

Oct. 7, 1930.

R. G. TURNER

1,777,387

DOUBLE SHUTTLE LOOM

Filed Aug. 17, 1928

3 Sheets-Sheet 1

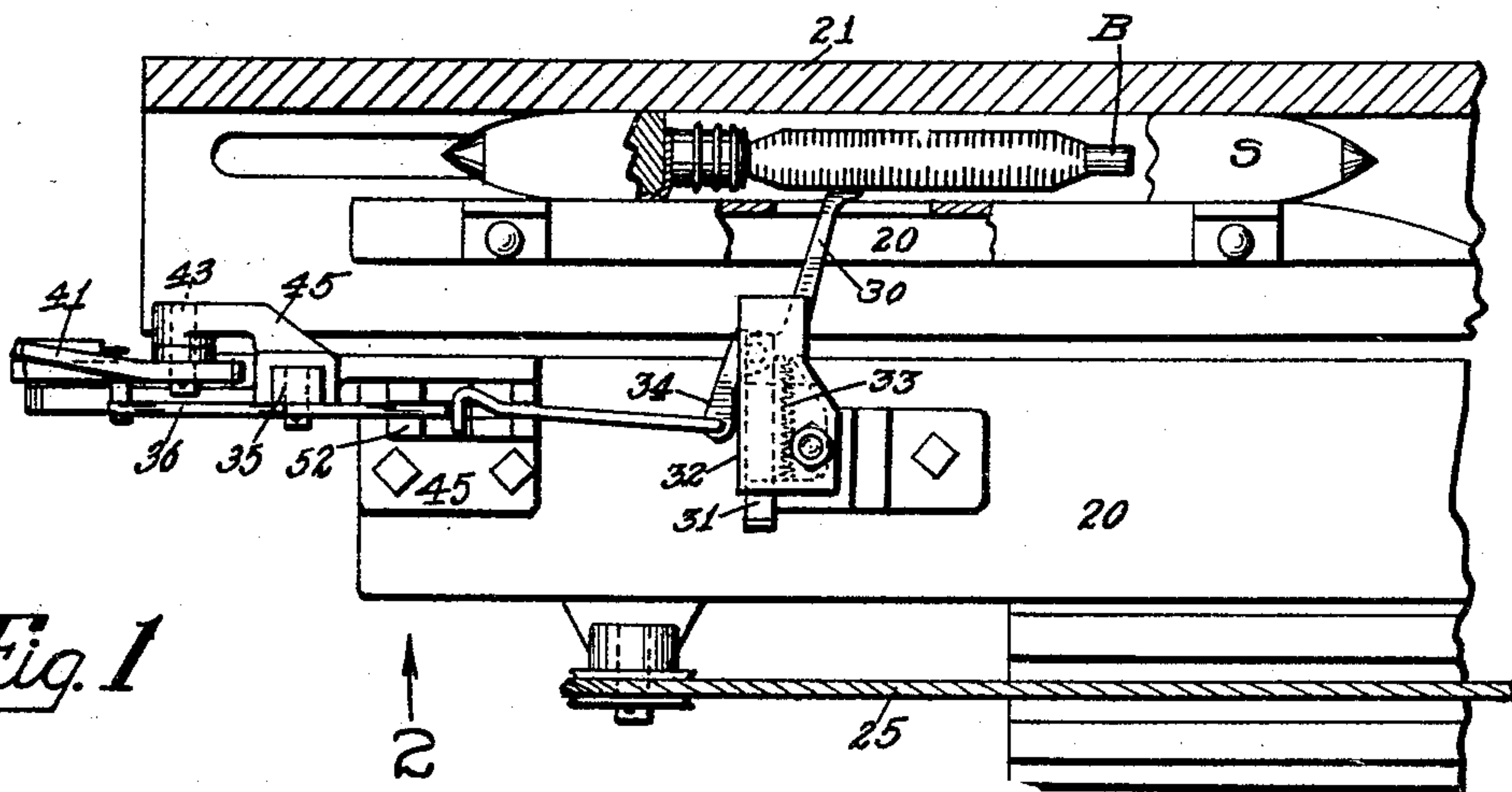


Fig. 1

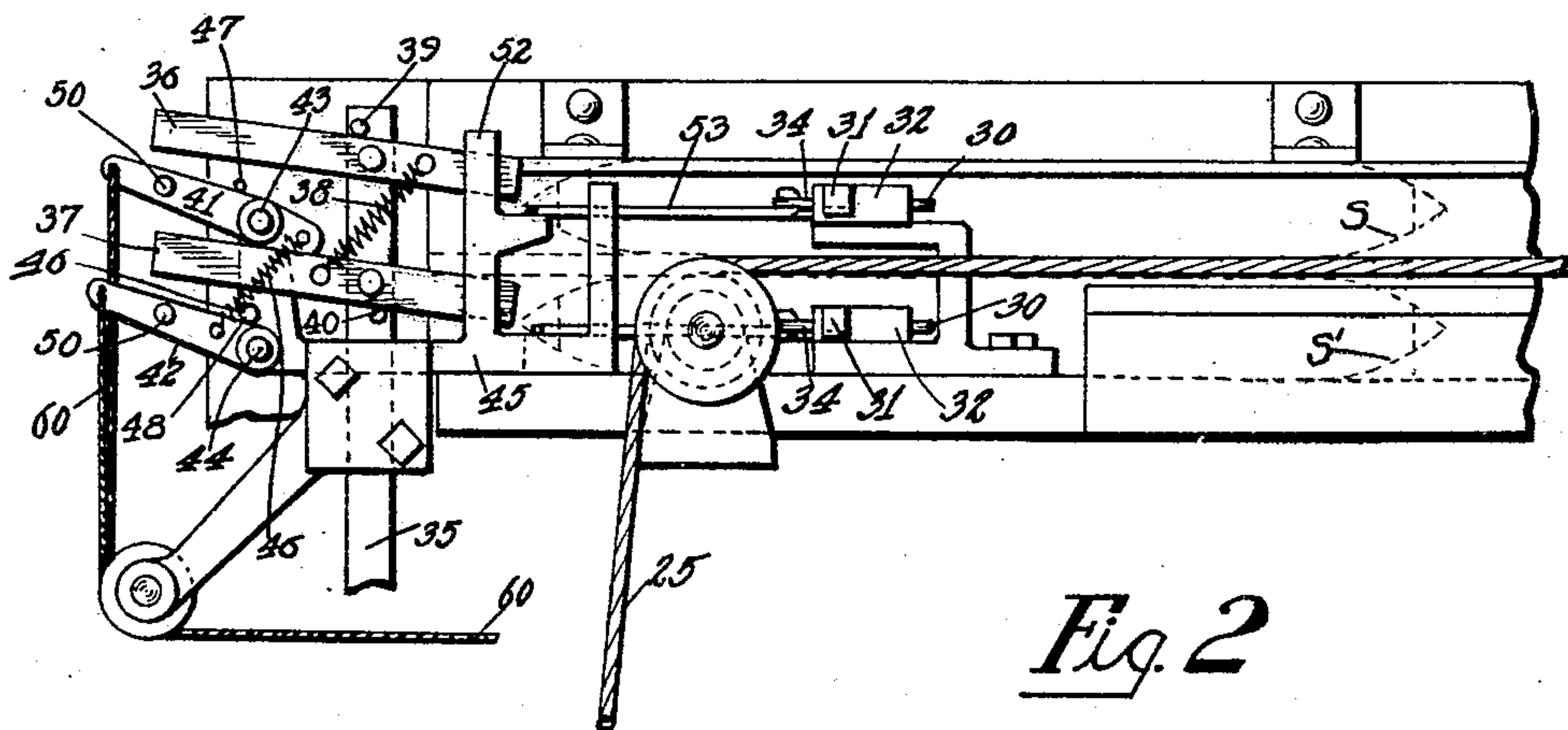


