

Jan. 6, 1953

K. E. SCHULZE
WIRE TYING MACHINE

2,624,375

Filed Nov. 29, 1948

2 SHEETS—SHEET 1

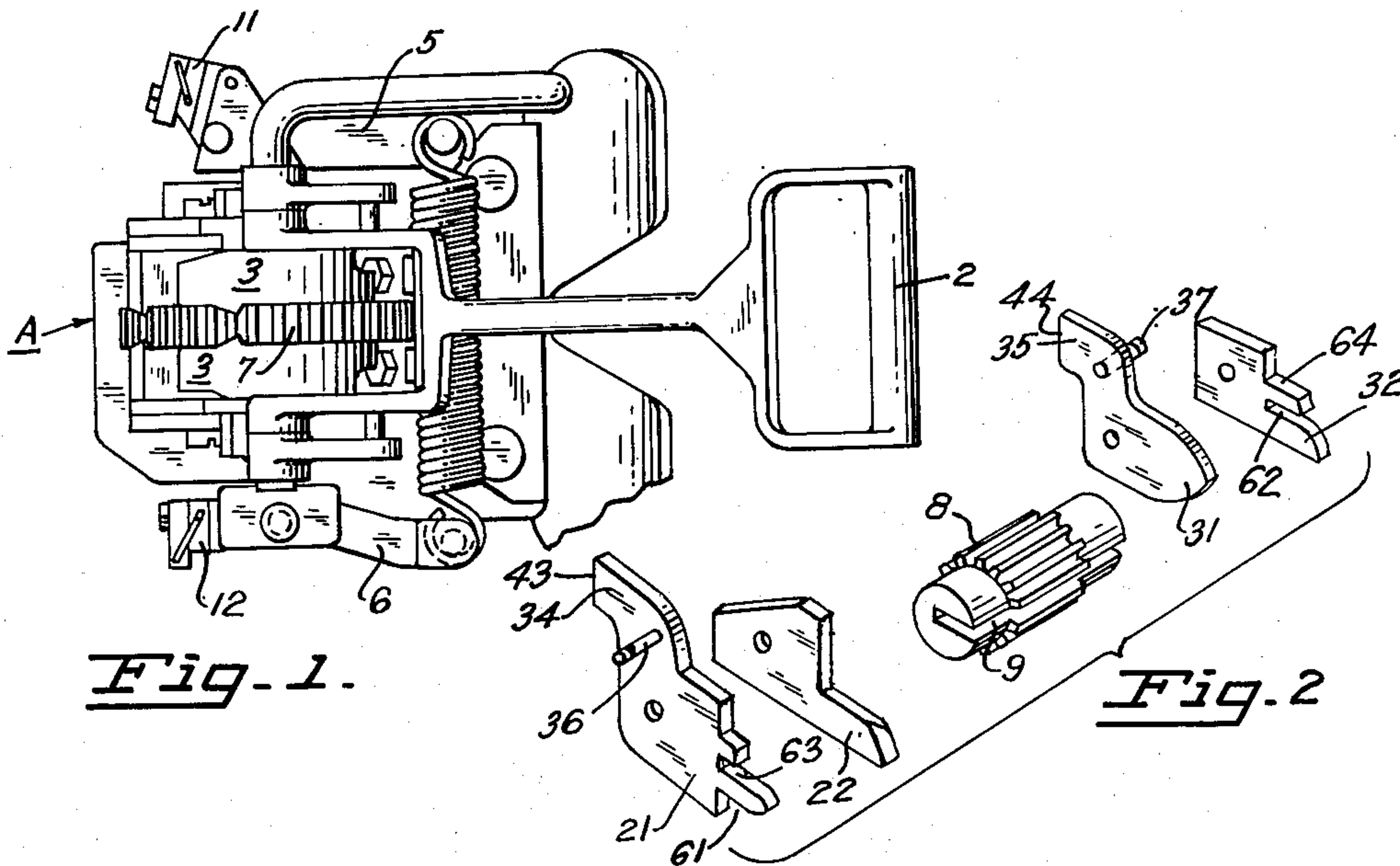


Fig. 7.

