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PATENTED JULY 10, 1906.

B. SALZER & G. WALTHER.

SHUTTLE DRIVING MECHANISM FOR EMBROIDERING MACHINES.

APPLICATION FILED FEB. 4, 1905.

2 SHEETS—SHEET 1.

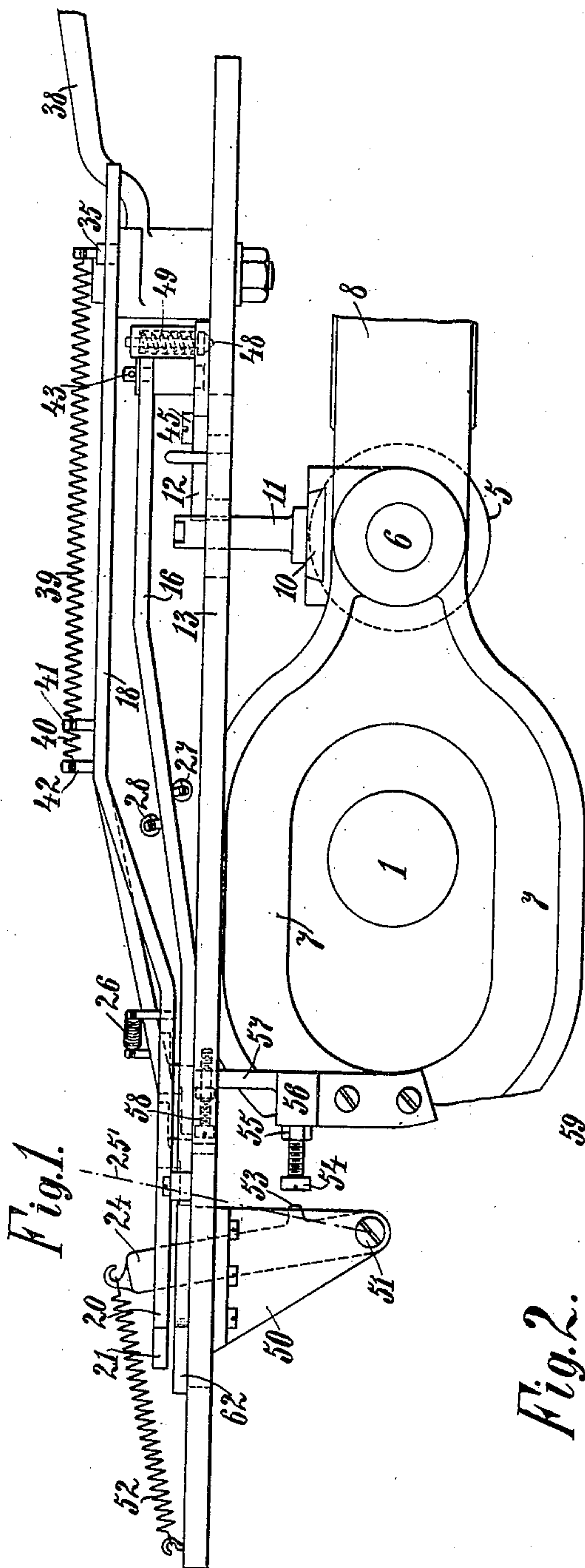


Fig. 1.

Fig. 2.

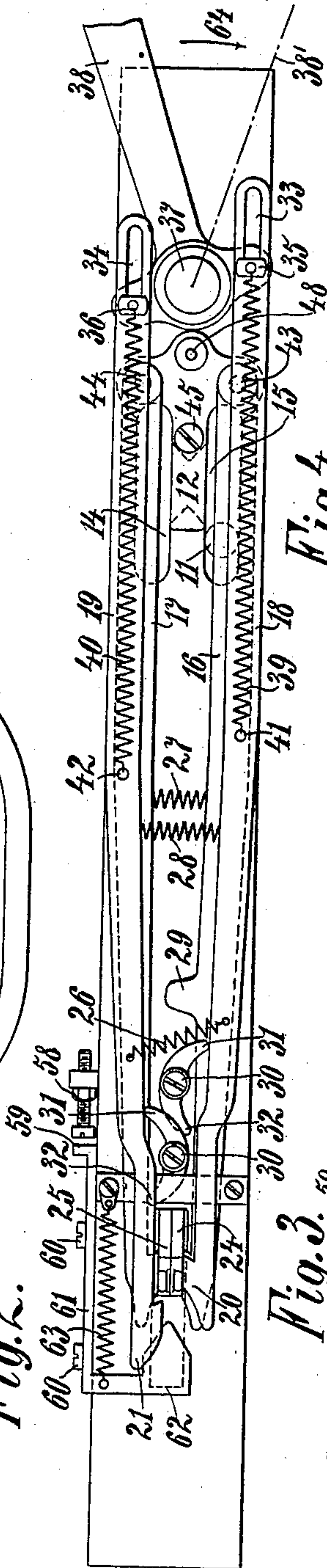


Fig. 3.

