. Fig. 4. Fig. 5. Fig. 6.



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2 SHEETS—SHEET 2.

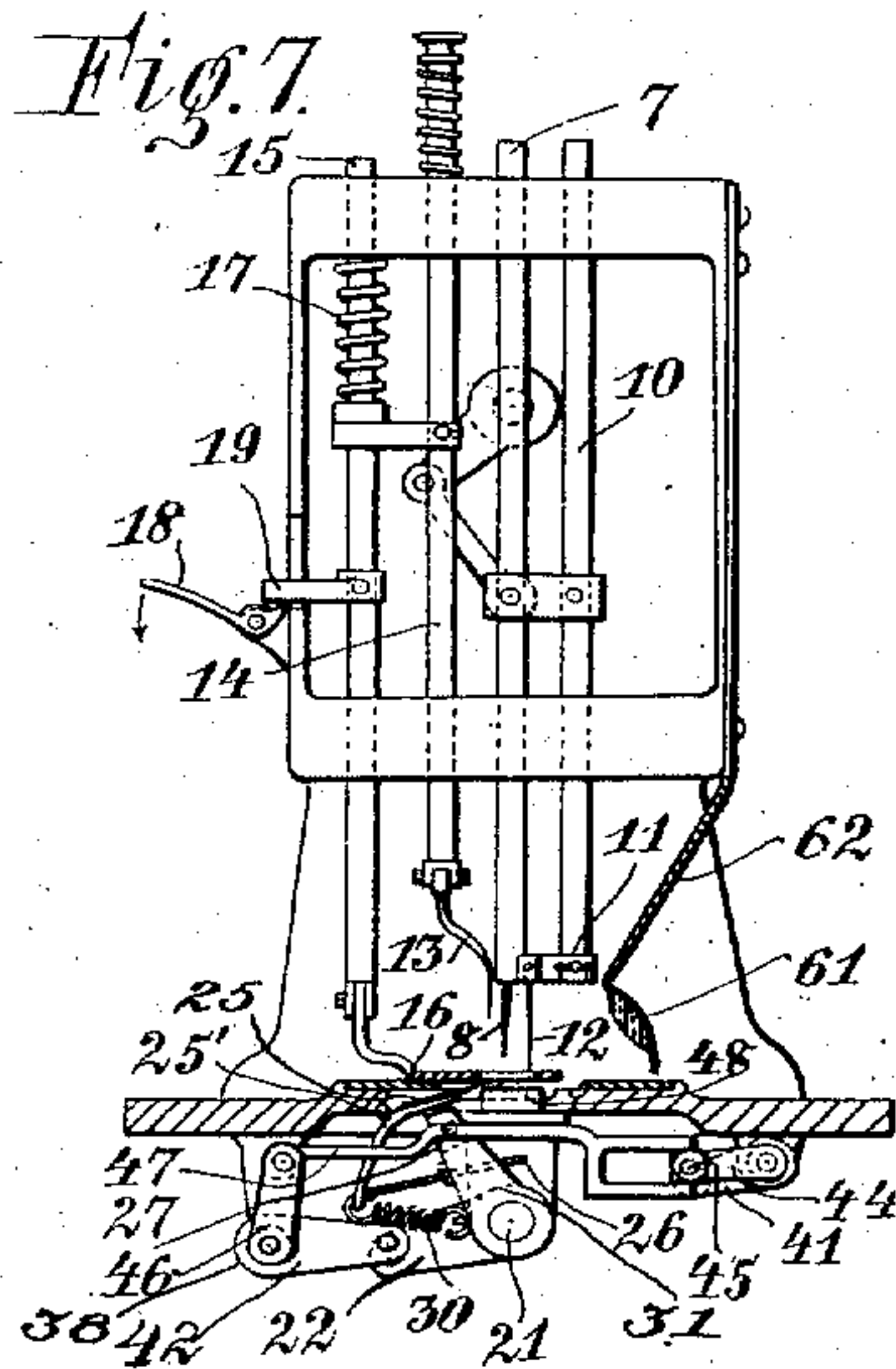


Fig. 9.