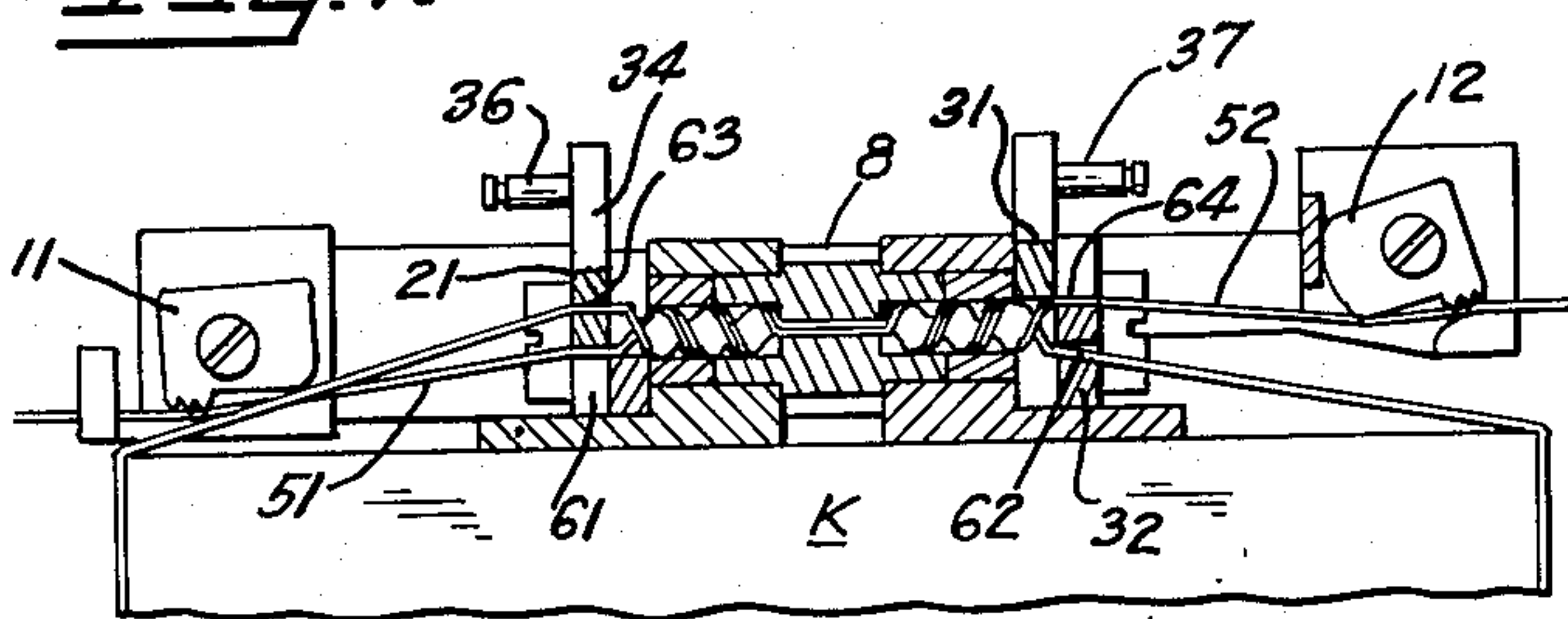


Fig. 8.

