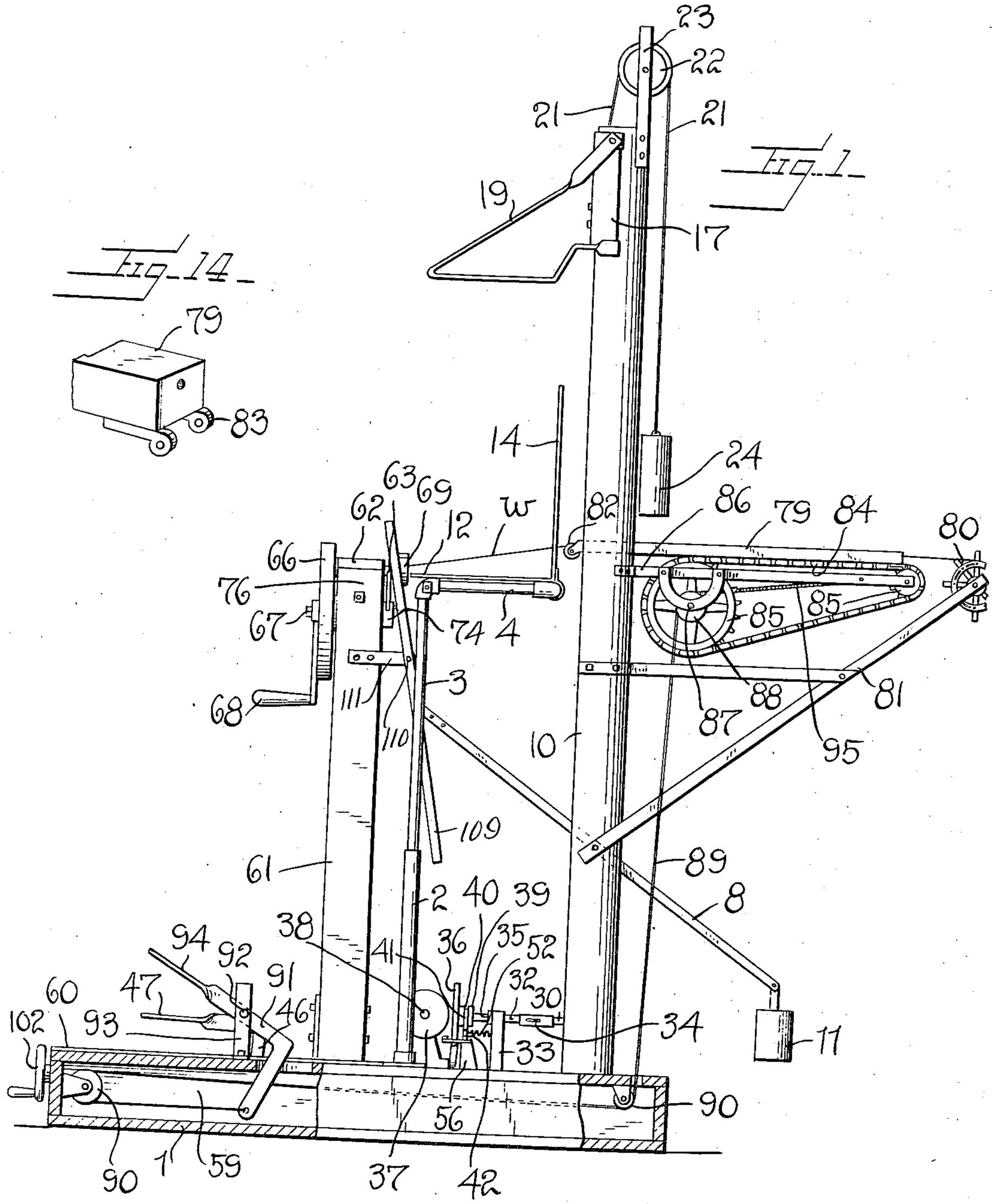
1,166,720.

A. B. SMITH & H. J. GOFF.
BUNDLE TYING MACHINE.
APPLICATION FILED MAR. 6, 1915.

Patented Jan. 4, 1916.
5 SHEETS—SHEET 1.