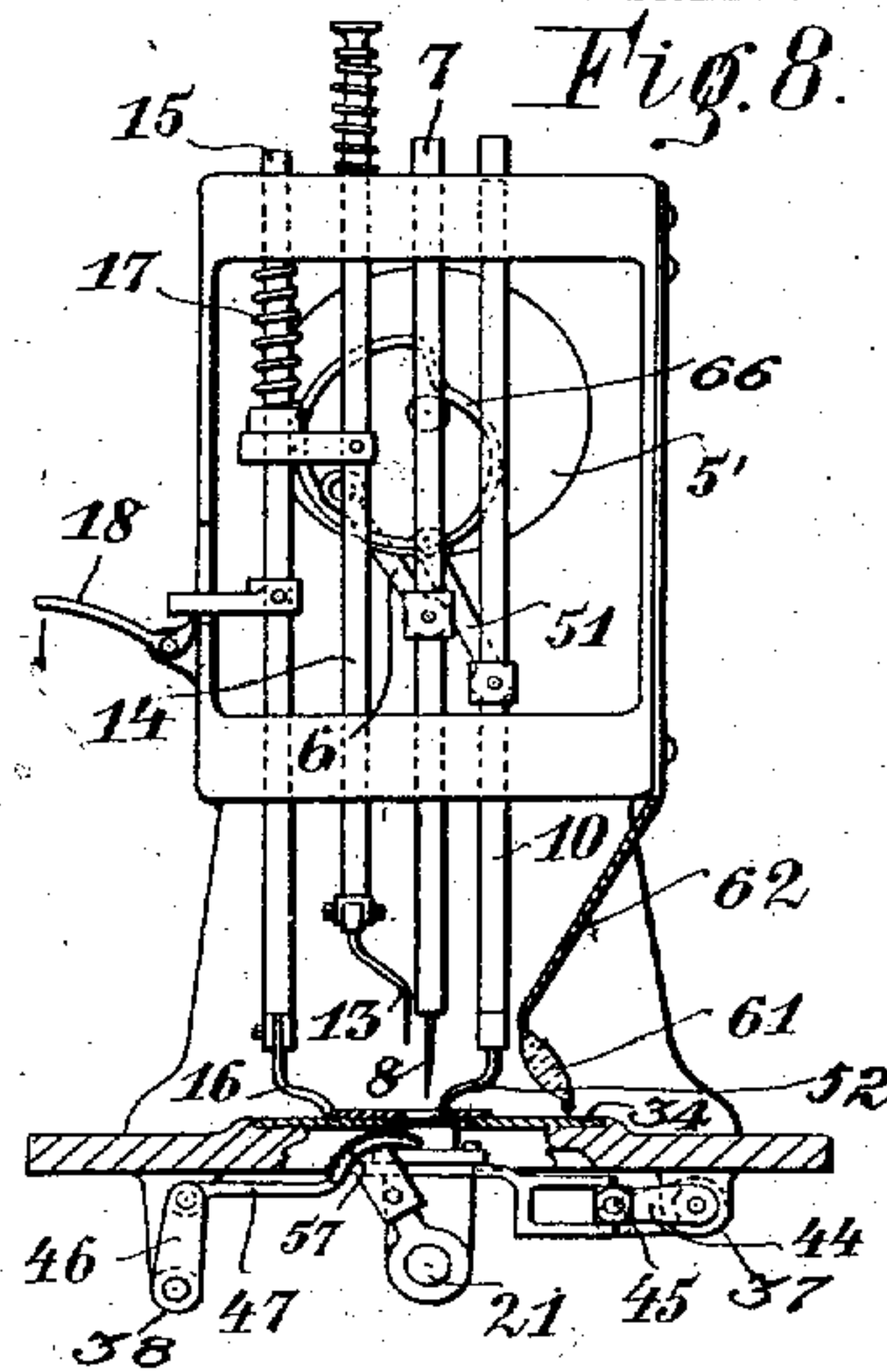


Fig. 11.

