July 6, 1948. M. W. LEWIS 2,444,518

PULL-OUT DEVICE

Filed Jan. 11, 1946 4 Sheets-Sheet 1

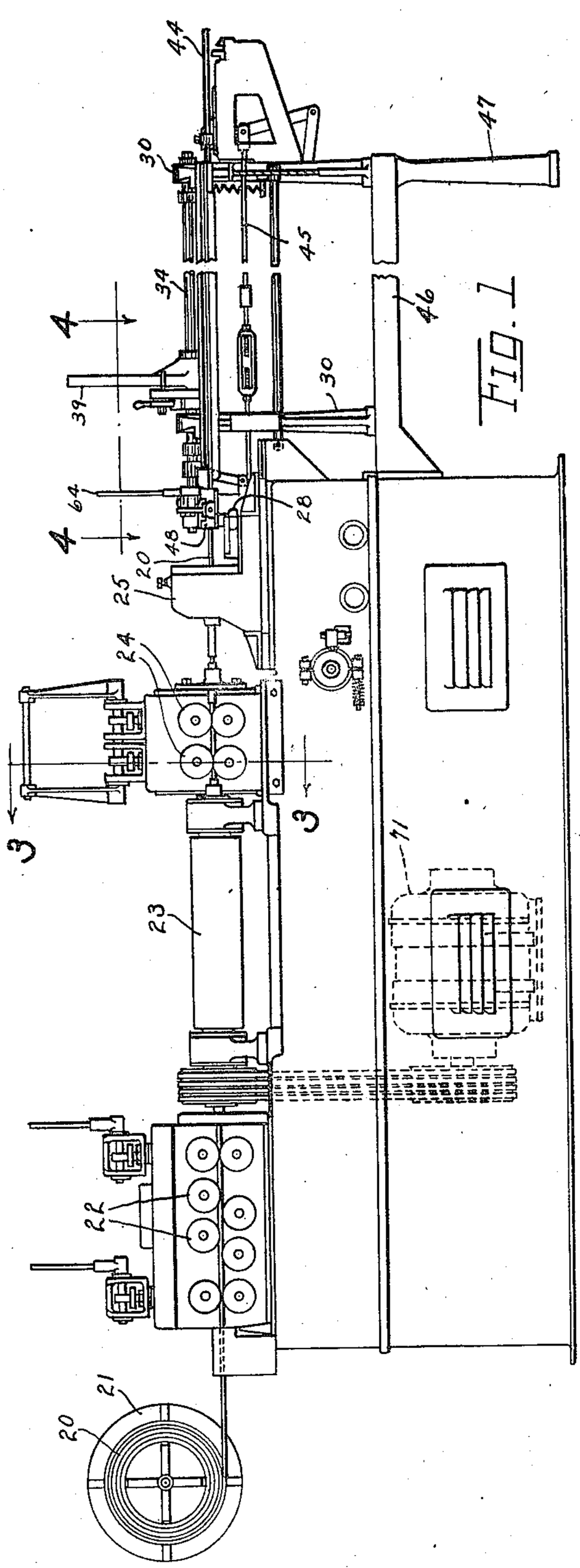

FIG. 1

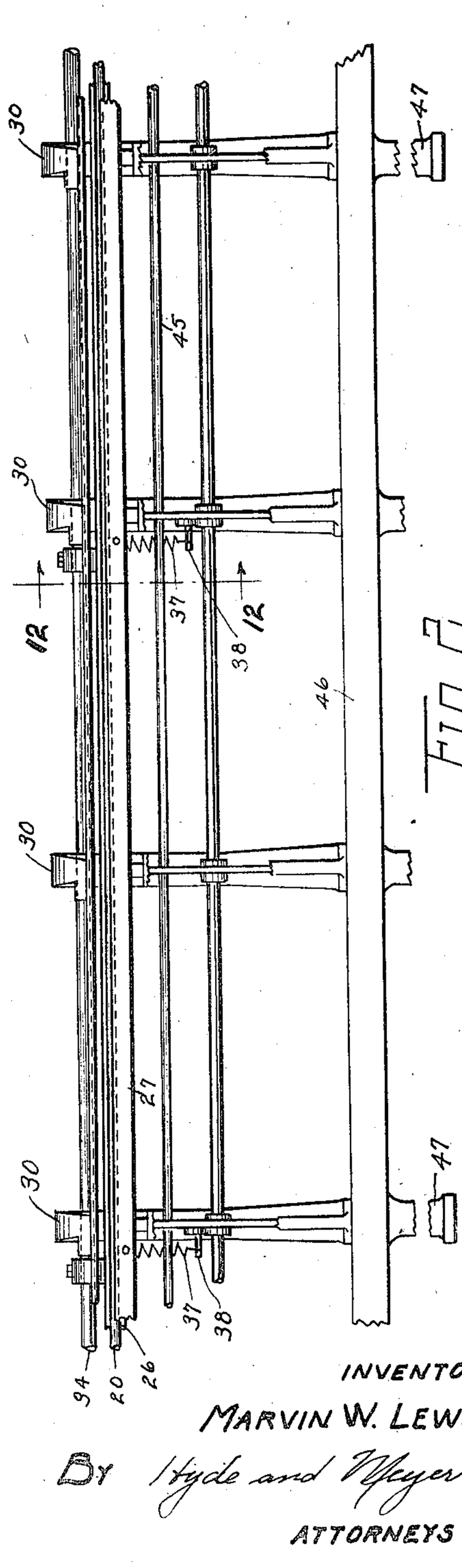

FIG. 2

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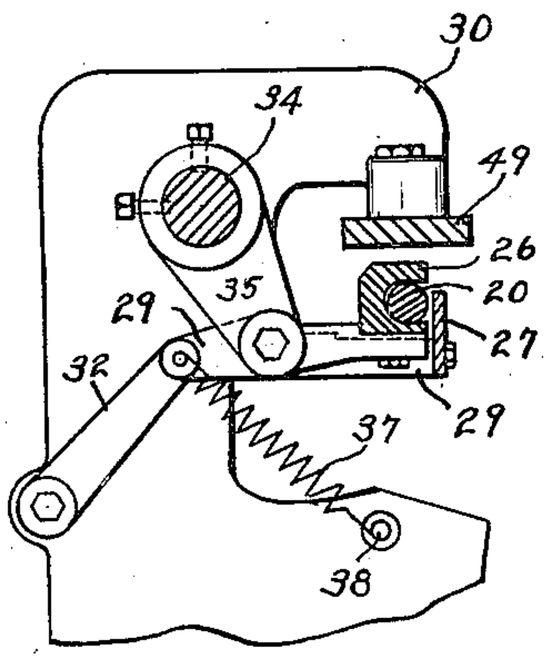