Fig. 1

Fig. 14



Witnesses
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Fig. 2.

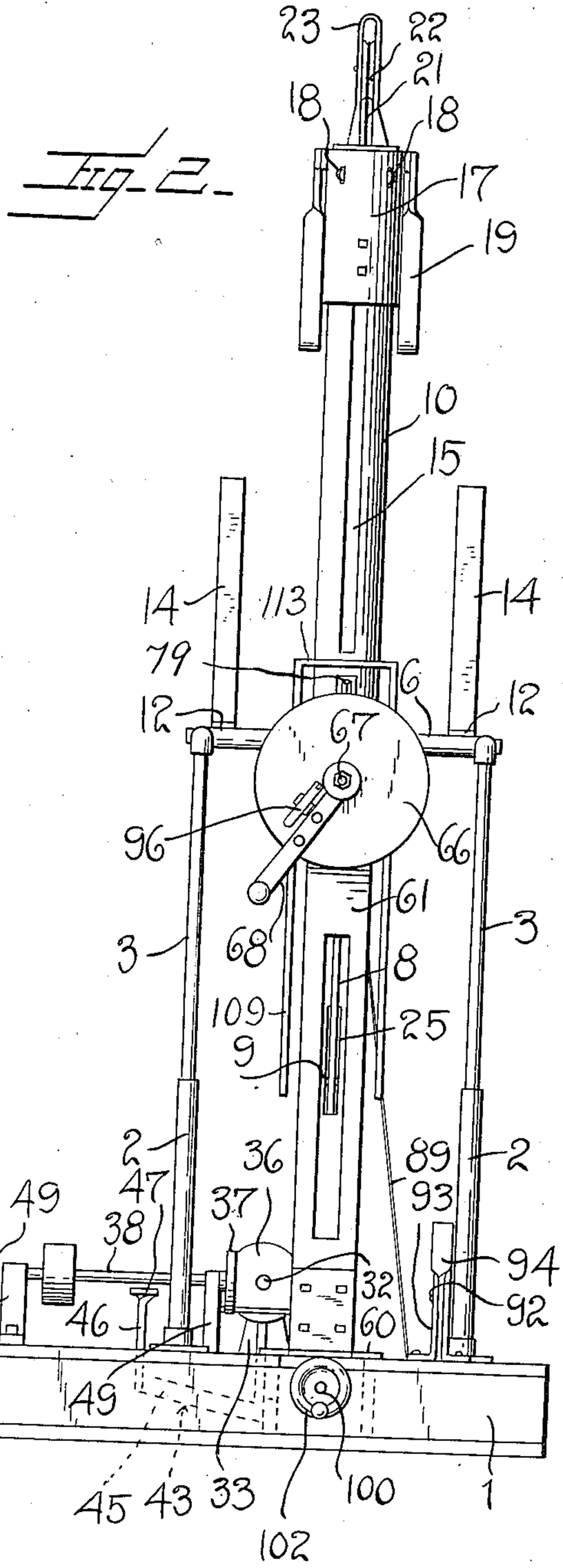
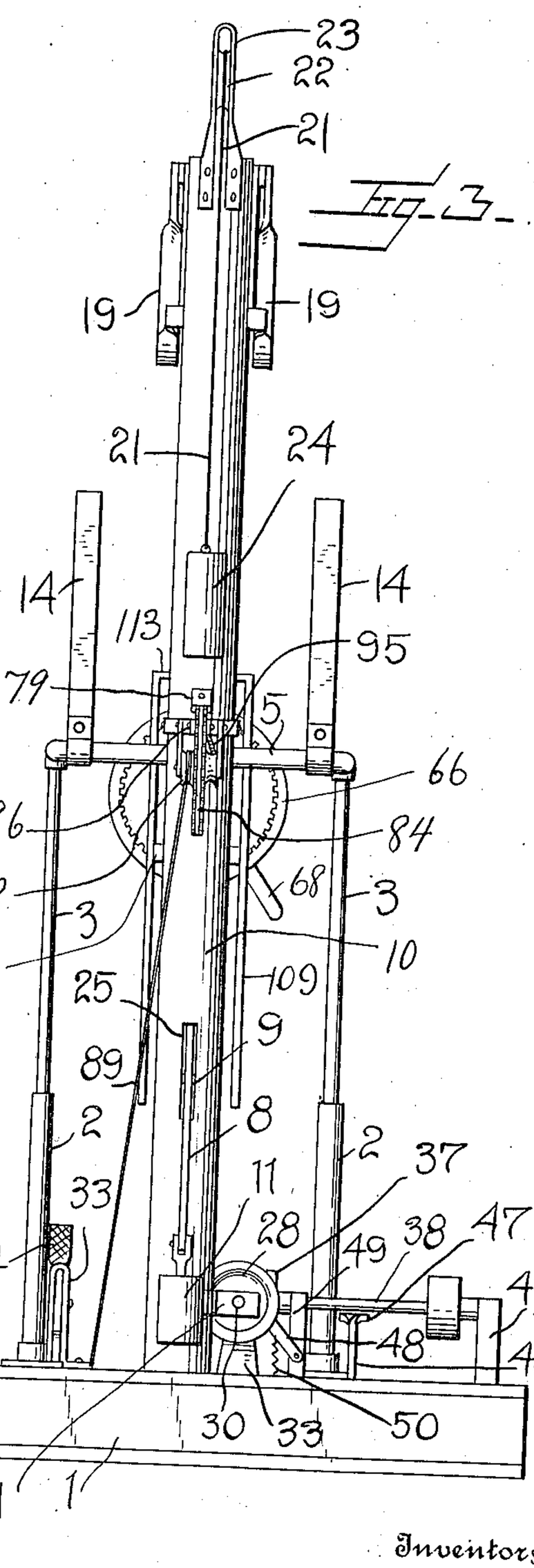