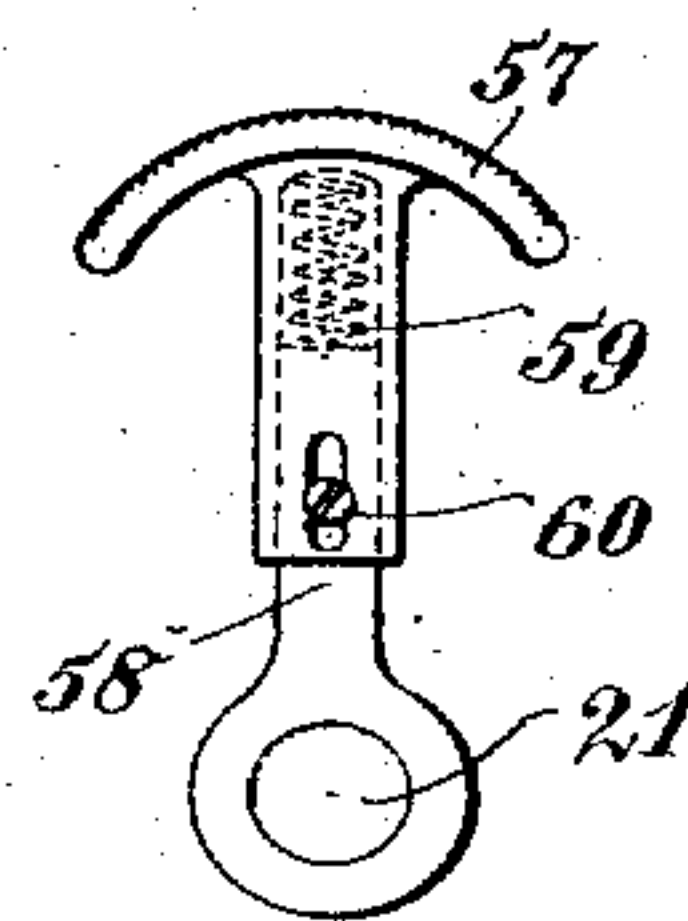
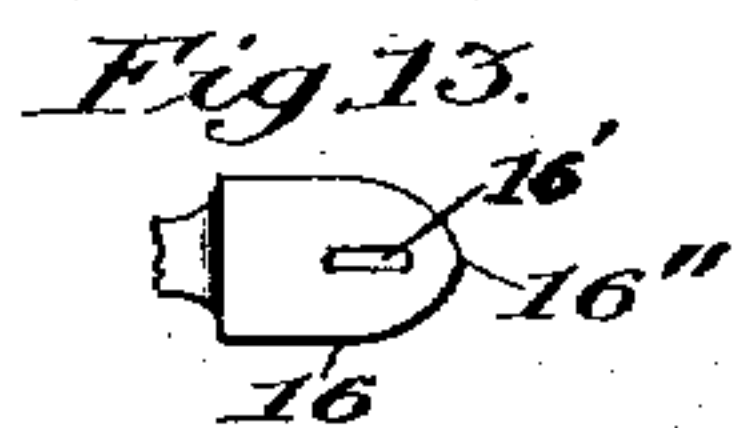