FIG. 12

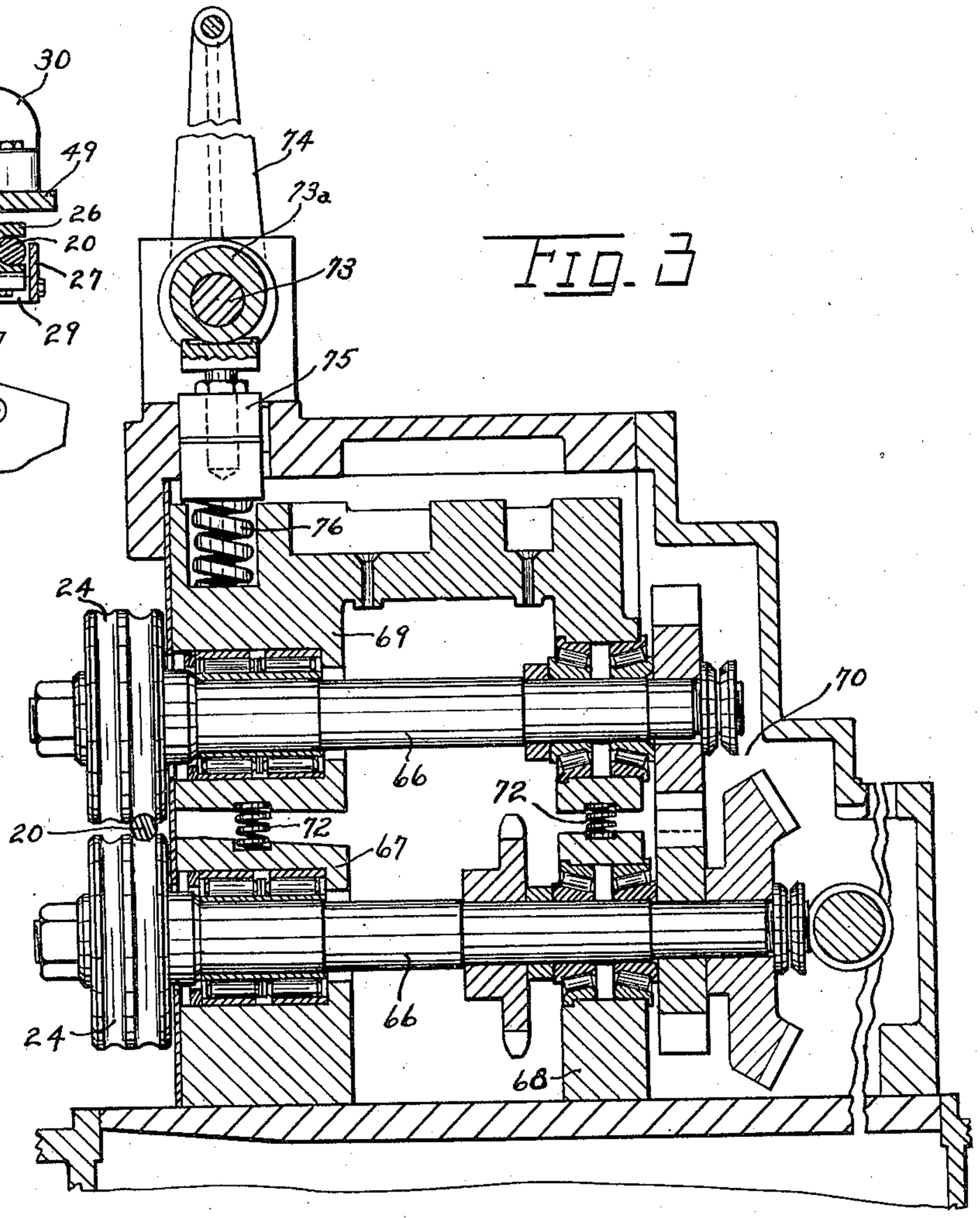

FIG. 3

FIG. 10

FIG. 11

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