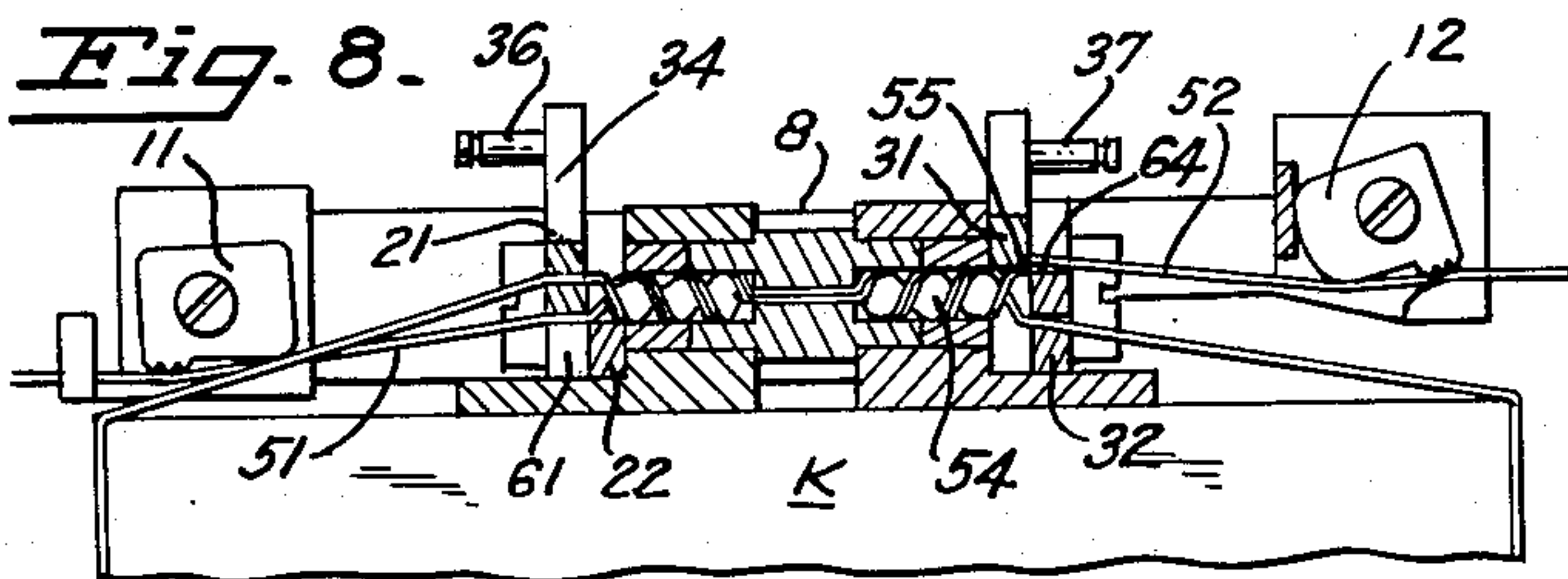
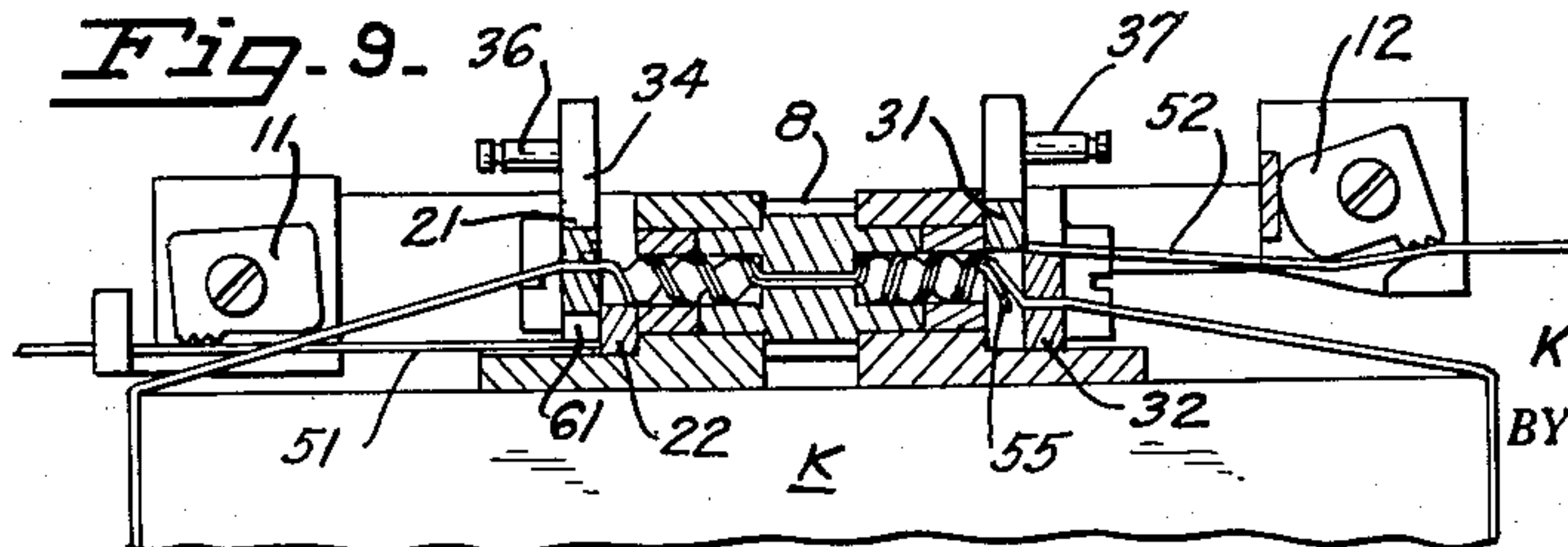


Fig. 9.



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2 SHEETS—SHEET 2

Fig. 3.