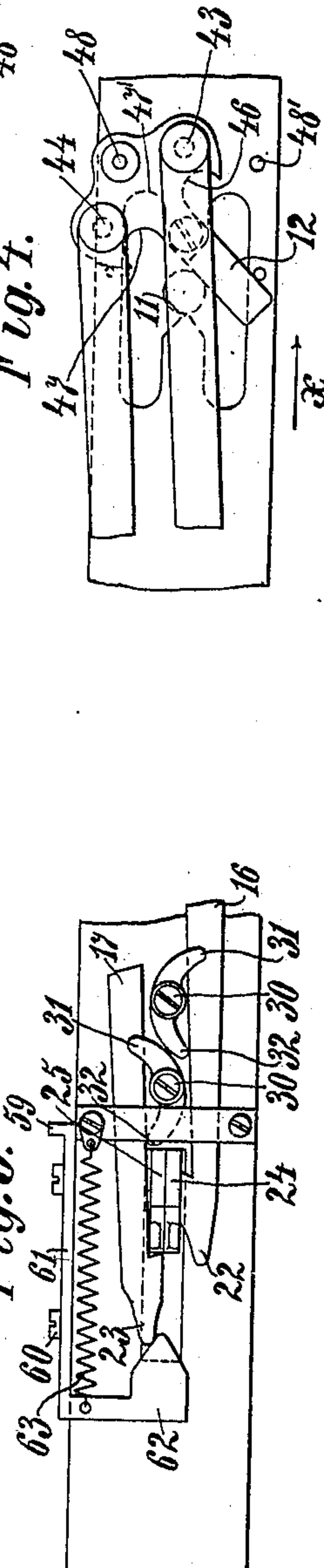


Fig. 4.

Witnesses.