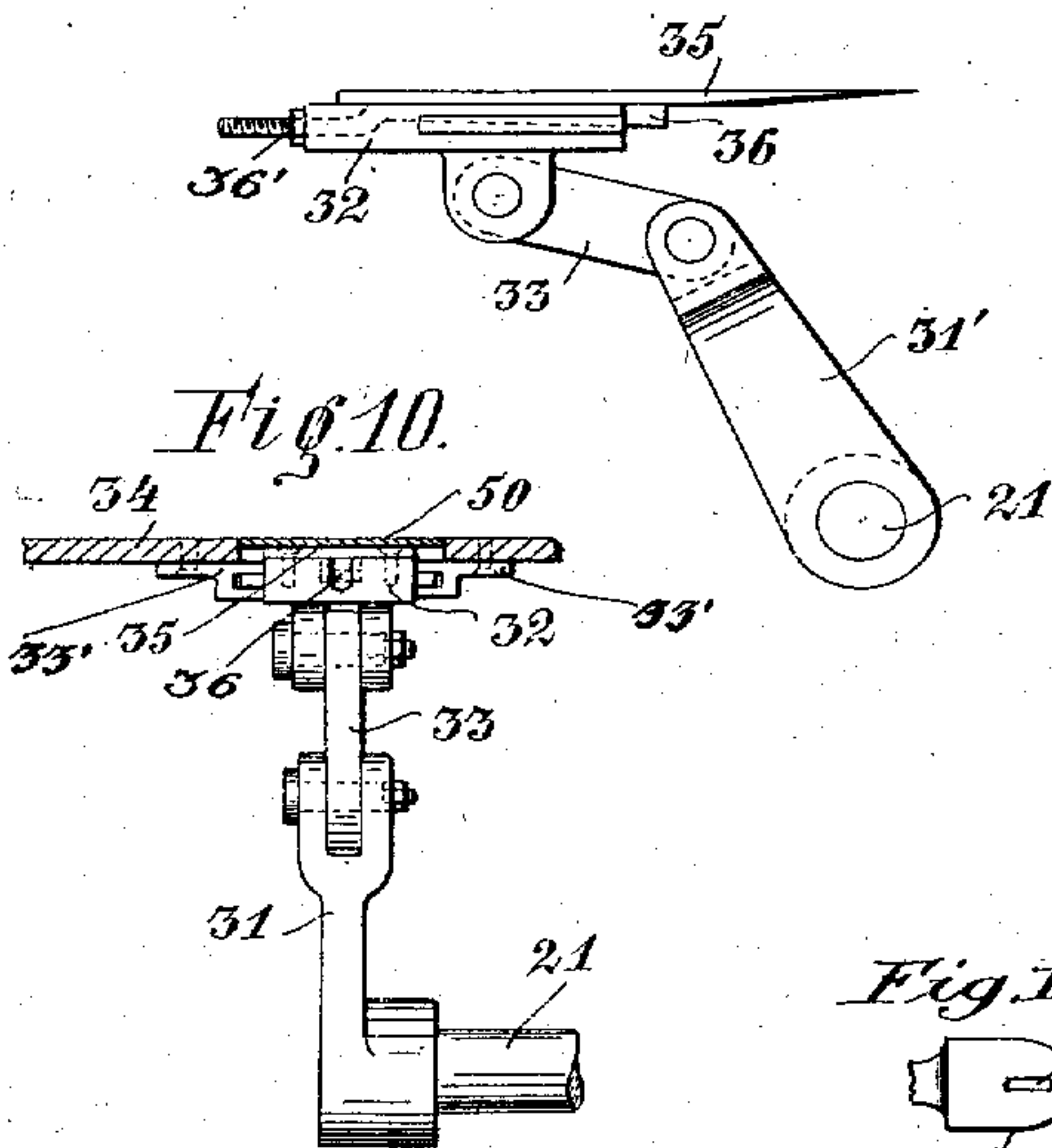
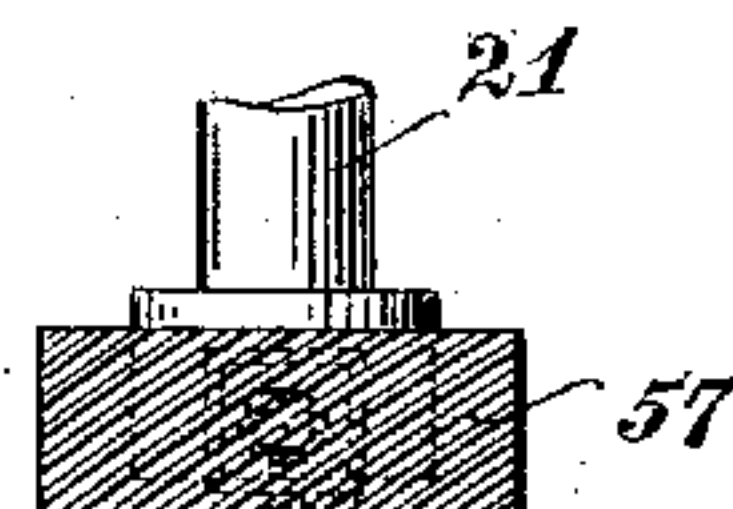