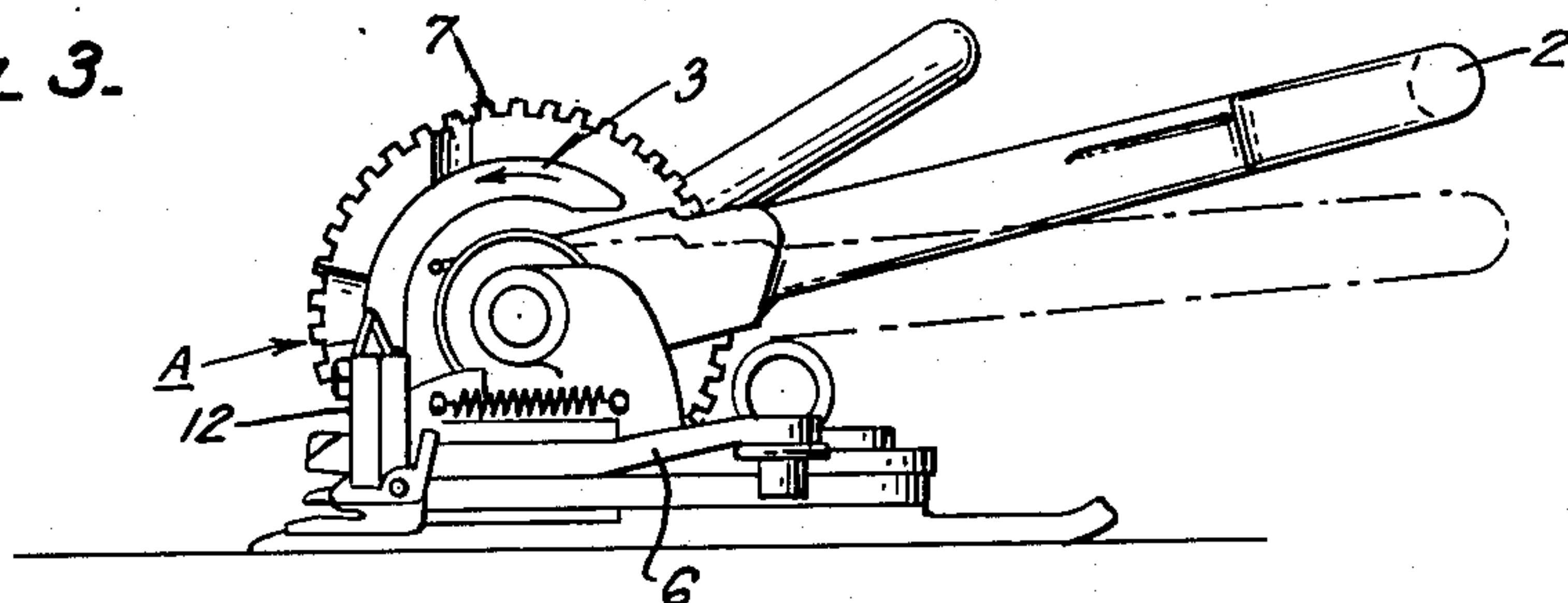


Fig. 4.

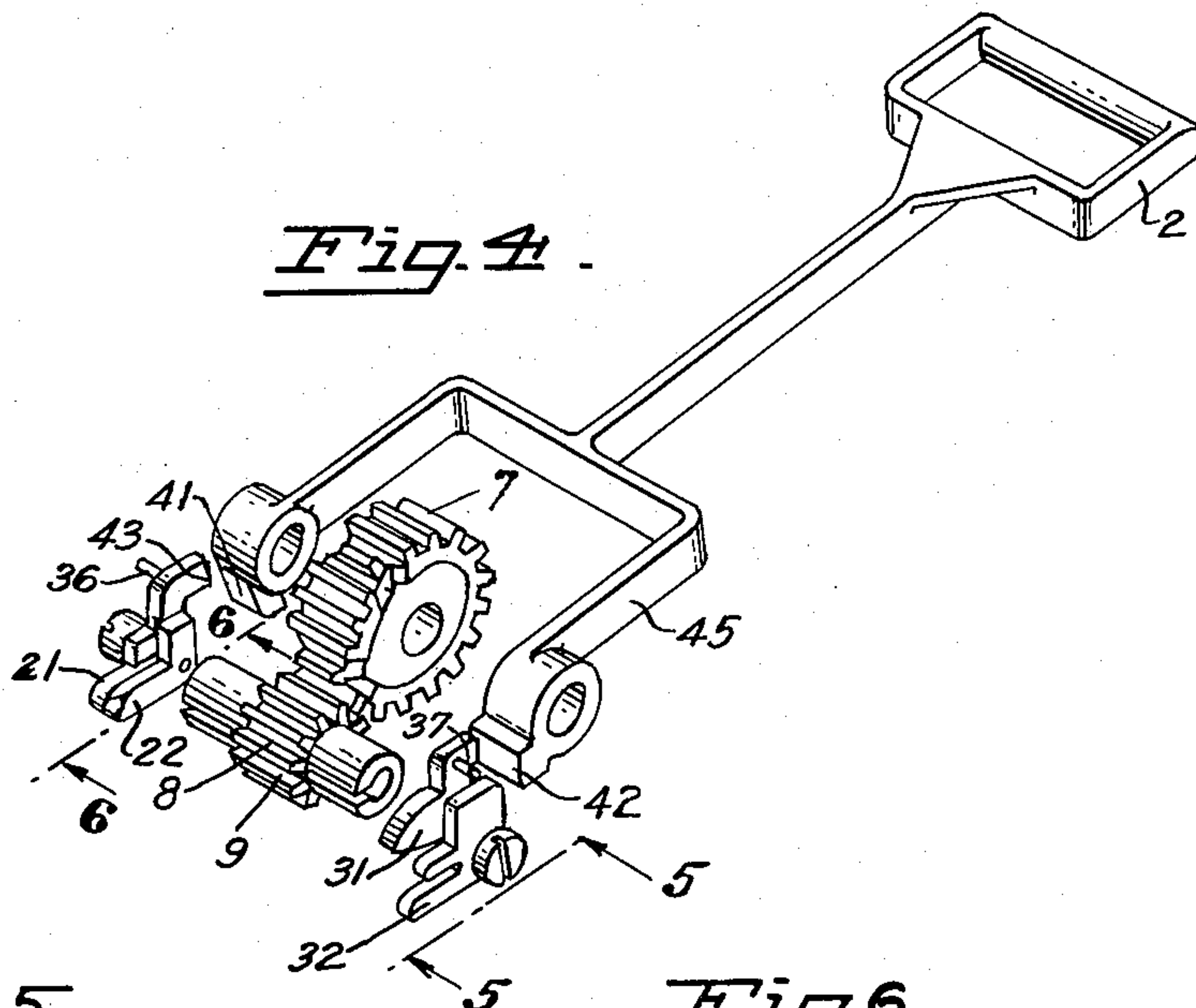


Fig. 5.