Fig. 3.



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5 SHEETS—SHEET 3.

Fig. 8.

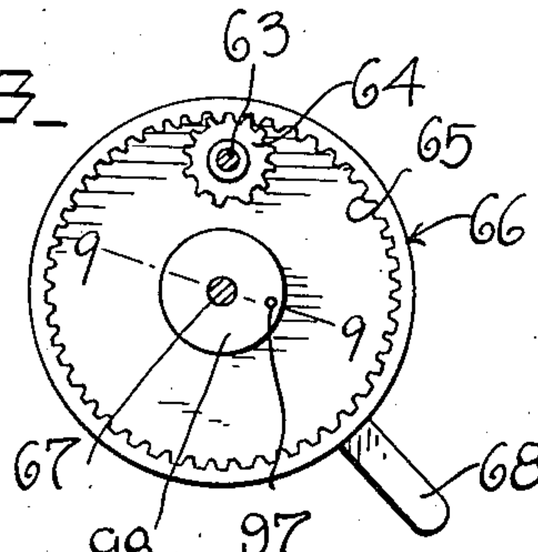


Fig. 4.

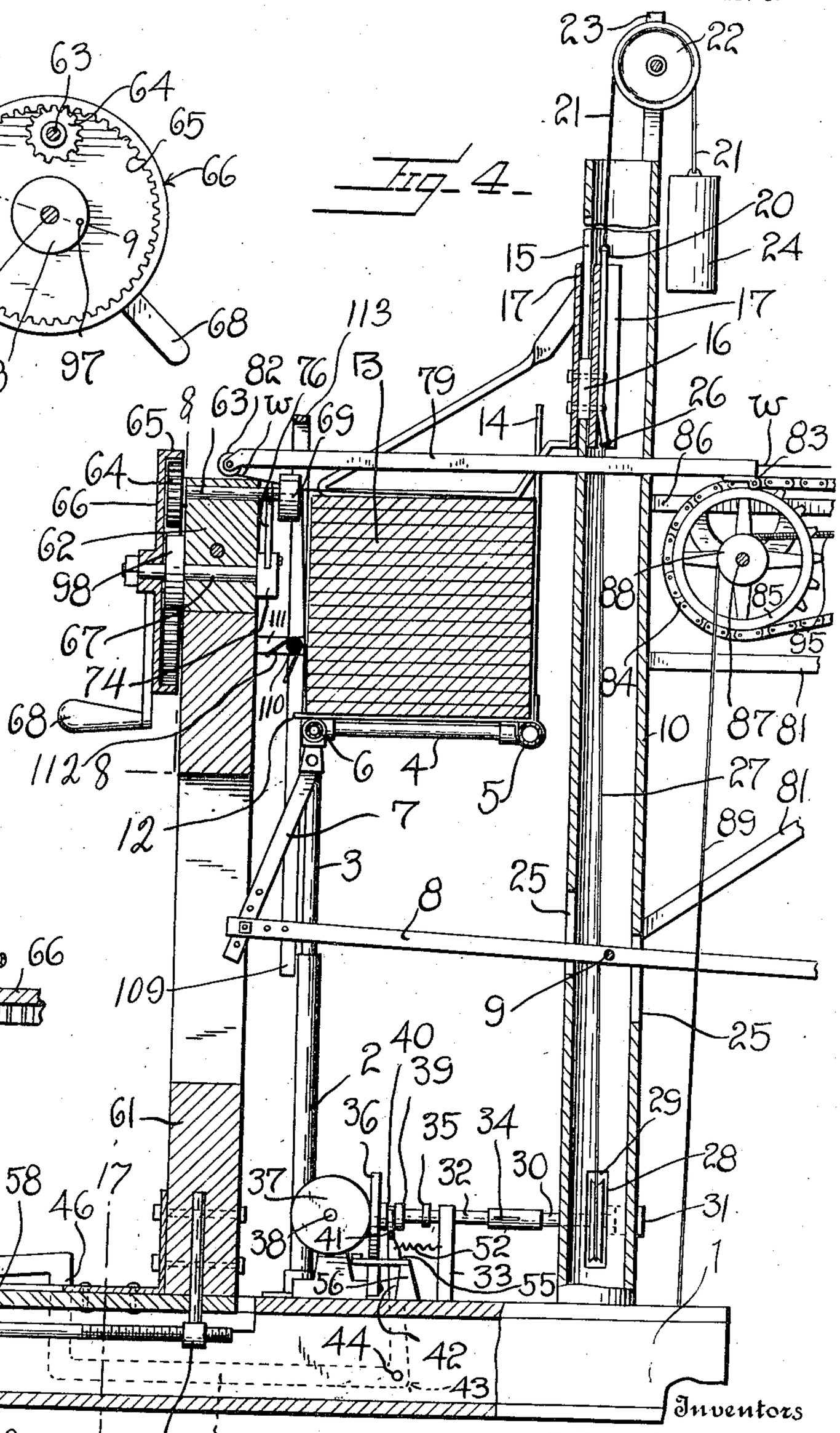
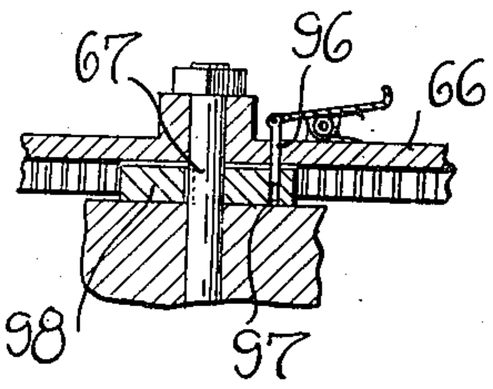


Fig. 9.



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5 SHEETS—SHEET 4.

Fig. 5.