Fig. 12.



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UNITED STATES PATENT OFFICE.

HERMANN CHRISTIAN FISCHER, OF VIENNA, AUSTRIA-HUNGARY.

MACHINE FOR EXTRACTING THREADS FROM FABRICS.

No. 819,010.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed December 6, 1905. Serial No. 290,810.

To all whom it may concern:

Be it known that I, HERMANN CHRISTIAN FISCHER, mechanician, a subject of the Emperor of Austria-Hungary, and a resident of Vienna, Austria-Hungary, have invented a new and useful Machine for Extracting Threads from Fabrics, of which the following is a specification.

The invention is a machine for removing certain threads or parts of threads from woven fabrics, whereby ornamental effects are produced.

The machine comprises a toothed blade, which coöperates with a swinging or sliding cutter or with a clamping device, the blade forcing parts of the threads out of the fabric, while the cutter or clamp removes these parts during the upward stroke of the blade.

The machine further comprises certain auxiliary knives or needles which pierce the fabric in front of the extracting-blade, a feeding mechanism which grasps the fabric and in moving it forward spreads it laterally, means for adjusting the relative position of the knives or needles, and means for operating the several parts in predetermined order.

Referring to the accompanying drawings, Figure 1 is a side elevation of the machine with part of the frame broken away. Fig. 2 is a plan view showing the arrangement of the driving mechanism for the cutter and the fabric-feeder, the frame-head being broken away. Fig. 3 is a detail view. Figs. 4 and 5 illustrate the knife-support on larger scale. Fig. 6 illustrates two forms of the extracting-blade. Fig. 7 is a sectional end elevation of the machine. Fig. 8 illustrates a modified construction. Figs. 9 and 10 are front and side views of a sliding cutter. Figs. 11 and 12 are a front elevation and plan view, respectively, of a clamping-jaw which may be used instead of the cutter; and Fig. 13 is a plan view of the presser-foot.

The machine-frame 1 may be of any suitable shape. In the upper part of the frame is journaled the main shaft 2, which may be driven, as in ordinary sewing-machines, by a belt passing over the pulley 3. The shaft passes into the frame-head 4, where it carries a crank 5, which is connected, by means of a pitman 6, with the vertically-reciprocable rod 7, to the lower end of which the extracting-blade 8 is secured by a clamp-screw 9. This blade 8 (shown in detail in Fig. 6) resembles a pointed saw-blade, the teeth of which are ar-

ranged in steps. The size of the teeth and the angle at which they are arranged, as well as the width of the blade, depend upon the fineness of the fabric to be worked upon. The teeth may be arranged on one or both sides of the blade, according to the number of the threads to be extracted. In the frame-head 4 is another vertically-reciprocable rod 10, which is coupled to the rod 7, so as to move with the latter. The rod 10 carries at its lower end a piece 11, which is adjustably mounted and is recessed below to receive a needle 12, as shown in Fig. 7. The needle 12 is so arranged that it pierces the fabric in the spot into which the extracting-blade will enter at its next downward movement. By this needle the threads extending transversely to those which are to be removed are separated in order to prevent the blade 8 from striking and pushing down such transverse threads, the needle thus acting as a piercer and thread-separator.