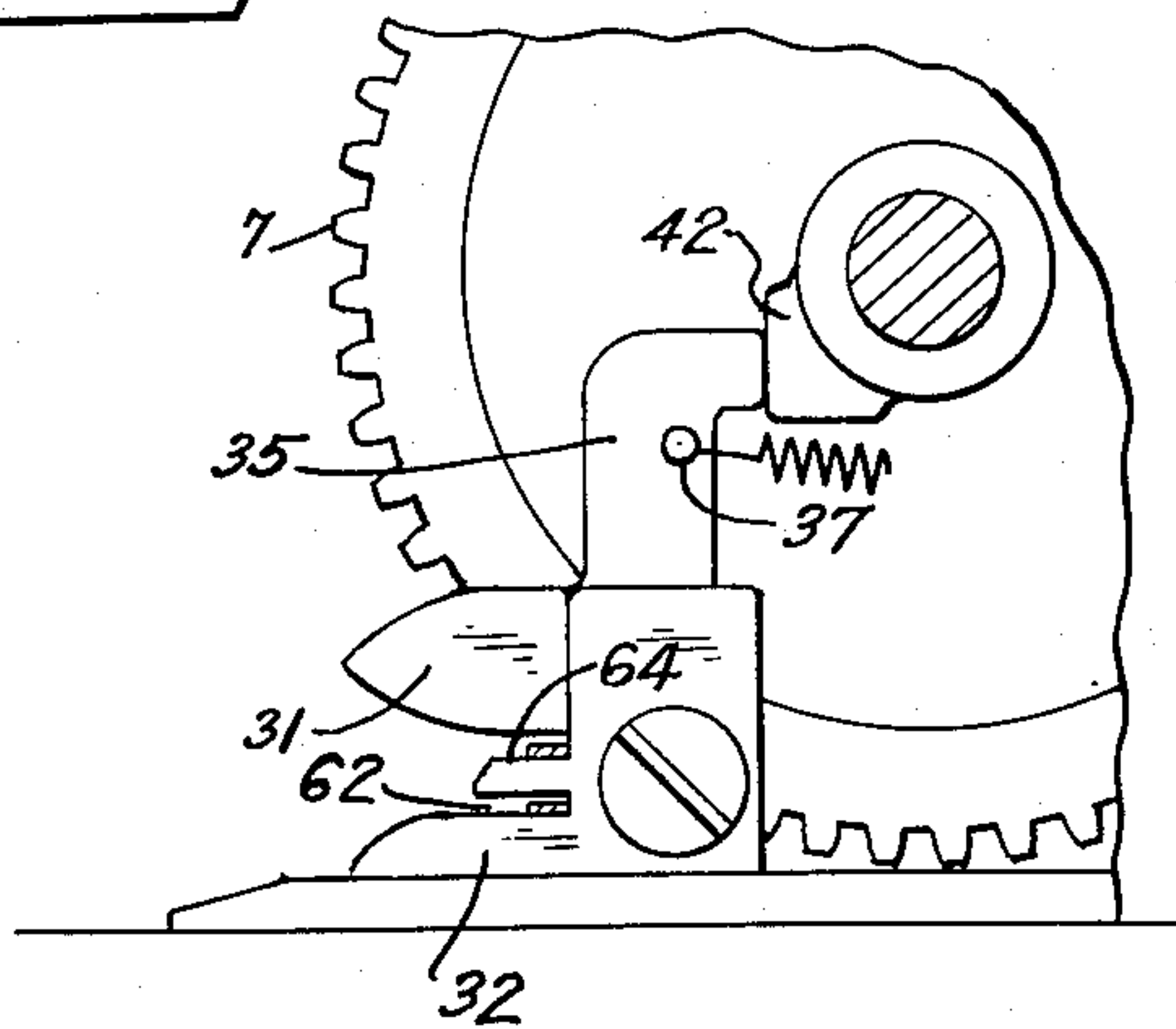
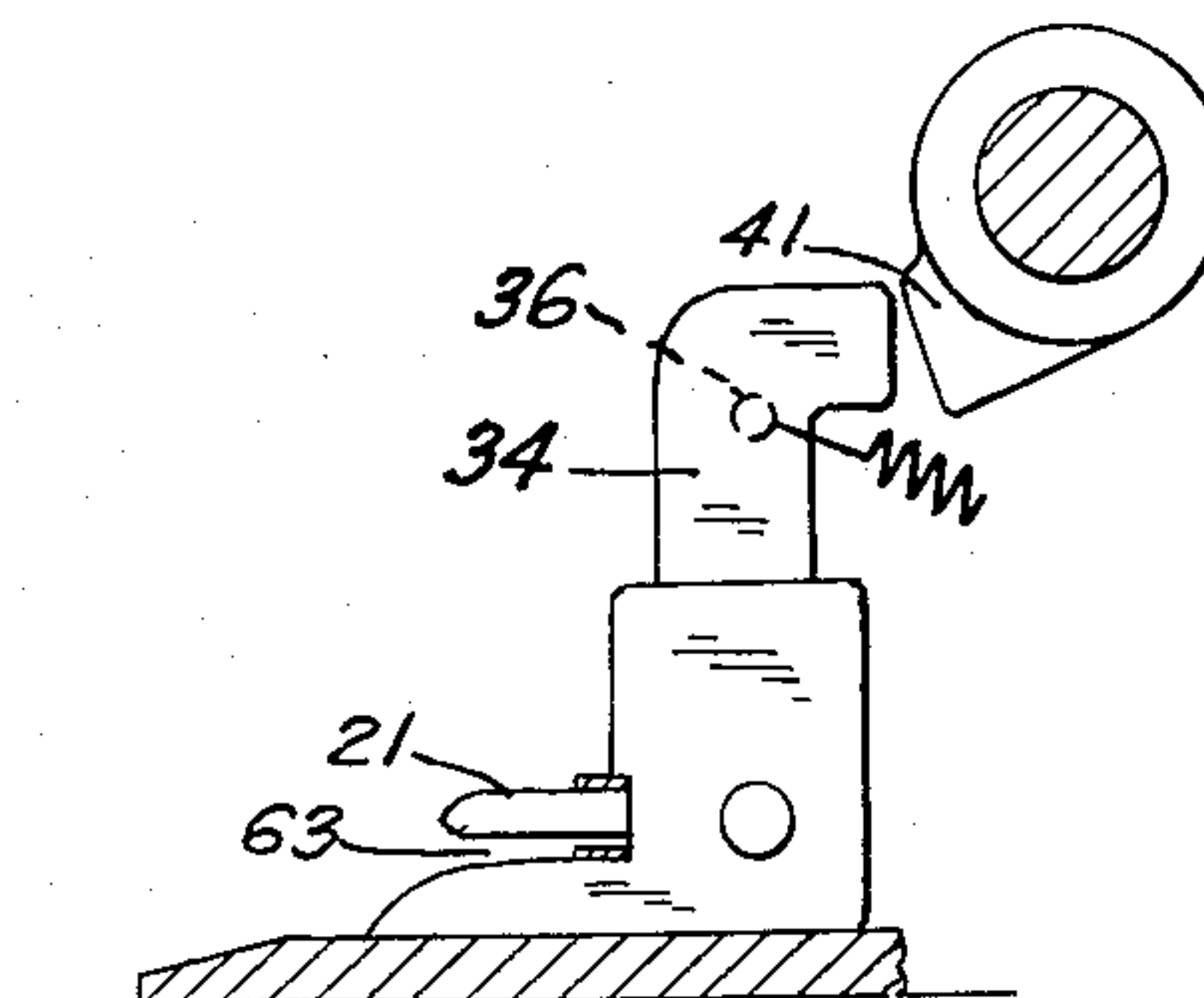