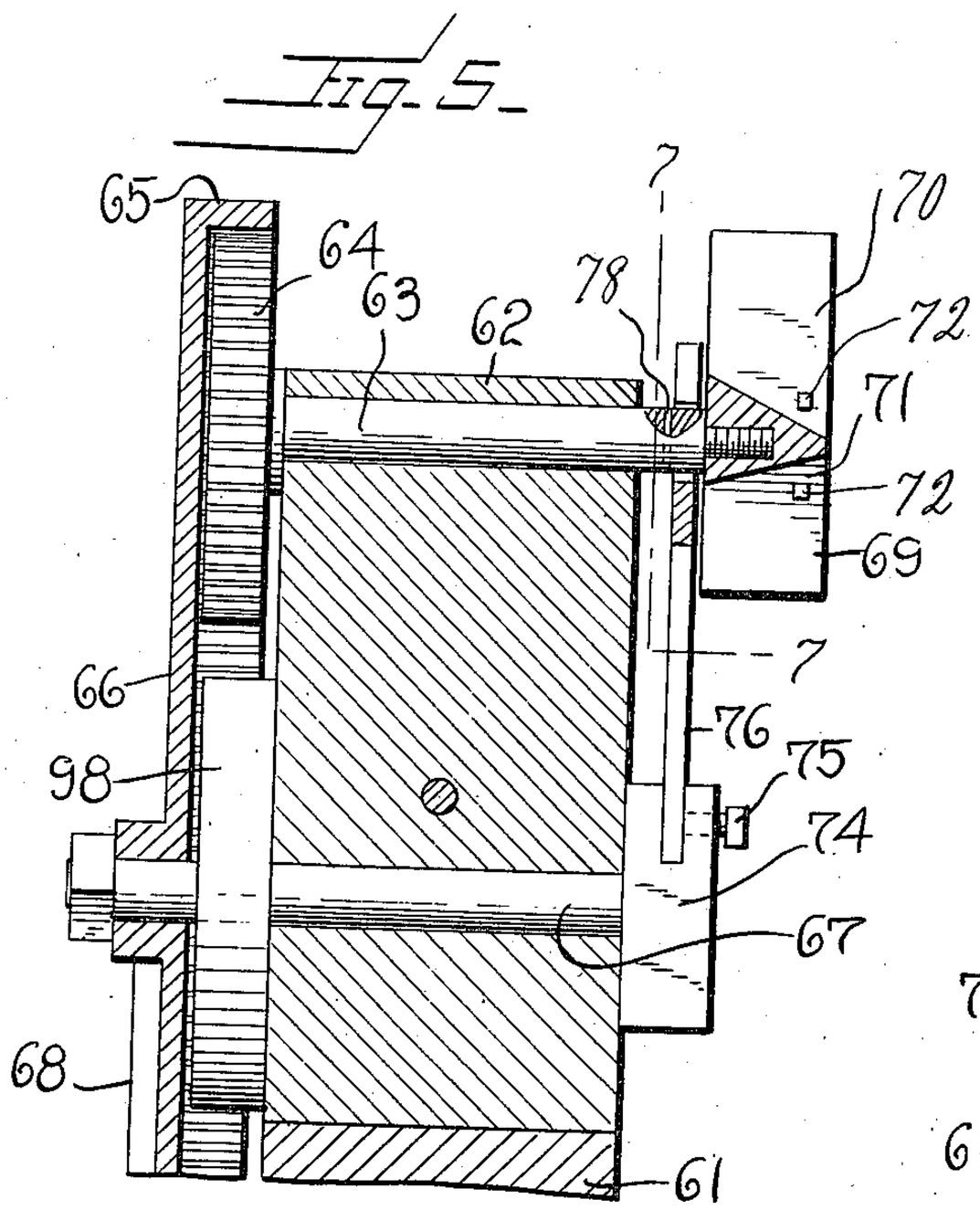


Fig. 6.