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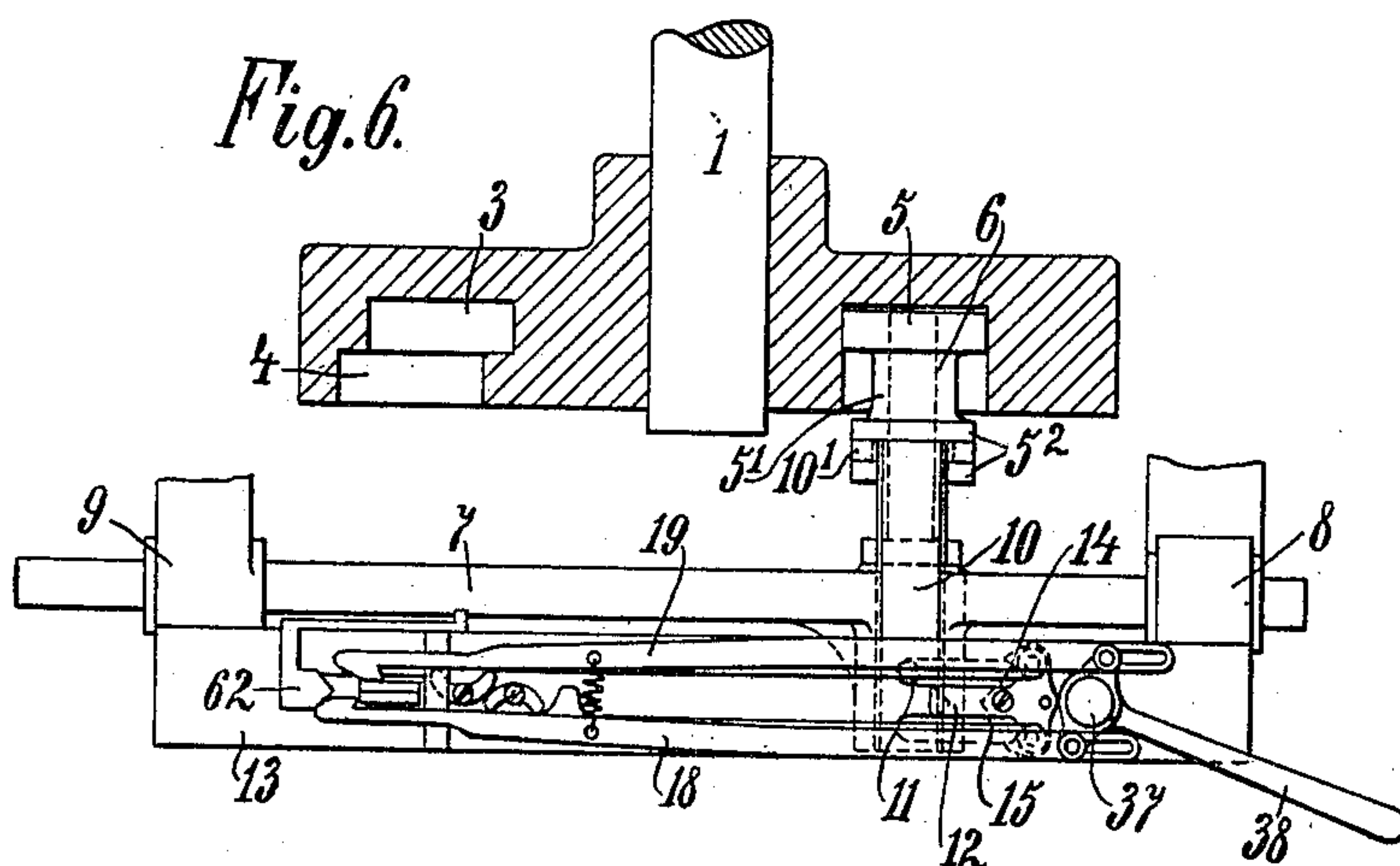