FIG. 4

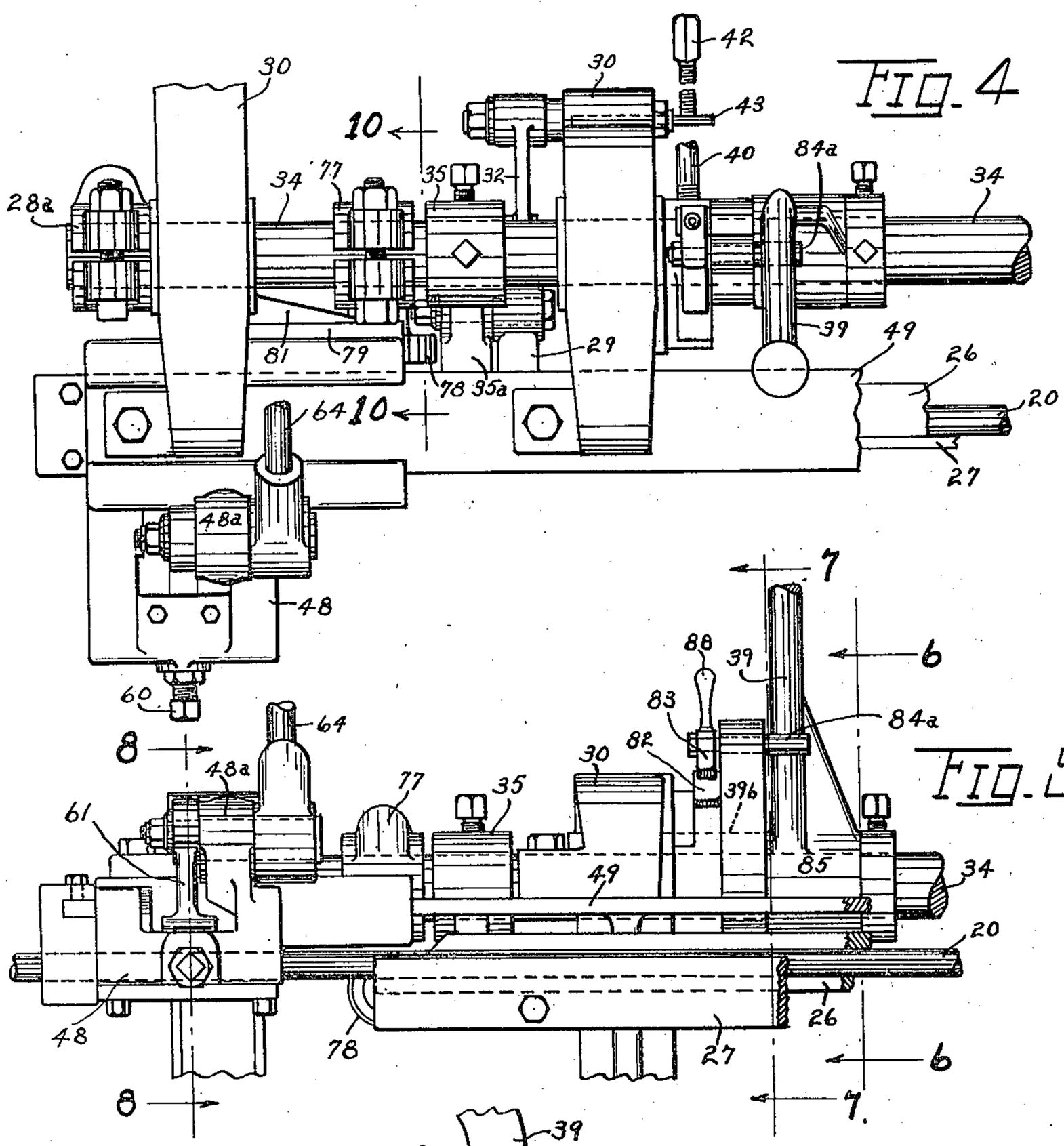

FIG. 5

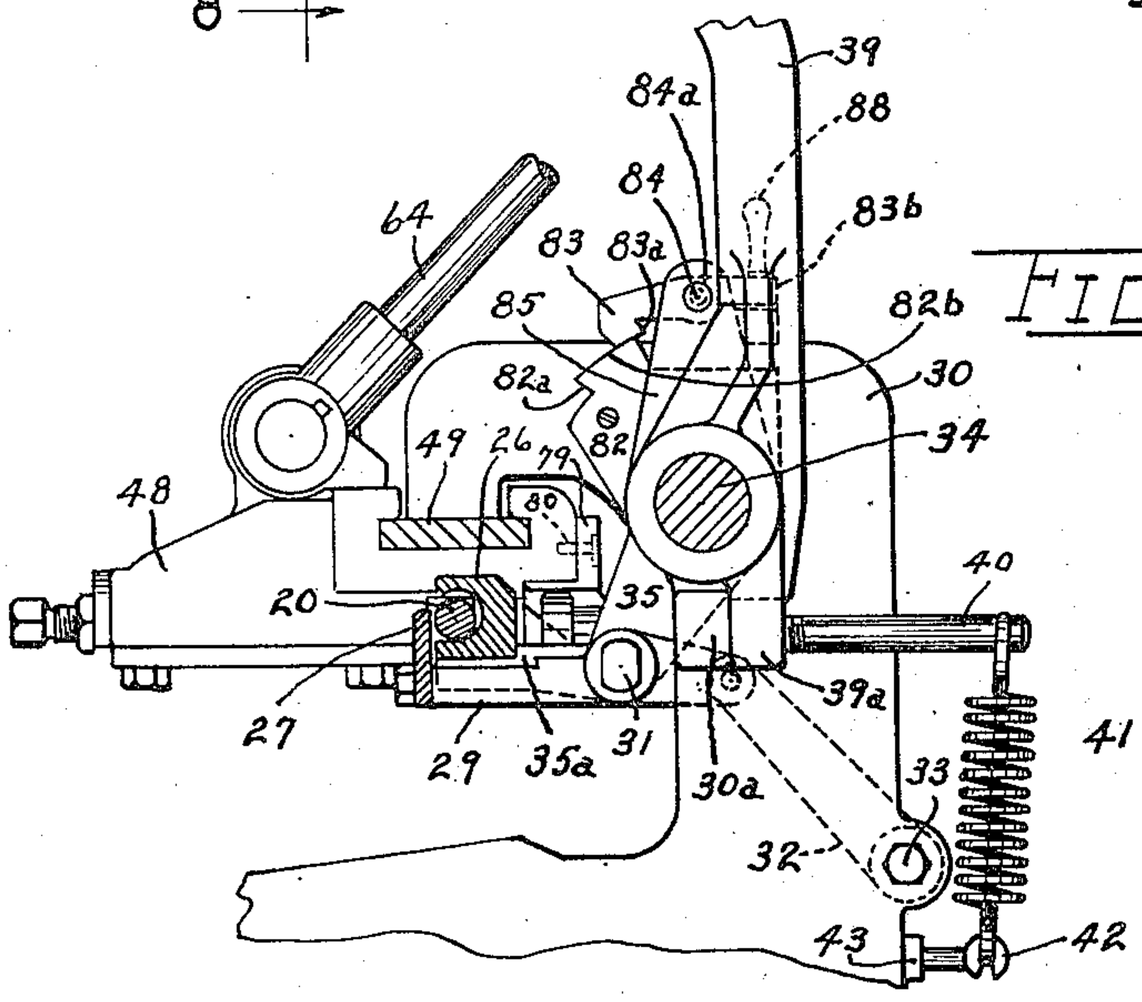