Fig. 2

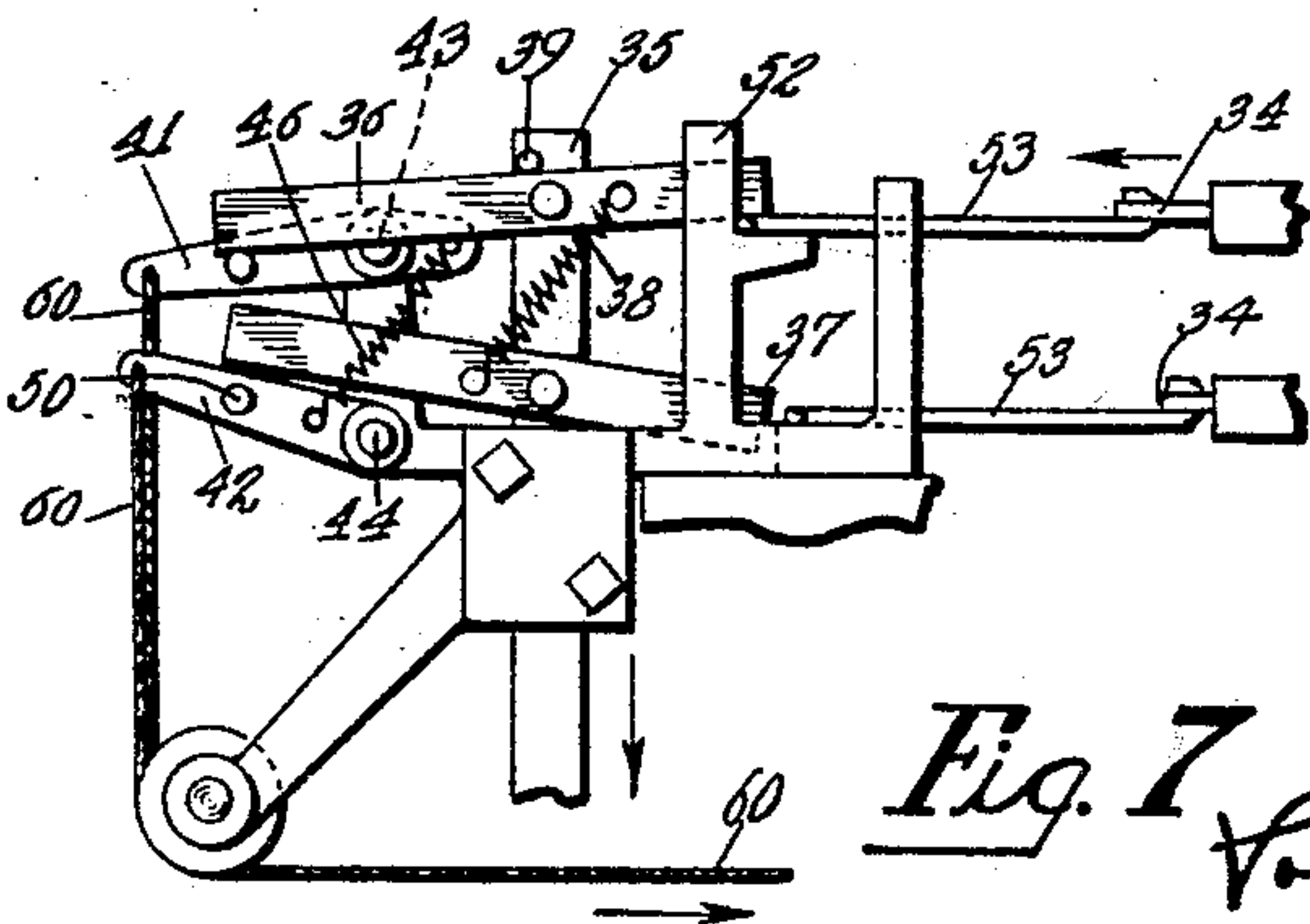


Fig. 7

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3 Sheets-Sheet 2

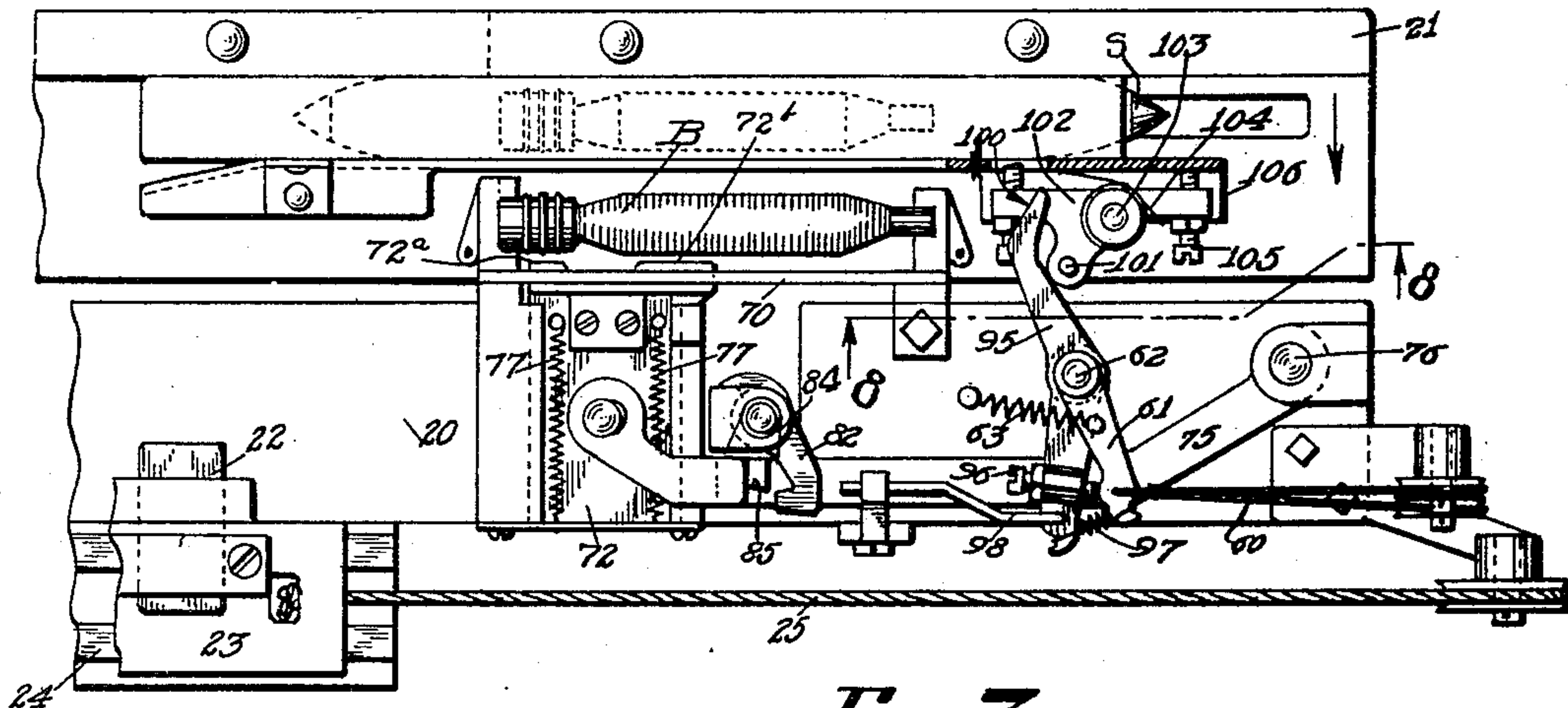


Fig. 3