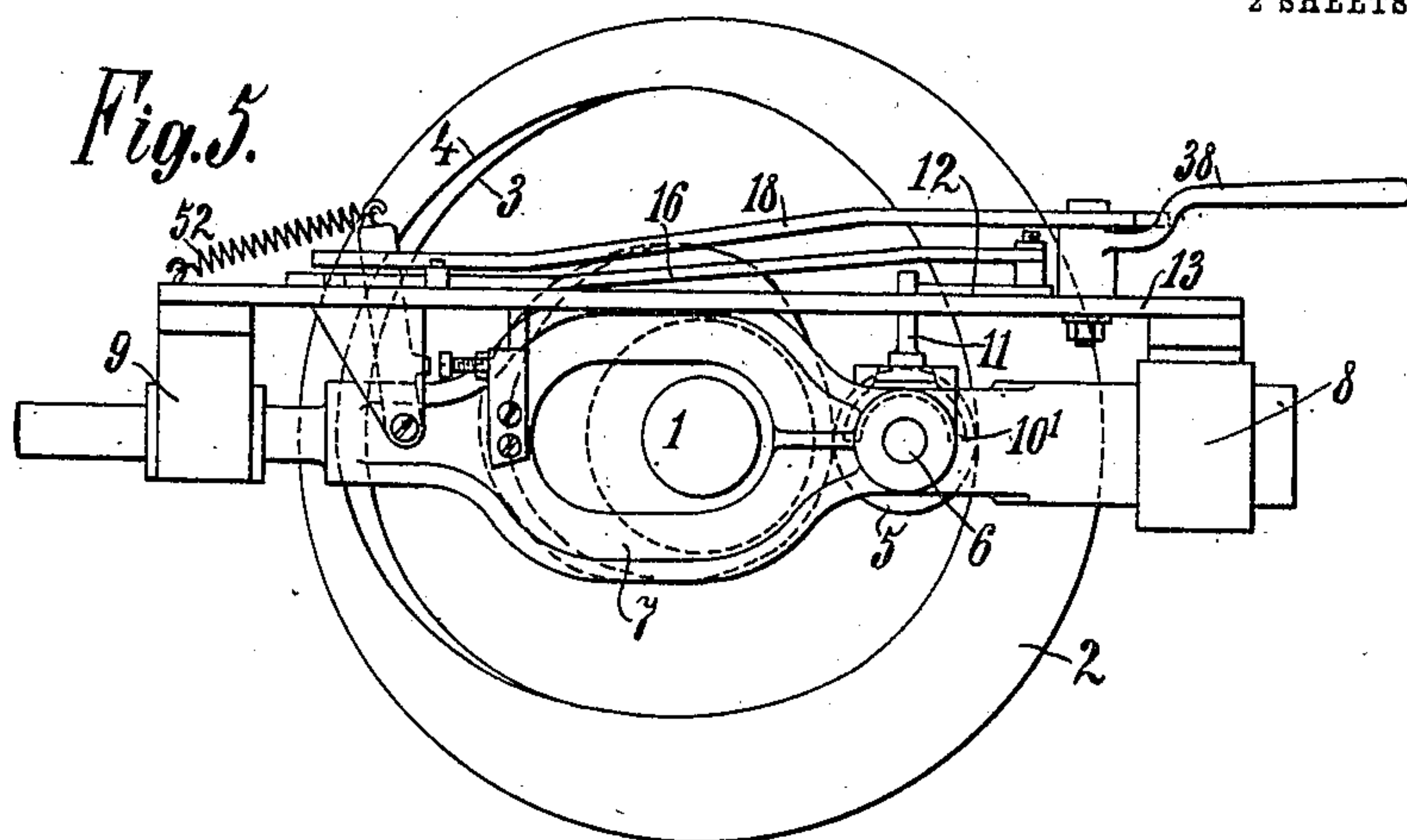
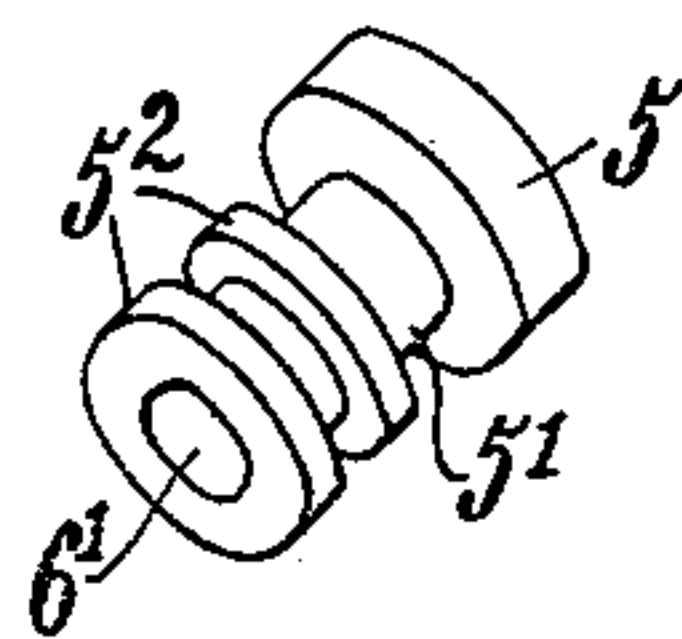