FIG. 6

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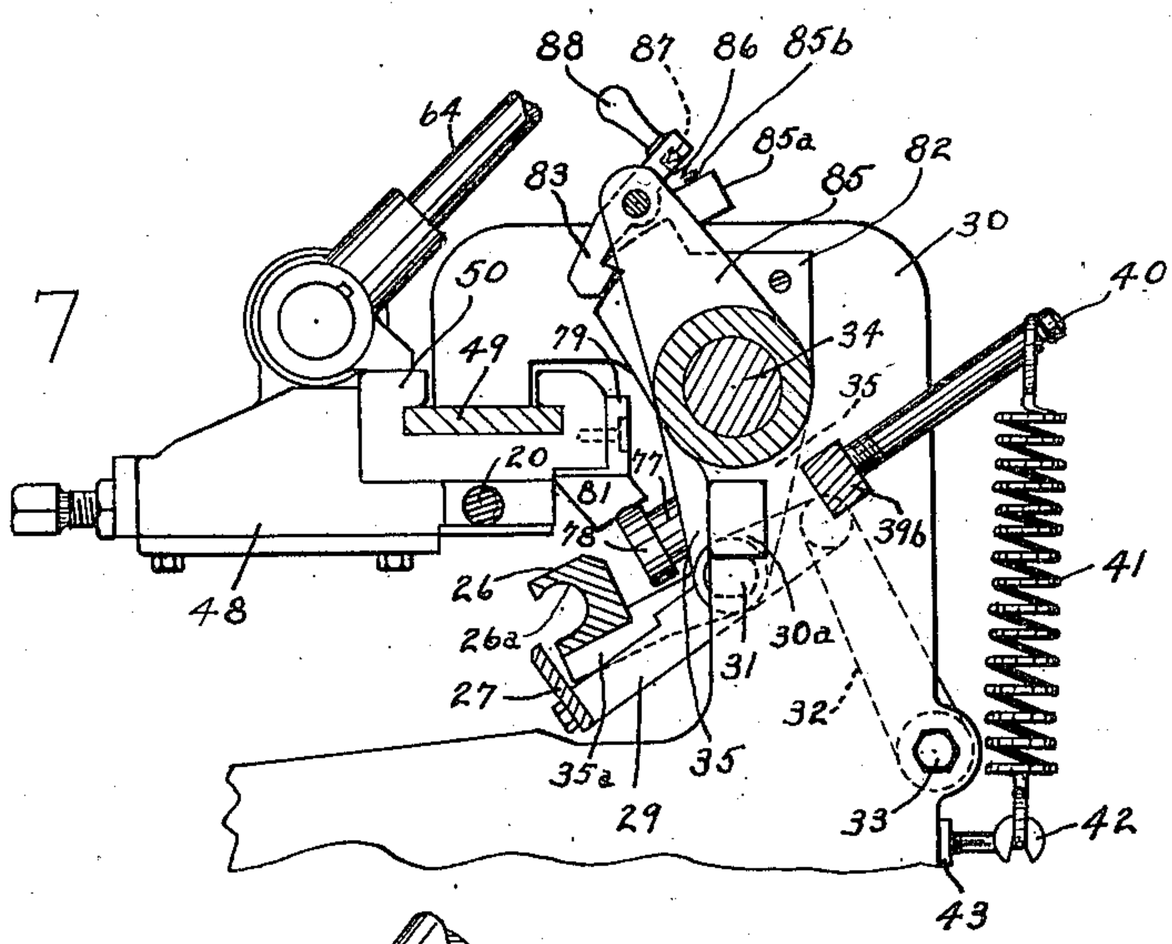
FIG. 7