Fig. 6.



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2,624,375

WIRE TYING MACHINE

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Application November 29, 1948, Serial No. 62,544

2 Claims. (Cl. 140—93)

1

This invention relates to wire tying machines, and more particularly to wire tying machines of the character designed to secure a flat wire or band around a box, package, bundle, or the like, to form a smooth tie.

A principal object of the present invention is to provide a machine for tightening and securing a wire or band around a container, or the like, and particularly flat wire, by twisting the ends of a strand of said wire together to form a tie and wherein the jagged ends of said wire so twisted together to form a tie do not project above the tie but are disposed under the twisted portion of the wire and lie flat against and next to the object tied. Thus, persons handling a package tied with the wire are not injured by contact with the jagged ends of the wires. Further, the tie is securely fixed and thus secured is not affected by rough handling or impact with the jagged ends which might otherwise be the case if the sheared or jagged ends protruded above the tie.

The present invention is in the nature of a continuation in part of my copending application Serial No. 701,530, filed October 5, 1946, for Wire Tying Machine, which matured in United States Patent 2,460,846, patented February 8, 1949.

Referring to the drawings:

Fig. 1 is a top plan view of the wire tying machine embodying the present invention.

Fig. 2 is an exploded view of the preferred form of wire cutting members, guide members and twisting gear.

Fig. 3 is a side elevational view of the wire cutting machine embodying the present invention.

Fig. 4 is an exploded view of the preferred form of operating handle and associated parts.

Fig. 5 is a fragmentary side elevational view taken from line 5—5 of Fig. 4 of the main actuating gear and a portion of the operating handle mechanism partially in section and in association with the cutting and guide members.

Fig. 6 is a view, similar to Fig. 5, and taken from line 6—6 of Fig. 4 and omitting the main actuating gear and handle mechanism.