Fig. 7.



Witnesses.

F. Heeren
Franklin

Fig. 8.

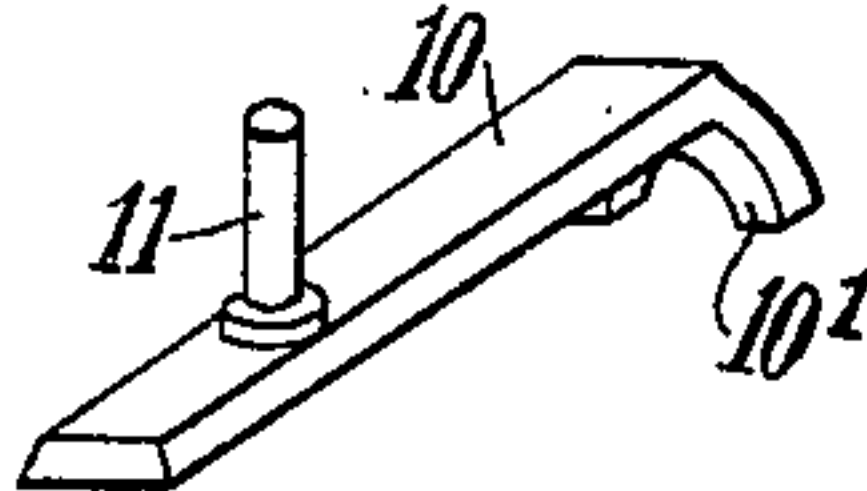
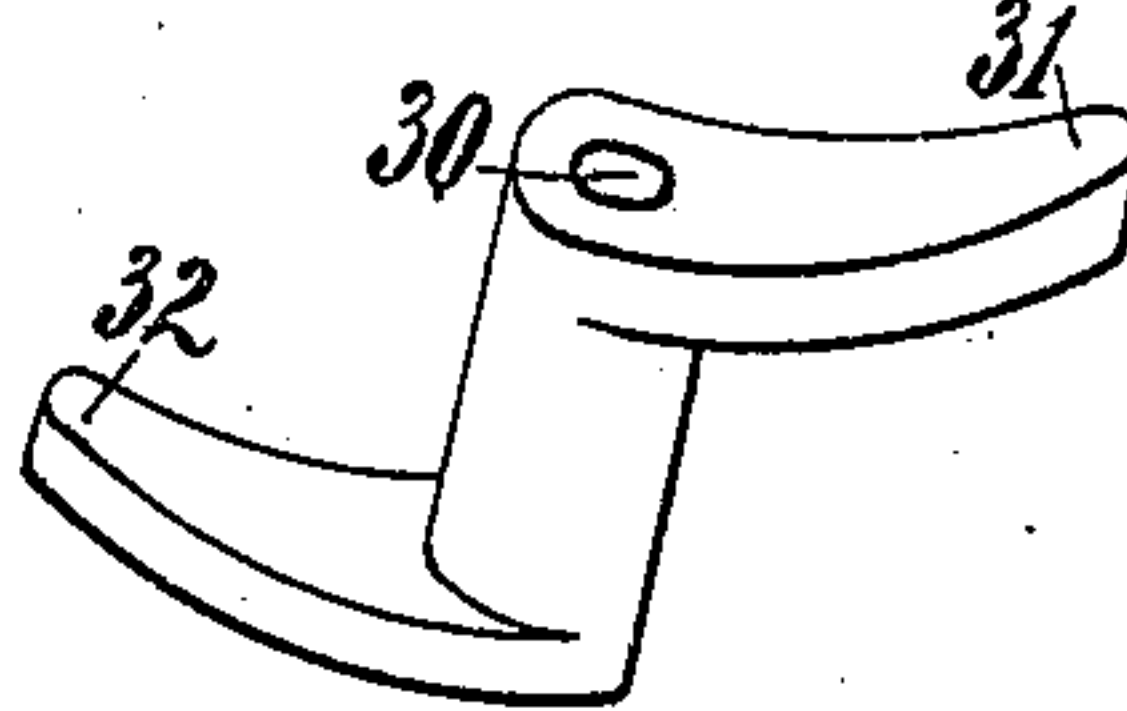


Fig. 9.



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UNITED STATES PATENT OFFICE.

BRUNO SALZER AND GUSTAV WALTHER, OF CHEMNITZ, GERMANY.

SHUTTLE-DRIVING MECHANISM FOR EMBROIDERING-MACHINES.

No. 825,435.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed February 4, 1905. Serial No. 244,127.

To all whom it may concern:

Be it known that we, BRUNO SALZER and GUSTAV WALTHER, subjects of the German Emperor, residing at Chemnitz, in the Kingdom of Saxony and Empire of Germany, have invented certain new and useful Improvements in Shuttle-Driving Mechanism for Embroidering-Machines, of which the following is a specification.

10 This invention relates to embroidery-machines, and has for its object the provision of mechanism for changing the shuttle-driving means from a satin-stitch to a back-stitch adjustment.

15 This invention consists more particularly in the provision of an actuating-cam having separate and distinct cam surfaces or grooves and a reciprocating carriage provided with a cam member adapted to be shifted from one 20 groove to the other, the shifting of the cam member being effected by mechanism which after being set completes the shifting movement during the operation of the cam from a satin-stitch to a back-stitch adjustment, or 25 vice versa.

In the drawings, Figure 1 is a front view of one embodiment of the invention. Fig. 2 is a top view of a portion thereof. Figs. 3 and 4 are views of portions of the apparatus in 30 changed positions. Fig. 5 is a face view of the cam and operating mechanism on a somewhat reduced scale. Fig. 6 is a top view of the mechanism, the cam being shown in section. Figs. 7, 8, and 9 are perspective views 35 of details.

As shown, 1 is the main shaft; 2, a cam fixed thereon provided with grooves 3 and 4, with which a guide-roller 5 is designed to singly engage. The guide-roller 5 is slidably mounted 40 on a pin 6 to permit alternate engagement with the grooves 3 or 4. The pin 6 is mounted upon a carriage 7.