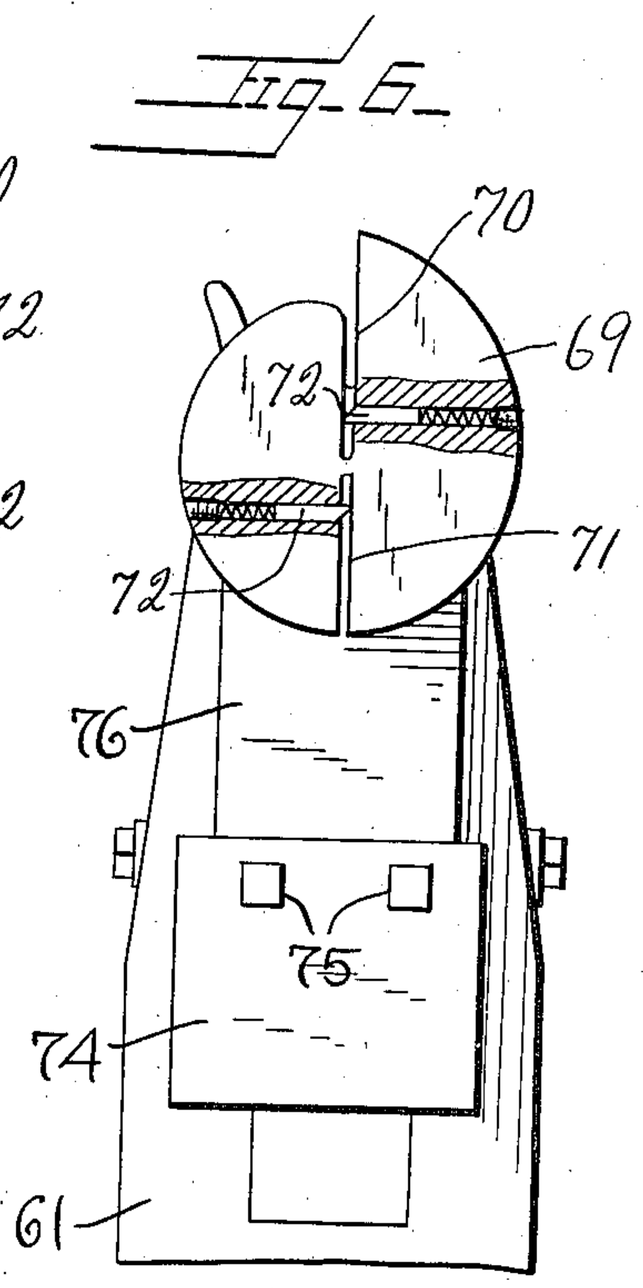


Fig. 10.

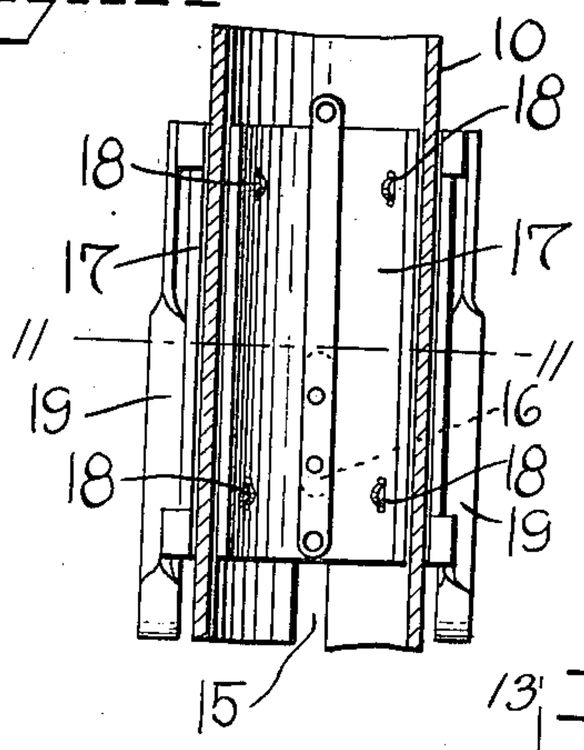


Fig. 11.

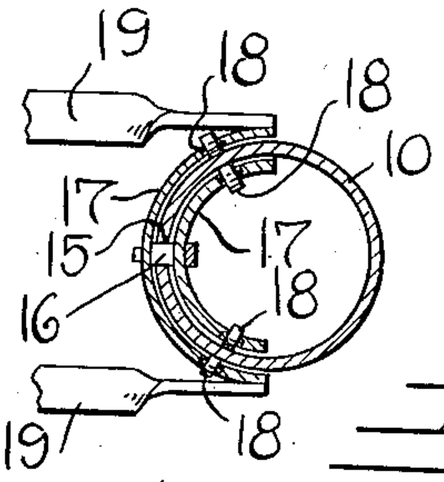


Fig. 7.