Fig. 7 is a front elevational view, partly in section, illustrating the function of the cutting, gripping and twisting elements and illustrating the tie prior to cutting an end of the wire being tied.

Fig. 8 is an illustration similar to Fig. 7 and illustrating the cutting action of the right hand cutting members.

Fig. 9 is a view similar to Figs. 7 and 8 and showing the completed tie and wherein the cut ends of the wires are disposed under the tie.

2

The machine may comprise any suitable structure of the general character disclosed in United States Letters Patent No. 1,545,407, issued July 7, 1925 to C. L. Drew et al., which comprises generally, a portable tool constructed to rest on a package, or the like, to be strapped, and provided with means for twisting together the wire to form a tie, and means for cutting off the ends of the wire extending beyond the tie, and a single operating lever. Movement of the lever from its normal position serves to tighten the wire and movement of the lever in a reverse direction serves to tie the wire and then cut the end portions thereof.

The present invention is preferably a machine of the character above mentioned, provided with improved wire gripping means, wire cutting members and wire guiding members of the character described in my heretofore mentioned application Serial No. 701,530 and also in my copending application for United States Letters Patent for Wire Tying Machine, Serial No. 733,296, filed March 8, 1947 now Patent 2,580,848 issued January 1, 1952.

Essentially, the machine comprises an operating handle 2, adapted to be moved forwardly from the neutral position, indicated in Fig. 3, toward the tying end of the machine, indicated at A. Forward movement of the handle 2 causes cam 3 to rotate in the direction of the arrow (Fig. 3), thereby causing pivotally mounted arms 5 and 6 to move laterally away from the machine, which, when the wire is positioned properly in the machine, causes the wire to be tightened around the package to be tied. Movement of the handle 2 in a reverse direction causes rotation of the main actuating gear 7 which in turn imparts rotative movement to the wire twisting gear 8, provided with a wire receiving slot 9, which, when the wire is positioned properly in the machine, causes the tie to be formed by twisting together strands of wire positioned therein. Further movement of the handle 2 to the position shown in dotted lines in Fig. 1 actuates the wire cutting members.

The wire gripping means preferably comprises a left wire gripper 11 and a right gripper 12 of the type illustrated and described in my copending application heretofore mentioned Serial No. 733,296, although it is to be understood that any suitable grippers may be utilized with the present invention.

The cutter members and the guide members are preferably of the character disclosed in my copending application Serial No. 701,530 heretofore mentioned, so far as the wire receiving portions thereof are concerned.

3

As illustrated herein, a left cutter member 21 is disposed adjacent to the left guide member 22 and a right cutter member 31 is disposed adjacent to a right guide member 32. As fully set forth in my copending application Serial No. 701,530, relative rocking movement of member 31 relative to member 32 produces a scissors action between adjacent said members to shear or cut the ends of wires disposed therein in cutting position.

As has been hereinabove pointed out, it is advantageous to position the sheared ends of the cut wire under the tie. With this end in view, a means is provided to shear one end of the wire disposed around the package to be tied before the other end is sheared; and in the interim between cutting the first end and prior to cutting the second end of said wire, the first sheared end is twisted to a position under the tie and then the second end is cut so that it is disposed below the tie thereby to provide a twisted wire tie wherein both of the sheared ends are disposed flat against and next to the surface of the object tied. Thus, a smooth wire tie is accomplished with no jagged portions of the wire projecting above the surface of the tie.

It is inherent in the type of wire tying machine under consideration, namely wire tying machines adapted particularly to handle flat wires or bands, that the wire cutting means must provide for the wires to be positioned in vertical alignment, whereby the end portions of a wire which lead to the grippers are retained in substantially vertical alignment with that part of the wire encircling the object to be tied. This result is accomplished by providing a plurality of wire receiving portions in one member of each pair of members which coact to guide and cut the ends of the wire. It is necessary to maintain the portions of the wire heretofore mentioned in substantial vertical alignment rather than place them side by side, as may be done when working with round wire, because of the fact that round wire may be bent in any direction without any greater or lesser degree of distortion or tension, whereas, obviously, flat wire, when bent in a lateral direction, i. e. in the direction of its greatest width, causes serious distortion which may result in rupture and weakening of the wire. It follows from the type of wire guide and cutter members utilized in the present invention that one end of the wire to be cut after formation of the tie would be disposed above or at least at the horizontal level of the top of the tie while the opposite end would be disposed under the tie.

The present invention, as hereinabove stated, provides for means to cut one end of the wire and then twist the cut end under the tie, at which time the other end is cut, thereby positioning both cut ends below the said tie.