8 and 9 designate bearings for the carriage, which depend from a main supporting member 13. 45

A cross-slide 10 is mounted on the carriage 7 and, as seen in Fig. 8, is provided with a vertical operating-pin 11. The roller 5 is provided with a hub 5', having annular rims 5², 50 into which a bifurcated or forked portion 10' of the slide 10 projects. The fork 10' seats between the rims 5², and when the slide 10 is moved to and fro the roller 5 is reciprocated on the pin 6 to alternately engage the grooves 55 3 and 4.

The support or plate 13 is provided with

two communicating slots 14 15, in which the operating pin or bolt 11 is received. In Fig. 6 the bolt 11 is located in slot 14, and the roller 5 occupies the groove 3. When the 60 roller 5 occupies the groove 4, the bolt 11 will occupy the groove 15. Switching mechanism is provided to permit passage of the pin 11 between the grooves 14 and 15 in a manner hereinafter more fully described. Fig. 4 65 represents an adjustment of the parts, showing the bolt 11 passing from groove 15 into the groove 14—to wit, when the roller 5 is moved from groove 4 into the groove 3.

The plate 13 supports a pair of switch-bars 70 16 and 17 and a pair of tappet-bars 18 and 19, said bars at one end being provided with hooks 20 21 22 23, adapted for engagement with the tappet-levers 24 25. For this purpose the bars 16 17 18 19 are movable longi- 75 tudinally and also transversely. The bars 18 19 are connected by means of a spring 26 and the bars 16 17 by the springs 27 28. A stop 29 is formed on the lower bar 16, preventing the latter from approaching the bar 80 17 too closely, so that the hooks 22 or 23 are prevented from simultaneously engaging the levers 24 and 25.

Displaceable levers 31 32 (shown in perspective in Fig. 9) are provided, the same being 85 pivoted to pins 30 and designed to prevent the hooked ends of the bars—for instance, 20 and 22 or 21 and 23—from simultaneously catching levers 24 or 25. If, for instance, the lower bar 17 engages the lever 90 end 32, Fig. 3, resulting from engagement of the catching device 23 with lever 25, the upper lever 31 will prevent the upper catching device 21 from engaging the lever 25—i. e., the upper lever 31 will force the upper bar 19 95 aside. To this end the springs 27 28 are sufficiently powerful to overcome spring 26.

The right ends of the tappet-bars 18 and 19 are provided with relatively long slots 33 34, which are traversed by pins 35 36, mounted 100 on hand-lever 38, which is pivoted at 37. The springs 39 40, which at their left ends are attached to the bars 18 19 and at their right ends to the pins 35 36, normally draw the bars 18 and 19 to the right sufficiently to bring the 105 left ends of the slots 33 34 in contact with the pins 35 36..

The right ends of the bars 16 and 17 are pivotally connected to a three-armed switch 12 by means of pivots 43 44, said switch being 110 pivoted at 45 to the support 13. When the bolt 11 is moved in the slot 15 in the di-

recession of the arrow x in Fig. 4, the switch 12 will occupy an angular position with respect to slot 15, the bolt 11 being forced into the slot 14 in its travel by engagement with said switch. The oppositely-extending arms of the switch 12 are provided with recesses 46 47, in which the bolt 11 fits. Furthermore, the lever 12 has a vertically-movable pin 48, controlled by a spring 49. The plate 13 is provided with three small holes, of which in Fig. 4 only one, 48, is visible, the other two being covered by the switch 12. These holes serve for the purpose of retaining the switch in a central position, as in Fig. 4, or in angular positions, this being attained by means of the spring 49 respectively forcing the lower conical end of the pin 48 into the holes 48'.

The bed-plate 13 carries a pillow-block 50, which is provided with a pin 51, serving as a pivot for the two tappet-levers 24 25. Two springs 52 are arranged for the purpose of maintaining the two levers 24 25 in a retracted position. Each one of said levers 24 25 is provided with a lug 53, arranged opposite a screw 54. The latter carries a lock-nut 55 and is screwed fast in a part 56, fixed to the carriage 7. When the latter is moved to and from the levers 24 25, the same will at each reciprocation be engaged by the screw-head 54, the purpose of which will hereinafter more fully appear. From the part 56 a small arm 57 extends upward and carries a second stop-screw 58, which is adjusted in such a manner as to strike against the end 59 of a bar 61 and provided with a wedge-shaped head 62. The spring 63 serves normally to bring the head 62 into a non-operating position—*i. e.*, to the right of the screw 58—leaving the bar end 59 free. Now as the head 63 is in the same plane with the two lower hooked ends 22 23 it is forced by the spring 63 against the hook 23, releasing the lever 25, Fig. 3. Otherwise the hook 22 could be pushed far enough forward to catch the lever 24 when the spring 63 would engage the head 62, releasing the lever 24.