As the operation will not always be started at the edge of the fabric where the ends of the threads are loose, it is necessary to provide a knife 13 to cut through the fabric at the starting-point, and thus free one end of the thread which is to be extracted. This knife 13 is secured to the lower end of a vertical rod 14, which is reciprocally mounted within the frame-head 4 and is normally held in lifted position by means of a spring. Also located within the frame-head 4 is a vertically-adjustable rod 15, carrying the presser-foot 16, which is forced against the fabric by the spring 17 and may be lifted by means of the lever 18, acting upon a projection 19. The foot 16 is provided with a slot 16' for the passage of the knives and the needle and has at its front end a point 16'', which is in line with the knives and indicates the direction of the fabric-feeding movement. The vertical rods in the frame-head are arranged in the line of feed.

Within the hollow frame of the machine is a pitman 20, driven by an eccentric on the main shaft 2 and operating the cutter-shaft 21 by a crank 22. The shaft 21 revolves in bearings 23 23 and carries upon the end which is below the knife-rod 7 a crank 31 and 31', by which the thread-cutter 25 or 35 is actuated. The swinging cutter 25 (shown in Fig. 7) is preferably provided with an oblique cutting edge, as shown in Fig. 2. This cutter is carried by a piece 25', pivoted on a bolt 27,

fixed in an arm 31 on the shaft 21, and its cutting edge is normally forced upward by a spring 30, connected to the end of the cutter-carrier 25'. The upward movement on the bolt 27 is limited by an adjustable stop 26, threaded through arm 31. This upward pressure is applied to the cutter in order to cause it to move smoothly along the lower face of needle-plate 50, Fig. 3, and thus shear off the thread. Instead of the swinging cutter a sliding one may be used, as shown in Figs. 9 and 10. In this case the crank-arm 31' on the shaft 21 is connected by link 33 to a slide 32, which runs in guides 33', fastened to the cover-plate 34, Fig. 10. The slide 32 carries the cutter 35, which is screwed down upon the slide, but is vertically adjustable by means of an interposed wedge 36, operated by a screw and nut 36'.

The fabric-feeding mechanism is actuated by the rock-shafts 37 38, journaled below the base and driven from the main shaft by the pitmen 39 40 and cranks 41 42. The outer ends of the shafts 37 38 are recessed to receive pivot-bolts 43 43. The shaft 37 is provided with two parallel arms 44 44, between which a square rod 45 is pivotally arranged. The shaft 38 carries arms 46 46, which support the apertured end of a plate 47. The other end of the plate 47 has two parallel forks which receive the square rod 45. The crank 41, arms 44 44, and the main-shaft eccentric driving the pitman 39 are set to give the rod 45 an upward-and-downward swinging motion, which is transmitted to the plate 47. This upward-and-downward motion of the plate 47 is combined with a forward-and-backward movement given by the arms 46 46. The plate 47 carries two feeders 48 48, Fig. 2, which are provided with roughened upper surfaces and with slotted flanges 49, loosely receiving retaining-bolts. The cover-plate comprises two halves 34 34', between which is a narrow needle-plate 50, having a wedge-shaped middle part 50'. The halves of the cover-plate have opposed recesses 65, which, with the part 50', provide oblique openings to receive the feeders 48. As these feeders move toward the operator in depressed position, they are thus caused to approach each other, moving freely by reason of the slots in their flanges 49 and sliding along the convergent outer sides of the holes 65; but as they rise and move from the operator, carrying the fabric, they are forced apart by the beveled sides of the piece 50', and thus draw the fabric tight.