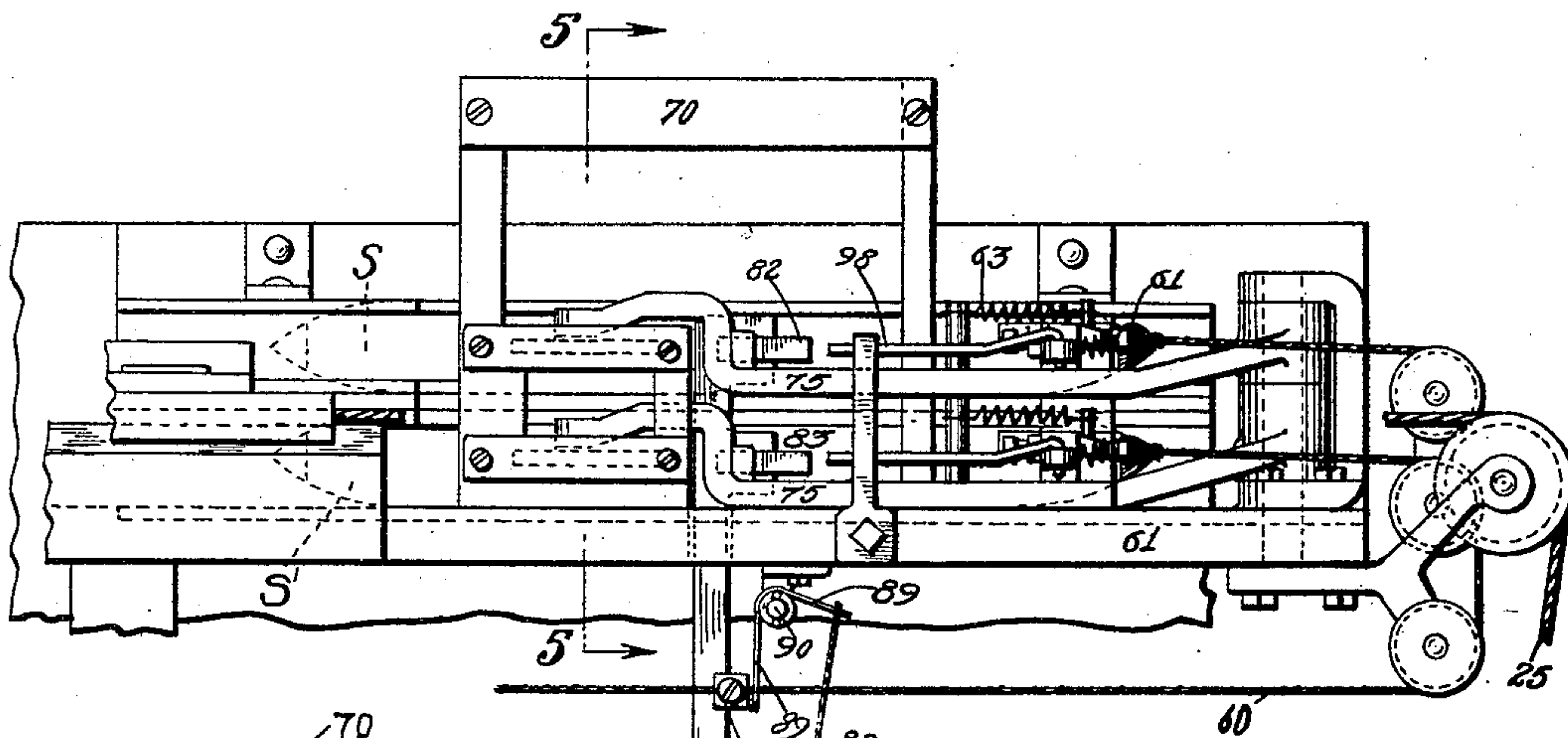


Fig. 4

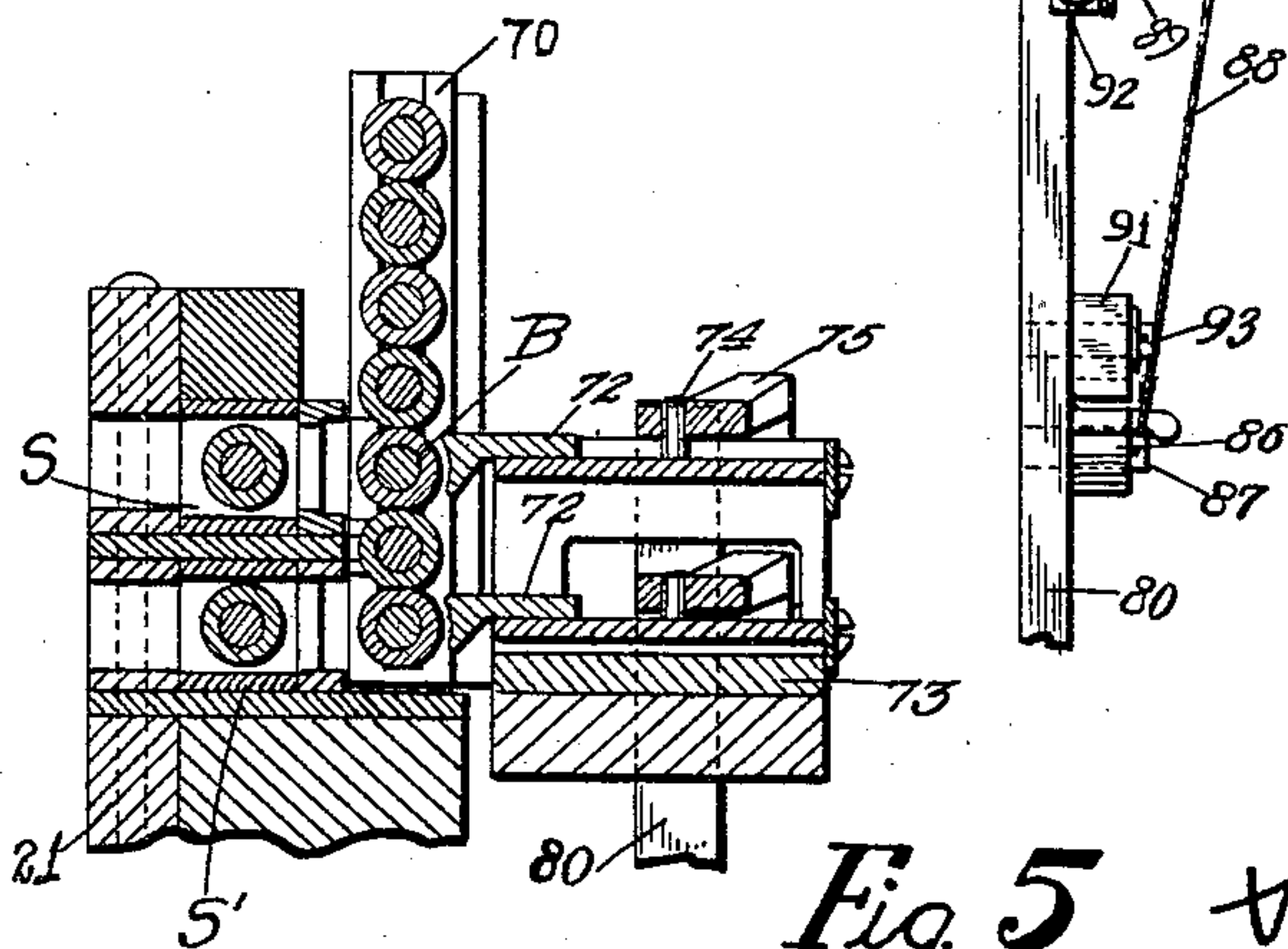


Fig. 5

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3 Sheets-Sheet 3

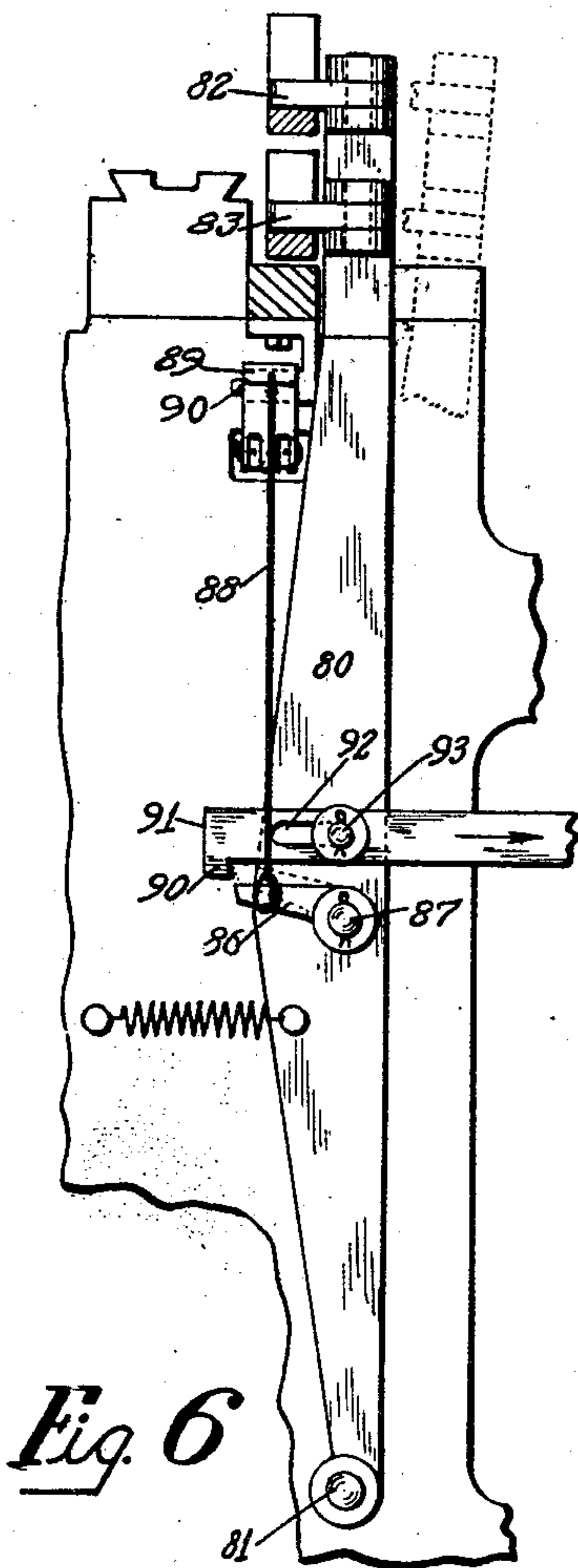