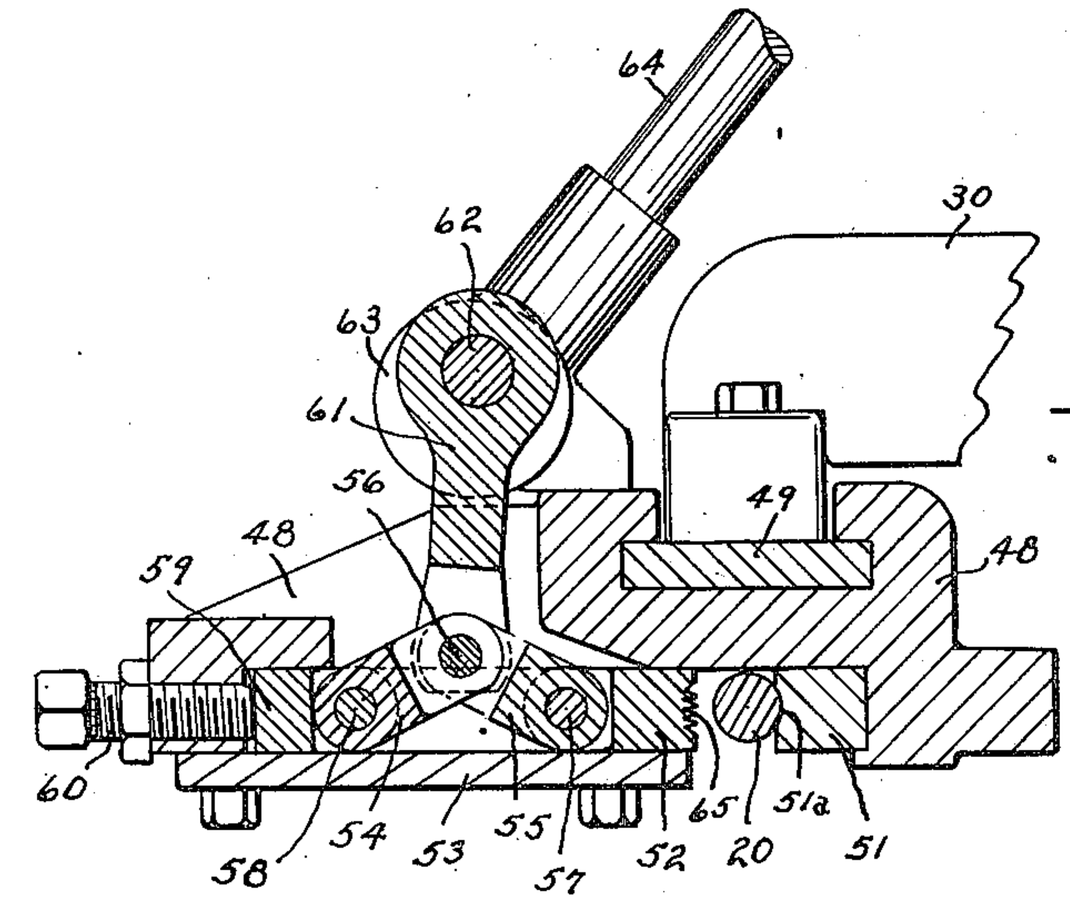


FIG. 8

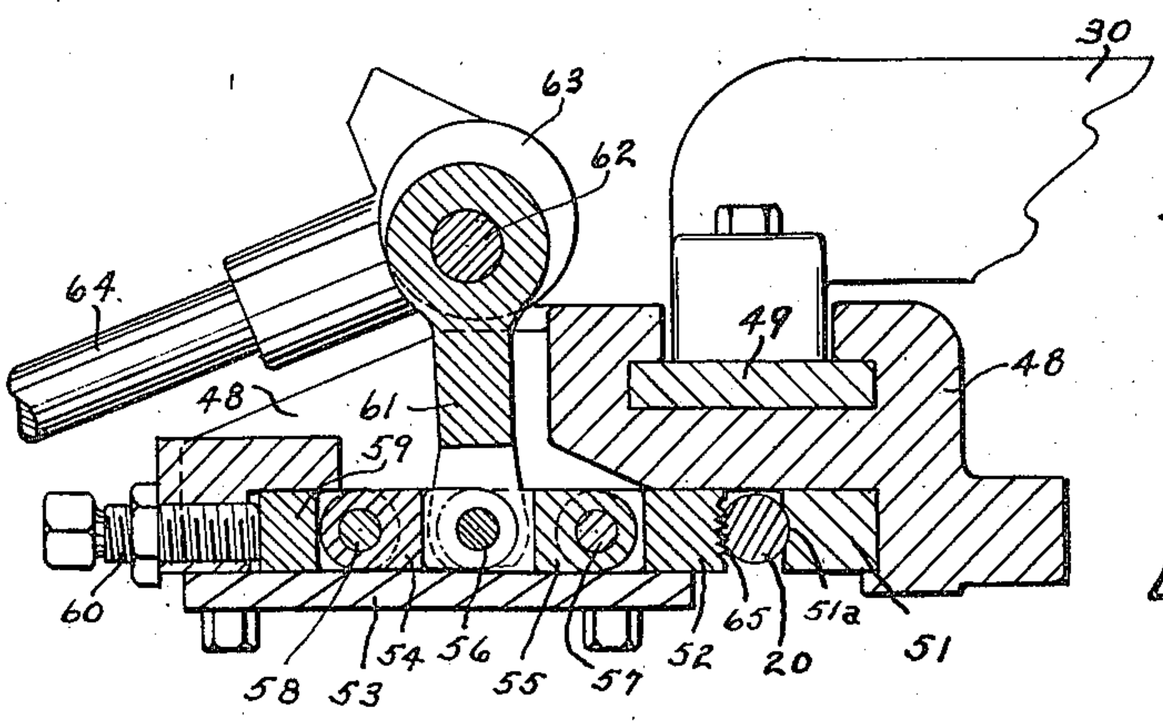


FIG. 9

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Patented July 6, 1948 2,444,518

UNITED STATES PATENT OFFICE

2,444,518

PULL-OUT DEVICE

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Application January 11, 1946, Serial No. 640,474

9 Claims. (Cl. 140—140)

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This invention relates to a pull-out device and more particularly to such a device in combination with a machine for straightening and cutting lengths of wire or rod.