The movable members or cutter members 21 and 31 are each provided with rearwardly extending shanks 34 and 35 and stops 36 and 37, respectively. The shanks 34 and 35 terminate in strike portions 43 and 44 which are arranged to contact pads 42 and 41, respectively. The pads are carried by the clevis portion 45 of handle member 2, and which said clevis straddles the cam 3 and main actuating gear 7 and the said pads are in operative alignment with the said strike portions 43 and 44 so that when the handle is operated to the dotted line position shown in Fig. 3 the pads thereupon urge members 21 and 31 forwardly to cut the ends of the wire disposed in the wire receiving portions thereof. The pad

4

42 (see Figs. 5 and 6) is enlarged or extended forwardly relative to pad 41 (Fig. 6) so that pad 42 contacts the shank 35 of member 31 before pad 41 contacts the strike portion of shank 34 of member 21. Pad 42 urges said member 35 forwardly to operative cutting position before pad 41 is in operative contact with the shank 44 of member 21. Thus, the end of the wire to be sheared by member 35 is cut before operative cutting movement occurs with respect to member 21.

It is obvious that rather than to provide for different relative sized pads 41 and 42 it may be desirable simply to extend shank 35 rearwardly further than shank 34 so that pads of equal size, carried by the clevis 45, will contact an enlarged shank 35 before contacting a relatively smaller shank 34 in order to urge member 31 forwardly before member 21 is urged forwardly.

Referring now to Figs. 2, 7, 8 and 9, the end 51 of the wire which leads from the left hand gripper 11 is disposed in the lowermost wire receiving portion or slot 61 of member 21. This portion 61 may be termed the wire cutting portion. The end of the wire 51 disposed in wire receiving portion 61 is then fed through member 22, thence through the slotted gear 9, thence below member 31 through wire receiving portion or slot 62 of member 32 around the article to be tied, indicated generally at K. The wire receiving portion 62 of member 32 may be referred to as the guide portion of said member 32.

After encircling the article K, the wire is then led through wire receiving portion or slot 63 of member 21, which said portion may be referred to as the guide portion of member 21, thence through members 22 and 9 under member 31 and through wire receiving portion or slot 64 of member 32. The wire receiving portion 64 may be referred to as the wire cutting portion of member 32. The end 52 of the wire passing over portion 64 is then led to the gripper 12.

Thus, it is seen that the ends 51 and 52, which are to be cut, are disposed through the cutting portions of the members having a plurality of wire receiving portions, and the wire 52, before it is cut (Fig. 7), occupies a position above the part of the wire strand which encircles the object K, i. e. it lies atop the tie and not thereunder.

Fig. 8 indicates the position of the parts after end 52 has been cut but prior to cutting of end 51. After end 52 has been severed by the movement of member 31, the twisted portion of the tie on the right side of the machine, indicated at 54, is enabled to rotate upon rotation of the gear 9 to thus place the sheared end portion 55 of the wire under the twisted portion 54 of the wire by the time member 21 has been actuated to cut wire end 51.

Fig. 9 illustrates the portions of the sheared wire ends at the completion of the tie. It is noted that movement of the operating handle and associated parts causes rotation of the gear 9 during the interim between actuation of member 31 through contact with pad 42 and movement of member 21 through contact with pad 41, and thus, the severed end 55 is rotated 180° from the position of Figs. 7 and 8 to the position of Fig. 9, as aforesaid.

I claim:

1. In a wire tying machine for tying the ends of wire encircling an object said machine having a wire twisting gear, a first wire gripper for gripping one end of said wire, a first wire cutter located between said first gripper and one

5

end of said wire twisting gear, a first means located adjacent said first wire cutter for maintaining the end portion of the wire which leads to the first gripper in substantially vertical alignment with that part of the wire encircling the object to be tied with said end portion above same encircling portion, a second wire gripper for gripping the other end of said wire, a second wire cutter located between said second wire gripper and the opposite end of said wire twisting gear, and second means for maintaining the other end portion of the wire which leads to the second gripper in substantially vertical alignment with that part of the wire encircling the object to be tied with said end portion below said encircling portion, the improvement in means to rotate said gear and to operate said wire cutters in timed relationship, including means, firstly, for rotating the wire twisting gear a plurality of turns, means, secondly, for operating said first wire cutter, means, thirdly, for rotating said wire twisting gear an additional 180 degrees and means, fourthly, for operating said second wire cutter whereby the wire is twisted, the ends are cut and the cut ends of said wire are disposed beneath the twisted portion of the wire.

2. A wire tying machine for tying the ends of wire encircling an object, said machine having a wire twisting gear, a first wire gripper for grip-

6

ping one end of said wire, a first wire cutter located between said first gripper and one end of said wire twisting gear, a second wire gripper for gripping the other end of said wire, a second wire cutter located between said second wire gripper and the opposite end of said wire twisting gear, means, firstly, for rotating the wire twisting gear a plurality of turns, means secondly for operating said first wire cutter, means, thirdly, for rotating said wire twisting gear an additional 180 degrees and means, fourthly, for operating said second wire cutter whereby the wire is twisted, the ends are cut and the cut ends of said wire are disposed under the twisted portion of the wire.

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The following references are of record in the file of this patent:

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2,018,177	Kruft -----	Oct. 22, 1935
2,111,115	Gibbs -----	Mar. 15, 1938
2,265,321	Smith -----	Dec. 9, 1941
2,460,846	Schulze -----	Feb. 8, 1949