Fig. 6

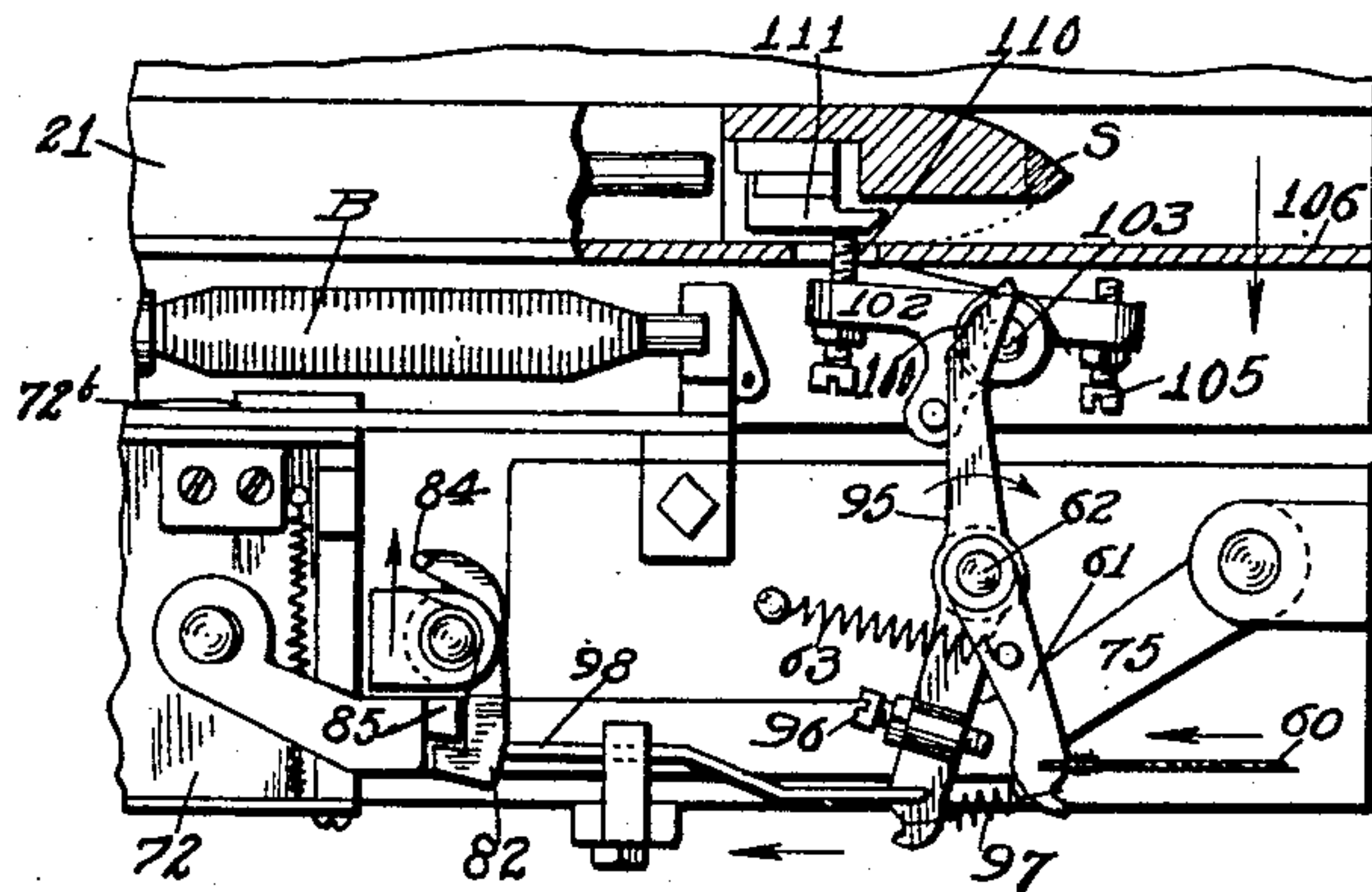


Fig. 10

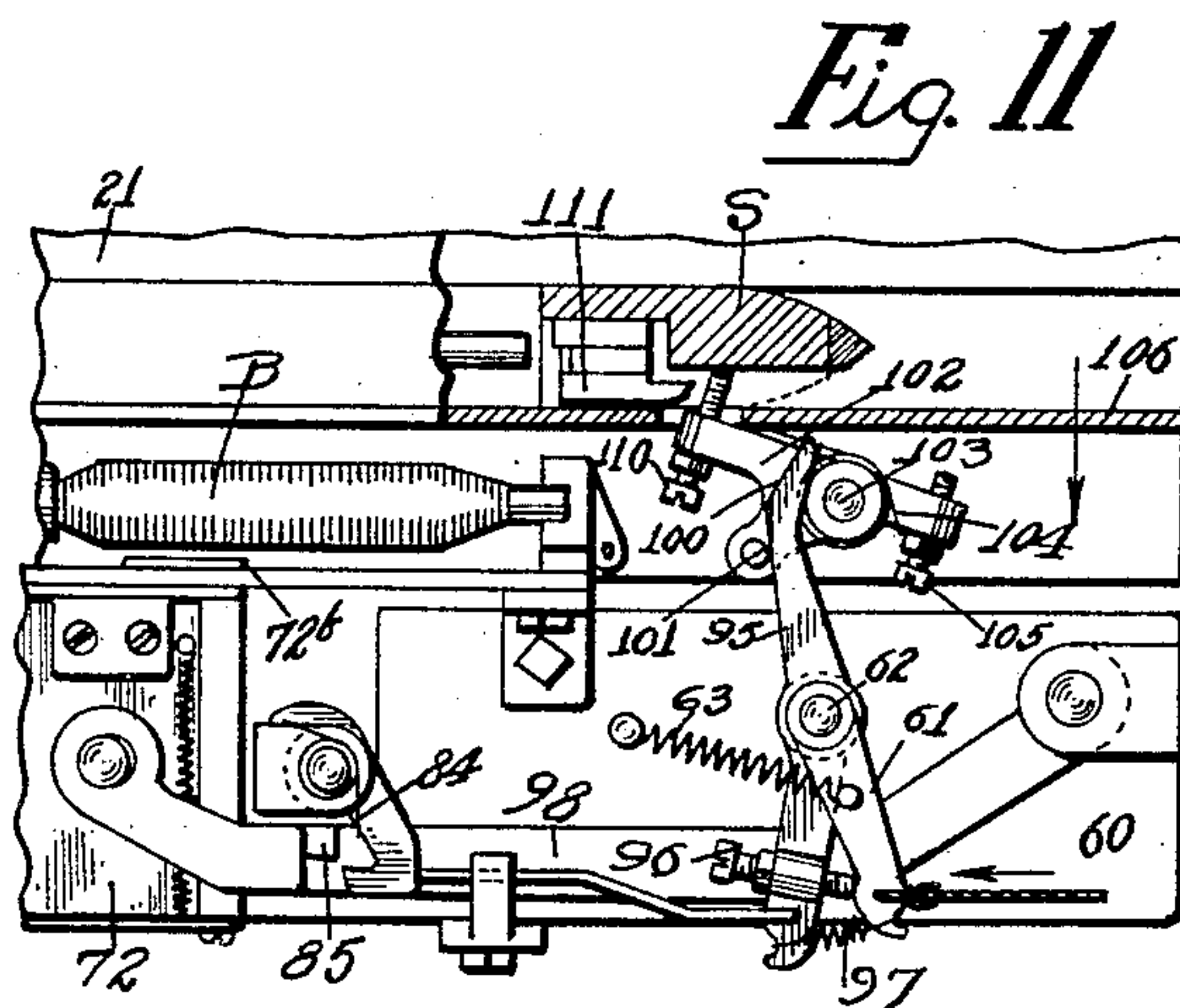


Fig. 11

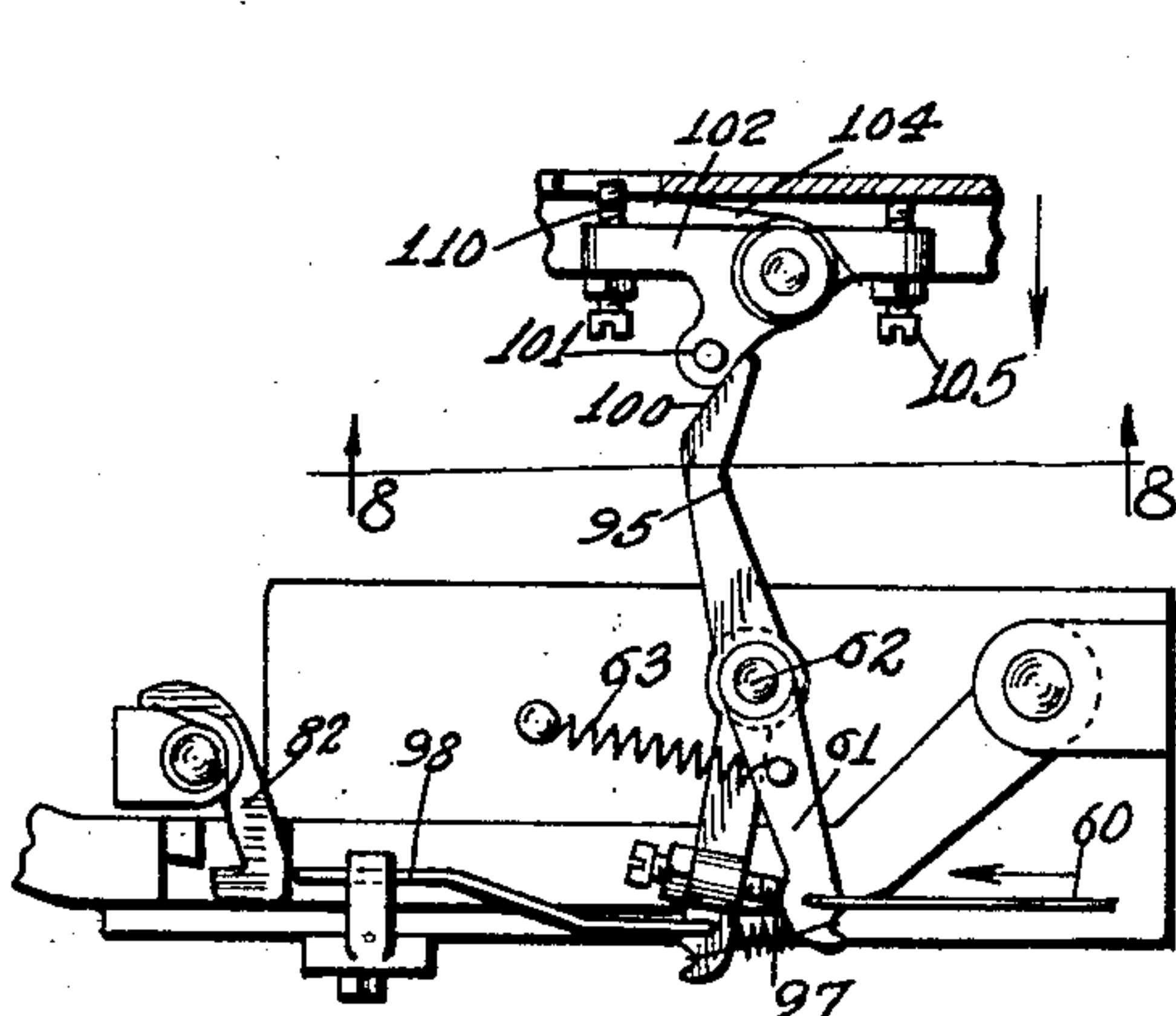


Fig. 9

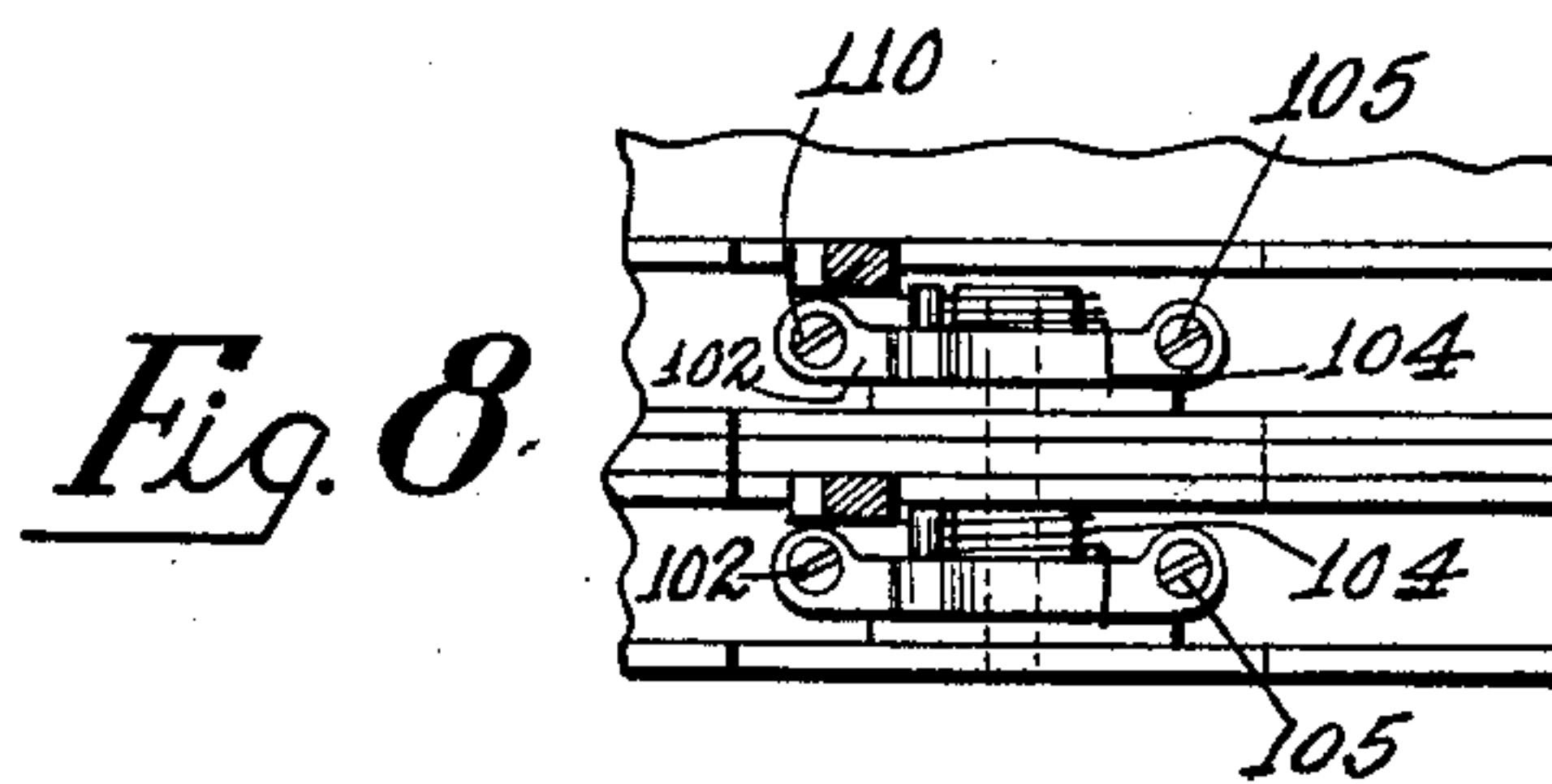


Fig. 8

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UNITED STATES PATENT OFFICE

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DOUBLE-SHUTTLE LOOM

Application filed August 17, 1928. Serial No. 300,279.

This invention relates to a loom of the type in which upper and lower shuttles are operated in separate shuttle boxes which are fixed at all times as to elevation.