An object of the present invention is to facilitate the straightening of the last length of a heavy wire or rod straightened from a reel of the same for the purpose of cutting the wire or rod into pieces of predetermined length.

Another object of the present invention is to provide a novel vise or clamping means guided in such a manner that it prevents the wire or rod from turning and twisting as the last end is pulled through the straightening arbor.

Another object of the invention is to provide a novel means for supporting a vise or clamp for movement lengthwise of the path traveled by the wire or rod to be cut.

Another object of the invention is to provide a novel toggle-operated clamp for firmly gripping the wire to insure that it does not turn or twist as the last end is drawn through the straightening arbor.

Another object of the present invention is to provide in combination with a straighten-and-cut machine wherein a guide bar normally holds the wire or rod in proper position for gaging and cutting, novel means for moving the guide bar out of the way when my improved pull-out device is operating. This novel means comprises a cam on the traveling vise, a follower adapted to cause movement of the guide bar to the desired position, and latch means for holding the guide bar out of the way.

Other objects and advantages of my invention will be apparent from the accompanying drawings and description, and the essential features thereof will be set forth in the appended claims.

In the drawings,

Fig. 1 is a side elevational view of a machine embodying my invention, with that portion of the machine where my pull-out device operates, greatly contracted to simplify the drawing;

Fig. 2 is a fragmental side elevational view of a portion of the machine in the pull-out zone which was omitted in Fig. 1;

Fig. 3 is a sectional view enlarged taken along the line 3—3 of Fig. 1;

Fig. 4 is a fragmental top plan view enlarged taken along the line 4—4 of Fig. 1;

Fig. 5 is a side elevational view of the mechanism of Fig. 4;

Figs. 6 and 7 are sectional views taken along the lines 6—6 and 7—7, respectively, of Fig. 5;

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Fig. 8 is a sectional view enlarged taken along the line 8—8 of Fig. 5;

Fig. 9 is a view similar to Fig. 8 showing the parts in another position;

Fig. 10 is a fragmental sectional view taken along the line 10—10 of Fig. 4;

Fig. 11 is a fragmental view partly in section and partly in elevation, taken along the line 11—11 of Fig. 10; while

Fig. 12 is a fragmental sectional view enlarged taken along the line 12—12 of Fig. 2 and showing a guide bar returning spring.

The device here disclosed and claimed is an improvement on the wire cutting machine shown in Patent No. 2,101,860 granted December 14, 1937, to Marvin W. Lewis and Carl B. Jones, to which patent reference may be had for details not described in the present application.

In this type of machine, as shown in the previous application and as shown in Fig. 1 of this application, a long length of wire or rod in coil form 20 is supported on a rotatable reel 21. The free end of this rod is fed through a set of straightening rolls 22 then through a rotatable straightening arbor 23 (which crimps the wire back and forth while rotating about it), and a final set of feed rolls 24 to the straightening and cutting portion of the machine at the right-hand end, as viewed in Fig. 1. The rod then passes through a shear head 25, which in all respects is like the shear head 21 of the above mentioned patent. This carries a vertically reciprocable blade for cutting the rod.

The length of rod to be cut passes through a guide bar 26, best seen in Figs. 6 and 7, which is of slightly different form than that shown in the earlier patent but which performs a similar function. It will be noted that this guide bar in the position of Fig. 6 supports the rod 20 as a length of the same is run out to be gaged and cut. In the present form the guide bar has a somewhat semicylindrical recess 26*a* open at one side for the discharge of the cut rod. As shown in Fig. 6, while the rod is being gaged and cut it is held in the recess 26*a* by means of a clapper bar 27 which sufficiently closes the recess to hold the rod in the guide bar. Normally, as disclosed in the above mentioned patent, the guide bar is swung downwardly to a position similar to Fig. 7, except not quite so far, in order to dump the cut length of rod, as explained in detail in the prior patent. This is accomplished by means of a follower 28, shown in Fig. 1, which is engaged by a cam on the side of the shear head 25 so as to dump the cut piece at the proper time. As shown

in Fig. 7, the clapper bar is supported by arms 29 which are pivotally mounted on one or more of the machine frame brackets 30 for pivoting motion around the point 31. The rear end of arm 29 is pivotally connected with a link 32 which in turn is pivotally mounted on the frame at 33. It results from this construction that when the guide bar 26 is moved from the position of Fig. 6 to that of Fig. 7, the clapper bar is moved farther in a counter-clockwise direction so as to open up the recess 26*a* as shown in Fig. 7. Since the guide bar and clapper bar have considerable length in this type of machine, say of the order of 10 to 16 feet, it is necessary to provide a number of supporting arms spaced along their length. For this purpose, a guide bar control shaft 34 is rotatably mounted in a number of the machine frame brackets 30. Clamped or otherwise rigidly secured to this shaft are a number of arms 35 which carry at their lower ends the angular arm extension 35*a* which is connected with the guide bar 26. It is this arm 35 which supports the pivot point 31 previously mentioned. Means is provided for urging the guide bar arm 35*a* for movement in a clockwise direction, as viewed in Fig. 7. This comprises a number of springs 37 connected between the pivot pins connecting arms 29 and links 32 and pins 38 on the machine frame (Fig. 12). This biases the guide bar toward the position of Fig. 6 at all times when it is not under the control of one of its operating cams. The follower 28 (Fig. 1) is carried by arm 28*a* clamped to the left end of shaft 34 (Fig. 4) and serves to oscillate shaft 34.