The operation of the device is as follows: Supposing, for instance, that the cam-roller 5 is engaged with the front groove 3, as represented in Fig. 6, to shift the member into groove 4, the hand-lever 38 will be swung to the position indicated in Fig. 2 in full lines. In consequence thereof the upper bar 19 is situated so far at the left that its hook 21 will catch the lever 25. Now the lever 38 will be swung in the direction of the arrow 64 until it assumes the position 38. Thus the stronger spring 40 will overcome the force of the spring 52 and draw the bar 19, together with the lever 25, engaged by it, to the right. Then the lever 25 would assume the position indicated by the line 25' in Fig. 1. Supposing the lever 38 were moved so slowly to 38' that the shaft 1 and cam 2 during the same time would make several revolutions and the main

slide 7 several reciprocations, then the following action would take place: The lug 53 of the lever 25, drawn by the bar 19 and following the slow movement of the lever 38, will gradually move into the path of the stop 54 on the carriage 7, and at each reciprocation of the stops 54 the lever 25 would at the first contact be forced back a slight distance and at the second, third, and fourth contacts more and more—that is to say, the oscillation of the lever 25 would at first be slight, but would gradually become greater. Of course the bar 19 at first would also reciprocate to some extent with the lever 25 through the medium of the slot 34, which permits sliding movement of the pin 36. On the continued movement of the lever 38 into the position 38' these reciprocating movements of the bar 19 will have been sufficient to permit the lower hook 23, which till then was immovable in the position shown in Fig. 2, suddenly to catch the lever 25. This is effected in consequence of the spring 27 drawing the bar 21 to the front and forcing the lever 32 back, overcoming the small spring 26, so that the lever 31 pushes the upper bar backward and thrusts the hook 21 away from the lever 25. This operation—to wit, the engagement of the lever 25 by means of the catching device 23—takes place at the moment the lever 25 has completely attained the position 25'—that is, at the time in which the carriage 7 is nearest to the right of its movement. If instantly thereafter the carriage 7 is moved to the left, the screw-head 54 will force the lever 25 backwardly to the left, completing the operation. However, as the lever 25 is engaged by the hook 23 the bar 17 will travel to the left, and, furthermore, as its right end at 44 is pivotally connected to the lever 12 the latter also will have to partake in the movement. The parts then are situated as shown in Figs. 3 and 4—to wit, the switch-tongue 12 is so adjusted that at the next movement of the carriage 7 to the right the guide-bolt 11 of slide 10 must come up against the obliquely-placed switch 12 and be forced into the opposite slot. At the commencement of this movement of the carriage 7 to the right the screw 58 will free the bar 61 and the spring 63 will force the wedged head 62 against the hook 23, releasing the lever 25. During the further movement of the main slide 7 to the right the guide-bolt 11 will first move from the position shown in Fig. 4 into the crescent-shaped opening 47 and then on a short distance till the crescent-shaped opening has reached the position 47'. Now the switch 12 is in a non-operating position—*i. e.*, lying parallel to the direction of motion of the carriage 7, as indicated in Fig. 2. When this operation of removing the roller is finished, it is immaterial whether the hand-lever 38 is left in the position 38' or moved back into the middle one. The opposite proceeding in the

removal of the roller is attained by moving the hand-lever from the position 38' into the position 38. In this case instead of the parts 19 25 17 the parts 18 24 16 partake in the operation of removal and the switch 12 would assume a position reverse to that indicated in Fig. 4. Otherwise the operation will be the same.

Having now fully described our invention, we declare that what we claim is—

1. A variable cam carrying two grooves in combination with a slide, a roller engaging said grooves, of a guide-pin connected with said roller, a switch-tongue 12 adapted to be adjusted obliquely in regard to said guide-pin, a pair of levers 24, 25 adapted to be moved by said slide, a pair of manually-adjustable catching devices 20, 21, a second pair of catching devices 22, 23 respectively adapted to be moved into the path of the levers 24, 25, and two double levers 31, 32 respectively arranged between said two pairs of catching devices reciprocally engaging the latter, substantially as and for the purpose set forth.