The combination of the extracting-blade with the prepiercing thread-separating needle is only necessary for the finest fabrics. For coarser work the arrangement shown in Fig. 8 is sufficient. Here the rods 7 and 10 are not coupled together, but move independently. Both are driven from the main shaft 2 by means of a crank-disk 5', to which

the pitman 6 is pivotally connected, while the pitman 51 of the knife-carrier 10 is driven by a pin which runs in a cam-groove 66 in the face of the crank-disk. The shape of the groove is such as to cause the rod 10 to reach its lowest position ahead of the rod 7. The rod 10 carries a flat knife-blade 52, (shown in detail in Figs. 4, 5,) which is secured to the lower end of the rod 10 by means of an adjusting mechanism comprising a slide 53, movable upon a square pin 54 in the line of feed. The pin 54 is arranged in another slide 55, which is adjustable in slots 56 of the rod-head 10' transversely to the line of feed. The knife is fixed in a hole in the slide 53. The knife 13 may be adjustably mounted in the same manner to permit an exact adjustment of the knives, both in the line of feed and transversely thereto.

Instead of the swinging or sliding cutter 25 or 35 a clamping-jaw 57 may be used, which, as shown, has a swinging motion, but may reciprocate in a straight line. The clamping-jaw 57 is movable upon a square arm 58, carried by the shaft 21. The jaw has a roughened and curved surface and is pressed upward by means of an inclosed spring 59, Figs. 11 and 12, the action of the spring being limited by a stop 60. The needle-plate 50 is provided with three holes which correspond to the operating knives or needles and register with the slots 16' in the presser-foot. In order to permit an exact adjustment and a straight feeding, a magnifying-lens 61 may be placed in front of the feeding mechanism, while a screen 62 is arranged to hide the reciprocating rods from the operator's eyes. As shown, the lens is mounted in the screen.

The mode of operation of the machine employing the thread-cutter below is as follows: The fabric being brought upon the cover-plate 34, the presser-foot 16 is lowered as soon as the lens shows its point 16'' to be directly over the line of threads to be extracted. In starting at a selvaged edge or at a point remote from the fabric edge it is necessary to cut and free one end of the thread or threads to be extracted by manually operating the knife 13. The driving mechanism is then started. The saw-shaped blade 8 while going downward presses short portions of some of the threads which extend at right angles to its broad surface down through the middle hole 63 of the piece 50. During the upward stroke of the blade the cutter 25 or 35 passes below the blade and cuts off those portions of the threads which stick out below the hole 63. At the next downward stroke the blade enters the hole which the needle 12 has pierced into the fabric during the previous downward stroke, which prevents the extraction of other threads than those intended if the distance between the needle 12 and the blade 8 is chosen with due consideration to

the feeding step and the weaving pattern. At each upward stroke of the extracting-blade 8 a new portion of the threads to be extracted is brought forward by means of the feeders 48, which grasp the fabric with their roughened surfaces and spread it out as it advances, as they are forced farther apart by the wedge-shaped part 50' of the needle-plate 50. If the clamping-jaw 57 is used instead of the cutter 25 or 35, the threads must be cut into small lengths. For this purpose the knife 52 is provided. If the operation is not started from the edge of the fabric or at a selvaged edge, one end of the thread or threads is cut and freed by pressing down the knife 13, while the knife 52 passes down ahead of the saw-shaped blade 8 and cuts off pieces of the threads. These short pieces are thereupon pressed down through the hole 63 of the plate 50 by the toothed blade. When the blade 8 rises, the jaw 57 clamps the pieces against the plate 50, and as the fabric is moved forward the clamped pieces are held and are pulled out of the fabric, falling from the mechanism as soon as the clamping-jaw leaves the plate 50.

It is obvious that other details may be added to the machine or that parts may be changed for special work within the scope of the invention, the important characteristic of which is the combination of a saw-shaped extracting-blade with a relatively movable cutting or clamping device operating to remove from a fabric predetermined threads or parts of threads.

I claim—

1. A machine for extracting longitudinal threads from woven fabrics, comprising means for engaging and deflecting a short portion of a thread or threads, and means for removing the deflected portion, as set forth.

2. In a machine for extracting threads, means comprising a laterally-toothed reciprocating blade, to deflect a short portion of a thread or threads, and means for removing the deflected portion, as set forth.

3. In a machine for extracting threads, means comprising a reciprocating blade having lateral teeth arranged in steps, to deflect a short portion of a thread or threads, and means for removing the deflected portion, as set forth.