Hand operated means is also provided for opening the clapper bar. This comprises a handle 39 rigidly fastened to shaft 34 and having at its lower end, as best seen in Fig. 6, a stop member 39*a* which engages a stop 30*a* on one of the machine brackets 30. The stop member 39*a* extends laterally at 39*b*, as shown in Figs. 5 and 7, to provide a mounting means for pin 40 which is connected by spring 41 with pin 42 which is mounted on bracket 43 connected with the machine frame. Thus, the spring 41 always tends to return handle 39 to the position shown in Fig. 6 and also aids in returning the guide bar to the position of Fig. 6.

A feature present in the above mentioned patent, and in the present device also, should be understood although it has no immediate bearing on the present invention. A gage rod 44 is clamped in a gage slide in all respects similar to the slide 86 of the mentioned patent. This gage rod enters the end of recess 26*a* opposite the rod to be cut. As mentioned in the previous patent, when the rod to be cut 20 engages the rod 44 then the gage slide and the shear head 25 connected together by link 45 move toward the right, as viewed in Fig. 1 so that the rod 20 is cut while still moving at its regular speed.

It should be understood, that in the machine under discussion, the portion at the right-hand end of Fig. 1, a part of which is shown in Fig. 2, is of a length of the order of 10 to 16 feet for the cutting of longer lengths of rod and therefore, a number of the machine brackets 30 are necessary, spaced approximately 30 inches apart on the sub-frame member 46 and provided with a sufficient number of supporting legs 47.

When the end of a long coil 20 is reached so that the coil runs free of the reel 21, in the type of machine shown in the previous patent, there was nothing to prevent the bending and whipping of this last piece of wire or rod. This bending and whipping is caused by the straightening device, more particularly the rotating arbor 23. As a result of this action, the last length of rod became snarled and was of no commercial value. This was of no importance in smaller diameters of wire but in rods one-half inch and three-quarters of an inch in diameter, the loss of a length of 10 or 16 feet of rod due to this cause was of serious commercial importance. The present invention does away with this loss.

As best seen in Figs. 4 to 10 inclusive, a vise generally indicated at 48, is mounted for sliding movement lengthwise of the machine just above the rod 20. The mounting means comprises a rectangularly shaped way 49 supported from above by the machine brackets 30. The vise is formed with a C shape portion 50 which embraces the way 49 so as to slidably mount the vise 48 on the way 49. It results from the embracing structure 50 about the way 49 that it is impossible for the vise 48 to oscillate or rotate transversely of the rod 20.

As best seen in Figs. 8 and 9, a clamping device is mounted on the vise 48 for gripping the rod 20. This clamping device comprises a fixed jaw 51 having a slightly arcuate seat 51*a* which may be varied in different jaws to accommodate different diameters of rod. A coacting movable jaw 52 is slidably mounted between plate 53 and the main body of the vise 48. A toggle comprising the links 54 and 55 pivotally connected together at 56, has one end pivotally connected to jaw 52 at the point 57 and the other end of the toggle is pivotally connected at 58 to a slidable block 59 whose position in the vise is adjustable by means of the screw 60. The middle pivot pin 56 of the toggle is connected by link 61 with the eccentric crank pin 62 mounted on shaft 63 which is rotatable in bracket portion 48*a* of the vise by means of handle 64. The jaw 52 is preferably provided with sharp serrated teeth 65 which bite into the rod 20 in holding position, as shown in Fig. 9. It results from this construction that when handle 64 is moved from the position of Fig. 8 to that of Fig. 9, the toggle is forced slightly over center downwardly causing jaws 52 and 51 to firmly grip the rod 20 between them. Since the rod 20 is at all times moving rapidly, the handle 64 must be operated to clamp on to the rod as it moves. The operator does this easily by allowing his hand to travel with the handle 64 as he moves it from the position of Fig. 8 to that shown in Fig. 9.

With the rod 20 firmly clamped, as shown in Fig. 9, it is impossible for the last length of rod 20 to be twisted in any way as it is run out for cutting, because the rod is firmly gripped in the jaws 51, 52 and the vise itself can move only in one direction, namely lengthwise along the way 49.

I found it desirable, in order to drive the last length of rod 20 through to the end of its travel against the gage rod 44, to provide a tight gripping means for rolls 24, as best shown in Fig. 3. Here the rolls are carried on arbors 66 having suitable bearings in lower blocks 67 and 68 and in the upper block 69. Suitable drive means is provided, as shown at 70, which is connected with motor 71 by means described in the prior patent and not necessary to describe here. The block 69 is held away from blocks 67 and 68 by means of springs 72. Above block 69 is an eccentric 73 operable by handle 74 to squeeze down on block 75 and stiff spring 76. When a tighter grip is desired between the rolls 24 the handle 74 is moved counter-clockwise from the position shown in

Fig. 3 causing the eccentric cam surface 73*a* to produce a downward pressure which is sufficient to overcome springs 71 and 72 so as to force the upper roll 24 slightly nearer the lower roll. This is of the order of a few thousandths of an inch, but is sufficient to give additional driving force to the rod 20.