5 It is the general object of my invention to provide improved weft replenishing mechanism for such a double shuttle loom, by which the weft carrier in either shuttle may be promptly replaced upon indication of weft
10 exhaustion.

A further object of my invention is to provide improved mechanism for preventing the operation of the transfer mechanism, unless the shuttle is properly boxed and in correct
15 transfer position.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

20 A preferred form of the invention is shown in the drawings in which

Fig. 1 is a plan view of the detecting end of parts of a double shuttle loom;

Fig. 2 is a front elevation of the detecting
25 mechanism, looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a plan view of the weft replenishing mechanism, with the front box plate shown in section;

30 Fig. 4 is a front elevation of the parts shown in Fig. 3;

Fig. 5 is a sectional end elevation, taken along the line 5—5 in Fig. 4;

Fig. 6 is an end elevation of certain parts,
35 looking in the direction of the arrow 6 in Fig. 4;

Fig. 7 is a view similar to Fig. 2, but showing the detecting mechanism in a different position;

40 Fig. 8 is a detail sectional front elevation, taken along the line 8—8 in Fig. 3;

Fig. 9 is a detail plan view of the shuttle feeler and certain parts associated therewith; and

45 Figs. 10 and 11 are views similar to Fig. 9, but showing the parts in different relative positions.

Referring to the drawings, I have indicated certain parts of a double shuttle loom
50 including a breast beam 20, a lay 21, upper

and lower shuttles S and S', a cutter 22 (Fig. 3), a cutter carriage 23, guideways 24 for said carriage, and a cable 25 for actuating said cutter carriage, all of these parts being substantially of the usual construction. 55

In my improved loom, the shuttles S and S' are provided with openings extending entirely through the shuttle horizontally, so that a weft carrier may be transferred there-
60 to by a simple rearward horizontal movement, the exhausted weft carrier being ejected at the rear.

Detecting mechanism

I will first describe the mechanism by
65 which weft exhaustion in either shuttle is detected.

For this purpose I have provided upper and lower detecting members 30, each mounted on a separate slide 31 in a fixed casing or
70 support 32, and held yieldingly in rearward position by a spring 33. When a sufficient supply of weft remains on the weft carrier B, the detector 30 is held from swinging movement and is pushed directly forward. 75

If, however, the supply of weft is substantially exhausted, the detector 30 swings to the right, as viewed in Fig. 1, and the forwardly projected end 34 of the detector
80 swings to the left.

An actuating rod 35 is given regularly repeated vertical reciprocations, being moved vertically once for every two picks of the loom. Rocking levers 36 and 37 are pivoted on the actuating rod 35 and their
85 left hand ends are held yieldingly elevated by a spring 38 connecting the levers 36 and 37 at points on opposite sides of their pivots and thus causing the levers to yieldingly engage stop pins 39 and 40 in the rod 35. 90

Indicating arms 41 and 42 are pivoted at 43 and 44 on a bracket or casing 45 clamped to the breast beam 20, and are held in raised position by a spring 46 cross-connected to the arms 41 and 42 and holding the arms
95 yieldingly against stop pins 47 and 48. The arms 41 and 42 are provided with studs 50, positioned for engagement by the levers 36 and 37.

Under normal conditions, the levers 36 100

and 37 occupy the position shown in Fig. 2 as they move upward and downward with the rod 35, and when in this position, their downward movement is not of sufficient extent to cause the levers to engage the studs 50 in the arms 41 and 42.

The right hand ends of the levers 36 and 37, however, move vertically in a slotted projection 52 of the bracket or stand 45.

Links 53 are pivoted to the ends of the forward projections 34 of the detectors 30 and the left hand ends of said links are offset and bent laterally, and are adapted to slide on supporting surfaces of the slotted projection 52. Whenever a detector 30 engages a substantially exhausted weft carrier and slips to the right, the corresponding link 53 moves to the left as indicated for the upper shuttle in Fig. 7, and thus takes a position in the path of the right hand end of one of the rocking arms 36 or 37.

As the rocking lever thereafter moves downward, it engages the end of the link, as indicated in Fig. 7, and is rocked on its own pivot, thus causing depression of the corresponding indicating arm 41 or 42.

Each indicating arm 41 or 42 is connected by a cord or cable 60 to an arm 61 at the replenishing or right hand end of the loom, said arm 61 being mounted on a fixed pivot 62 and being yieldingly drawn to the left by a spring 63. The springs 63 are of less strength than the spring 46 previously described, and are overcome by said spring 46 in the normal operation of the loom.

When, however, one of the indicating arms 41 or 42 is positively depressed by one of the rocking levers 36 or 37, the corresponding spring 63 is then free to swing its arms 61 yieldingly to the left, as viewed in Fig. 3.

Magazine and transfer mechanism

The magazine 70 is of a very simple type, having a single vertical compartment adapted to contain a plurality of weft carriers B, all of a single color or kind.

The upper and lower shuttle boxes are so spaced that when the lowest bobbin B is in position for transfer to the lower shuttle S' (Fig. 5) the bobbin B which is third from the bottom in the magazine, will be in a position for transfer to the upper shuttle S.

A transferrer 72 is provided for each of the shuttles S and S', said transferrer being slidable in suitable guideways in a stand or support 73 and having upwardly projecting studs 74 each forming a pin and slot connection between a transferrer and one of a pair of upper and lower transfer levers 75 (Figs. 3 and 4). The transfer levers 75 are mounted to swing on a fixed pivot 76, and the transferrers and levers are held yieldingly in forward

position by springs 77 on each transferrer (Fig. 3).

Each transferrer 72 is provided with two rearwardly projected engaging portions, one portion 72^a (Fig. 3) engaging the butt of the bobbin B, and the other portion 72^b engaging the weft on a full bobbin.

The ends of the bobbin to be transferred are yieldingly held in the magazine and the bobbin is capable of relatively free movement directly rearward when engaged by a transferrer 72.

For a more complete description of a magazine of the general type shown in this application, reference is made to my prior application, Serial No. 79,479, filed January 5, 1926.

Actuating and control mechanism

The transferrers 72 are actuated and controlled as follows:—

An actuating lever 80 (Fig. 6) is pivoted at 81 on the loom frame and is provided at its upper end with upper and lower latches 82 and 83, said latches being pivoted on the lever 80 and being normally held yieldingly in the position shown in Fig. 3 by springs 84. When either latch 82 or 83 is swung to the position indicated in Fig. 10, the latch engages a lug 85 on the corresponding transfer lever 75 and causes a transfer movement thereof when the lever 80 is swung rearward.

A latch or pawl 86 (Fig. 6) is pivoted at 87 on the actuating lever 80 and is connected by a cord 88 to a bell crank 89 (Fig. 4) mounted on a fixed pivot 90 and having a double-slotted depending portion positioned for engagement by collars 92 on the cords or connecting cables 60 (Fig. 6). Whenever either one of the weft detectors indicates weft exhaustion, the corresponding cord 60 will be moved to the right by its spring-actuated arm 61 (Fig. 10) and such movement will cause the latch 86 (Fig. 6) to be raised into the path of a hook or lug 90 on the lower edge of an actuating connector 91.