2. A variable cam provided with two grooves or cam-surfaces in combination with a slide, a roller carried by the slide for engaging said grooves, a guide-bolt connected with said slide, a switch-tongue adapted to be swung angularly by said bolt, a catching device operated by said tongue, and means for moving the roller from one groove to the other, substantially as described.

3. A variable cam provided with two grooves or cam-surfaces in combination with a slide, a roller engaging said grooves, a guide-bolt connected with said slide, a switch-tongue adapted to be swung by said bolt, a catching device operated by said tongue, and means for moving said catching device into the track of said lever, substantially as described.

4. A variable cam provided with two grooves or cam-surfaces in combination with a slide, a roller engaging said grooves, a guide-bolt connected with said slide, a switch-tongue 12 adapted to be swung by said bolt, a pair of levers 24, 25 adapted to be moved by said slide, a pair of manually-adjustable catching devices 20, 21, and a second pair of catching devices 22, 23 respectively adapted to be moved into the path of the levers 24, 25, substantially as and for the purpose set forth.

5. A variable cam provided with separate cam-surfaces, a roller, a slide engaging said roller with said surfaces and provided with an operating-pin, in combination with operating mechanism comprising a reciprocating carriage on which said roller and slide are mounted, a supporting member for said carriage provided with communicating slots receiving said operating-pin, a pivotally-mounted switch for shifting said pin from

one to the other of said slots, switch-bars pivotally secured to said switch, tappet-levers adapted to be engaged by said bars, stops on said carriage engaging said levers, a spring-actuated wedge-block for disengaging said switch-bars from said levers, a stop on said carriage engaging said block, tappet-bars engaging said tappet-levers, a spring holding said switch-bars in engaging positions with respect to said tappet-levers, a spring of greater strength for holding said tappet-bars in engaging positions with respect to said levers, displaceable levers preventing simultaneous engagement of said bars with said levers, and a hand-lever yieldingly connected with said tappet-bars.

6. A variable cam provided with separate cam-surfaces, a roller, an operating-pin engaging said roller with said surfaces, in combination with operating mechanism comprising a reciprocating carriage on which said roller and pin are mounted, a supporting member for said carriage provided with communicating slots receiving said pin, a switch for shifting said pin from one to the other of said slots, switch-bars secured to said switch, tappet-levers adapted to be engaged by said bars, stops on said carriage engaging said levers, a movable wedge-block for disengaging said switch-bars from said levers, a stop on said carriage engaging said block, tappet-bars engaging said tappet-levers, displaceable levers preventing simultaneous engagement of said bars with said levers, and a hand-lever slidably secured to said tappet-bars.

7. An operating mechanism for cams of the class described, comprising a reciprocating carriage, a supporting member for said carriage, a switch, switch-bars pivotally secured to said switch, tappet-levers adapted to be engaged by said bars, stops on said carriage engaging said levers, a spring-actuated wedge-block for disengaging said switch-bars from said levers, a stop on said carriage engaging said block, tappet-bars engaging said tappet-levers, a spring holding said switch-bars in engaging positions with respect to said tappet-levers, a spring of greater strength for holding said tappet-bars in engaging positions with respect to said levers, displaceable levers preventing simultaneous engagement of said bars with said levers, and a hand-lever yieldingly connected with said tappet-bars.

8. Cam-operating mechanism comprising a reciprocating carriage, a supporting member for said carriage, a switch, switch-bars secured to said switch, tappet-levers adapted to be engaged by said bars, stops on said carriage engaging said levers, a movable wedge-block for disengaging said switch-bars from said levers, a stop on said carriage engaging said block, tappet-bars engaging said tappet-levers, displaceable levers preventing simultaneous engagement of said bars with said levers, and a hand-lever yieldingly connected with said tappet-bars.

taneous engagement of said bars with said levers and a hand-lever slidably secured to said tappet-bars.

9. A variable cam provided with separate
5 cam-surfaces, in combination with a cam member, operating mechanism comprising a carriage on which the cam member is mounted, switching mechanism engaging said cam member with said surfaces, switch-bars con-
10 nected with said switch mechanism, manually-operated tappet-bars, tappet-levers

adapted for engagement with said bars, and means preventing simultaneous engagement of said bars with the levers.

In testimony whereof we affix our signatures in presence of two witnesses.

BRUNO SALZER.
GUSTAV WALTHER.

Witnesses:

FREDERICK J. SIELZMAN,
MORRIS LIPMAN.