Since the guide bar 26 would interfere with the operation of the vise 48 as above described, means is provided for taking the guide bar and clapper bar out of the way, as shown in Fig. 7. This means is more clearly shown in Figs. 10 and 11. On the shaft 34 is rigidly clamped an arm 77 which extends downwardly from the shaft and then is bent at right angles to support the rotatable roller 78. On the side of vise 48, is clamped a cam bracket 79 by means of bolts 80. The cam bracket supports a cam 81 which slopes outwardly and downwardly, as shown in Figs. 10 and 11. As viewed in Fig. 4, the cam extends toward the top of the sheet as one moves toward the left and the cam face extends downwardly toward the left also. In other words, the roller 78 is in the same position in Fig. 4 as it is in Figs. 10 and 11. It results from this construction that when the vise 48 (which normally is at rest near the shear head 25) is clamped on the rod and starts to move toward the right as viewed in Figs. 1, 4 and 5, the cam surface 81 forces the roller 78 downwardly and follows it in a counter-clockwise direction so as to move arm 77 to the dot-dash position of Fig. 10 or to the position shown in Fig. 7. This moves the guide bar 26 to the position shown in Fig. 7 which is slightly beyond the normal position to which it is forced by the action of the follower 28 operated by the shear head 25 as previously described.

After the guide bar is moved out of the way, latching means is provided for holding it there. This is best seen in Figs. 6 and 7. Secured to one of the frame brackets 30 is a fixed latch member 82 which coacts with a movable latch member 83 pivotally mounted at 84 on arm 85 which is rigid with guide bar control shaft 34. The rear end of latch member 83, as indicated at 83*b*, is urged upwardly by a spring 86 which is held in compression against a shoulder 85*a* formed integrally with the arm 85. An upstanding pin 85*b* is embraced by the helical spring at its lower end and a recess 87 in the latch member holds the upper end of the spring. A handle 88 is provided for manipulation of the latch member. Coacting shoulders 83*a* on the movable latch member and 82*a* on the fixed latch member are engageable, as shown in Fig. 7, to hold the guide bar out of the way while my improved vise 48 is being used. Normally however, the latch member 83 rides on the surface 82*b* of the member 82 each time the guide bar and clapper bar are operated to dump a cut length of wire, as described in connection with the follower member 28. This follower member 28 does not operate the latch nose 83 far enough to engage the shoulder 82*a*, as shown in Fig. 7. This holding engagement is also possible when the handle 39 is moved toward the left, as viewed in Fig. 6, engaging against the pin 84*a* which extends out from the pivot point 84, as best seen in Fig. 5. Either this hand operation of handle 39 or the operation of cam 81 and follower 78 is relied upon to lock the latch members 82 and 83 in the position of Fig. 7 to hold the guide bar out of the way during a pull-out operation. To release the latch from the position of Fig. 7, handle 88 is pushed downwardly, whereupon the springs 37 and 41 return the guide bar to its normal position.

What I claim is:

1. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length, means for driving the rod, a vise adapted to be clamped on said rod and carried therewith in said zone, said clamping of said vise to said rod providing the sole driving means for said vise, and means preventing rotation of said vise in a plane transversely of said rod.

2. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length, means for driving the rod, a vise adapted to be clamped on said rod and carried therewith in said zone, said clamping of said vise to said rod providing the sole driving means for said vise, and means slidably mounting said vise for movement only in a path parallel to the length of said rod.

3. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length, means for driving the rod, a vise adapted to be clamped on said rod and carried therewith in said zone said clamping of said vise to said rod providing the sole driving means for said vise, a fixed track parallel to a length of rod in said zone before cutting, and means mounting said vise on said track for sliding movement along said track, said means preventing rotation of said vise about said track.

4. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length, means for driving the rod, a vise adapted to be clamped on said rod and carried therewith in said zone, said clamping of said vise to said rod providing the sole driving means for said vise, a fixed track parallel to a length of rod in said zone before cutting, a pair of jaws in said vise positioned on opposite sides of said rod, lever actuated means for moving one of said jaws toward the other to tightly clamp said rod between said jaws, and means mounting said vise on said track for movement lengthwise only of said track.

5. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length, means for driving the rod, a vise adapted to be clamped on said rod and carried therewith in said zone, said clamping of said vise to said rod providing the sole driving means for said vise, a fixed track parallel to a length of rod in said zone before cutting, a pair of jaws in said vise positioned on opposite sides of said rod, over-center toggle means for moving one of said jaws toward the other to tightly clamp said rod between said jaws, and means mounting said vise on said track for movement lengthwise only of said track.

6. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length and wherein a guide bar normally holds said rod in proper gaging and cutting position in said zone, the combination of a vise adapted to be clamped on said rod and carried therewith in said zone, means preventing rotation of said vise transversely of said rod, and means operable by movement of said vise for moving said guide bar away from said rod.

7. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length and wherein a guide bar normally holds said rod in proper gaging and cutting position in said zone, the combination of

a vise adapted to be clamped on said rod and carried therewith in said zone, means preventing rotation of said vise transversely of said rod, cam and follower means operable by movement of said vise for moving said guide bar away from said rod, and latch means for holding said bar away from said rod.

8. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length and having a shear spaced from the end of said rod for making said cut and wherein a guide bar normally holds said rod in proper gaging and cutting position in said zone, the combination of a vise adapted to rest near said shear and to be clamped on said rod near the end thereof and to be carried therewith through said zone, means preventing rotation of said vise transversely of said rod, and means operable by the first movement of said vise away from said shear for moving said guide bar away from said rod.

9. In a straighten-and-cut machine having a zone where a straightened length of rod is run out and cut to length and having a shear spaced from the end of said rod for making said cut and wherein a guide bar normally holds said rod in

proper gaging and cutting position in said zone, the combination of a vise adapted to rest near said shear and to be clamped on said rod near the end thereof and to be carried therewith through said zone, means preventing rotation of said vise transversely of said rod, means for oscillating said guide bar away from said rod including a follower positioned near said shear, a cam on said vise engageable with said follower by the first movement of said vise away from said shear for causing movement of said guide bar away from said rod, and latch means for holding said bar away from said rod.

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