The front end of the connector 91 is slotted at 92 and is supported on a stud 93 on the actuating lever 80. The member 91 receives a rearward actuating movement on every other pick of the loom, such movement being preferably caused by a cam (not shown) on the bottom or cam shaft of the loom.

The mechanism thus far described provides for giving the actuating lever 80 a rearward operative movement whenever either of the weft detectors indicates substantial weft exhaustion.

Control mechanism

Before such movement of the lever 80 can be made effective, it is necessary that one of the latches 82 or 83 shall be moved to op-

erative engagement with one of the lugs 85 on the transfer levers 75.

I will now describe the mechanism by which the latches 82 and 83 are rendered operative.

5 A lever 95 (Fig. 3) is pivoted on the stud 62 adjacent each arm 61 and is provided with an adjustable screw 96 engaging said arm 61. Each arm 61 and lever 95 are connected by a spring 97 which holds them normally in close engagement.

10 A control rod 98 is pivoted to the front end of each lever 95 and extends to the left, toward the corresponding latch 82 or 83 but spaced therefrom.

15 The rear end of the lever 95 is provided with a cam portion 100, which at times engages a stud 101 in a rock arm 102, pivoted at 103 on the lay 21. A spring 104 normally holds an adjustable stop screw 105 in the rock arm against the front side of the box plate 106. When the rock arm is in this position and the lever 95 is in normal position, the cam portion 100 is at the left of the stud 101 and is not engaged thereby.

25

Operation

Upon indication of weft exhaustion and depression of one of the indicating arms 41 or 42 (Fig. 7), the corresponding arm 61 (Fig. 9) is permitted to move to the left, bringing the end of its control rod 98 closely adjacent its latch 82 or 83 but not moving the latch from inoperative position.

At the same time the cam portion 100 of the lever 95 is moved into the path of the stud 101 on the corresponding rock arm 102, the parts assuming the position shown in Fig. 9.

As the lay moves forward, the stud 101 will engage the cam portion 100, thereby causing rocking movement of the rock arm 102 or of the lever 95. The spring 97 for the lever 95 is stronger than the spring 104 for the rock arm 102, and the lever thus normally overcomes the rock arm, causing movement thereof to the position shown in Fig. 11, unless such movement is positively prevented.

Each rock arm, however, is provided with a contact screw 110 adapted to engage a portion of the metallic shuttle eye 111, as indicated in Fig. 10, when the shuttle is properly boxed. Such engagement positively prevents rocking movement of the arm 102 and thus causes movement of the lever 95 from the position shown in Fig. 9 to that shown in Fig. 10. The front end of the lever 95 is thus swung to the left, carrying with it the rod 98 and swinging the associated latch 82 or 83 to the operative position indicated in Fig. 10.

As the actuating lever 80 thereupon moves rearward, the corresponding transfer member 72 forces a bobbin directly rearward into the indicated shuttle and ejects the sub-

stantially exhausted bobbin rearward therefrom.

It will be evident that the rock arms 102 act as shuttle feelers and that they prevent complete and effective indication of weft exhaustion, unless the corresponding shuttle is present and is boxed in correct position for transfer. Otherwise the engagement between the latch 82 or 83 and the corresponding transfer lever 75 is not completed.

Having thus described the construction of my improved mechanism, it will be seen that I have provided very simple and effective mechanism for replenishing either shuttle in a double shuttle loom, on the pick following indication of weft exhaustion, and that I have also provided for preventing transfer until the shuttle is properly boxed.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. In a double shuttle loom, a separate weft detector for each shuttle at one side of the loom, a single cell magazine at the other side of the loom, a separate transfer mechanism for each shuttle, a common actuating lever for said transfer means, said lever being normally inoperative, a regularly moved actuator for said lever connecting means between said actuator and said lever rendered operative whenever either weft detector indicates weft exhaustion, and a separate device controlled by each of said detectors and operative to thereafter connect said lever to one of said transfer mechanisms upon effective boxing of the indicated shuttle.

2. In a loom, a shuttle, a weft detector, transfer mechanism, and means actuated in part by the shuttle to be replenished, effective to set said transfer mechanism in operative position by forward movement of said shuttle in correct longitudinal position for transfer.

3. In a loom, a weft detector, a transfer mechanism, and a shuttle feeler normally in position to render said transfer mechanism operative upon engagement with a properly positioned shuttle after indication of weft exhaustion, but movable yieldingly to inoperative position upon failure to thus engage a shuttle presented for transfer.

4. In a loom, a weft detector, a transfer mechanism, actuating means therefor, a shuttle feeler, means controlled by said detector effective to partially prepare said transfer mechanism for operation, and means controlled by said shuttle feeler effective to complete an operative connection between said transfer mechanism and its actuating means when said shuttle feeler is engaged by a shuttle moving forward in correct longitudinal position for transfer.

5. In a loom, a transfer mechanism, actu-

ating means therefor, means operable in two steps to render said actuating means operative, a weft detector controlling the first step, and a shuttle feeler effectively completing the second step when said shuttle feeler is engaged by a shuttle moving forward in correct longitudinal position for transfer.

6. In a loom, an actuating member, a weft detector controlling the operation thereof, a transfer member, means to connect said transfer member to said actuating member, and a shuttle feeler, said connecting means being normally inoperative and being rendered operative by the combined action of said weft detector and of said shuttle feeler when said shuttle feeler is engaged by a shuttle moving forward in correct longitudinal position for transfer.

7. In a double shuttle loom, a weft detector, an arm controlled thereby, a lever engaged by said arm and movable thereby upon indication of weft exhaustion, means to give said lever additional movement when the shuttle is boxed in position for transfer, and a transfer mechanism rendered operable by said additional movement of said lever.

8. In a double shuttle loom, a weft detector, an arm controlled thereby, a lever engaged by said arm and movable thereby upon indication of weft exhaustion, and a rock arm having a stud-and-cam engagement with said lever when said rock arm engages a shuttle boxed in position for transfer, whereby said lever is given an additional movement, and a transfer mechanism rendered operable by said additional movement of said lever.

9. In a loom, a weft detector, an operating member 35, a transfer mechanism, an actuating connection for said transfer mechanism, a spring 63 constantly tending to complete said actuating connection, a stronger spring 46 normally preventing operation of said first named spring, the stronger spring being rendered inoperative by said operating member 35 upon indication of weft exhaustion by said weft detector, an arm engaged by said operating member, an arm engaged by said weaker spring, and a flexible connection between said arms.

10. In a double shuttle loom, pile cutting mechanism, actuating means therefor, a weft carrier magazine and means to transfer a weft carrier from said magazine to an indicated active shuttle, said magazine and said transfer mechanism being of relatively slight rearward depth and being positioned entirely between the lay and the cutter actuating mechanism.

In testimony whereof I have hereunto affixed my signature.

RICHARD G. TURNER.