4. In a machine for extracting threads, means for engaging and deflecting a short portion only of a thread or threads, and means for severing the deflected portion, as set forth.

5. In a machine for extracting threads, means constructed to deflect a short portion of a thread or threads, said means comprising a reciprocating blade, and a cutter movable against the deflected portion, as set forth.

6. In a machine for extracting threads, means comprising a laterally-toothed recip-

rocating blade to deflect a short portion of a thread or threads, and a reciprocating cutter for severing the deflected portion, as set forth.

7. In a machine for extracting threads, means constructed to deflect a short portion of a thread or threads, said means comprising a reciprocating blade, and an oscillating cutter for severing the deflected portion, as set forth.

8. In a machine for extracting threads, a thread-separating device, means for engaging and deflecting a short portion of a thread or threads, and means for removing the deflected portion, as set forth.

9. In a machine for extracting threads, a reciprocating piercer and thread-separator, a reciprocating thread-deflector, and a cutter for severing the deflected thread portion, as set forth.

10. In a machine for extracting threads, a fabric-support having openings, means for feeding the fabric step by step, a reciprocating piercer and thread-separator, a reciprocating thread-deflector, and a cutter for severing the deflected thread portion, as set forth.

11. In a machine for extracting threads, a fabric-support having openings, a presser-foot having a pointer, means for feeding the fabric step by step, a reciprocating piercer and thread-separator, a reciprocating thread-deflector, and a cutter for severing the deflected thread portion, as set forth.

12. In a machine for extracting threads, a fabric-support having openings, a presser-foot having a pointer, a magnifying-lens, means for feeding the fabric step by step, a thread-separator, a thread-deflector, and a cutter for severing the deflected thread portion, as set forth.

13. In a machine for extracting threads, a fabric-support having openings, means for feeding the fabric step by step, a reciprocating thread-separator, a reciprocating thread-deflector, a cutter for severing the deflected thread portion, and a screen for the moving parts, as set forth.

14. In a machine for extracting threads, a fabric-support having an opening, means for feeding the fabric step by step, a thread-deflector constructed to engage a short portion of a thread or threads and force them through said opening, and means for removing the deflected thread portion, as set forth.

15. In a machine for extracting threads, a fabric-support, means for feeding the fabric step by step and for drawing it tight as it advances, a thread-deflector, and means for removing the deflected thread portion, as set forth.

16. In a machine for extracting threads, a fabric-support, means for feeding the fabric step by step and for drawing it tight at each step, comprising reciprocating feeders and means for separating said feeders as they ad-

vance, a thread-deflector, and means for removing the deflected thread portion, as set forth.

17. In a machine for extracting threads, a fabric-support, means for feeding the fabric step by step and for drawing the fabric tight as it advances, a thread-separator, a thread-deflector, and means for removing the deflected thread portion, as set forth.

18. In a machine for extracting threads, an initial thread-cutter, a thread-deflector, and means for removing the deflected thread portion, as set forth.

19. In a machine for extracting threads, an initial thread-cutter, a thread-separator, a

thread-deflector, and means for removing the deflected thread portion, as set forth.

20. In a machine for extracting threads, an initial thread-cutter, means for feeding the fabric and for spreading it laterally as it advances, a thread-separator, a thread-deflector, and means for removing the deflected thread portion, as set forth.

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

HERMANN CHRISTIAN FISCHER.

Witnesses:

FRANZ REITER.

ALVESTO S. HOGUE.

Correction in Letters Patent No. 819,010.

It is hereby certified that in Letters Patent No. 819,010, granted April 24, 1906, upon the application of Hermann Christian Fischer, of Vienna, Austria-Hungary, for an improvement in "Machines for Extracting Threads from Fabrics," an error appears in the printed specification requiring correction, as follows: In line 37, page 3, the word "longitudinal" should read *body*; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of May, A. D., 1906.

[SEAL.]

F. I. ALLEN,

Commissioner of Patents.

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