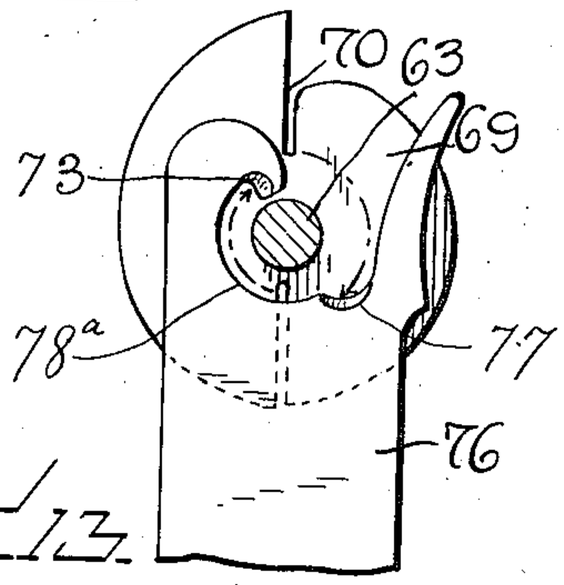
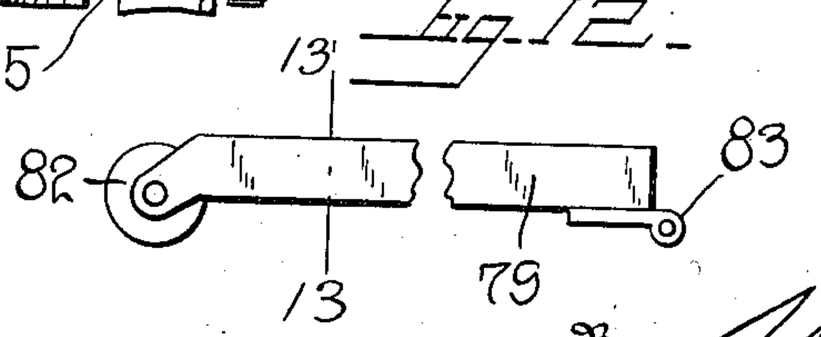
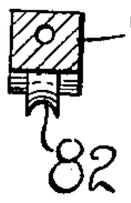


Fig. 12.





Witnesses

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5 SHEETS—SHEET 5.

Fig. 15.

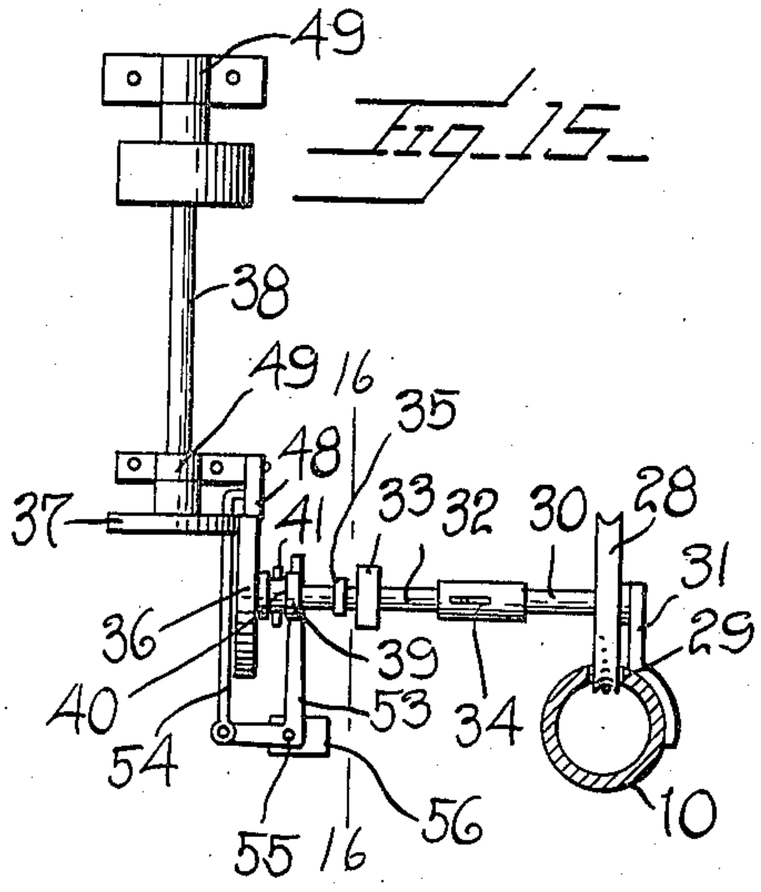


Fig. 16.

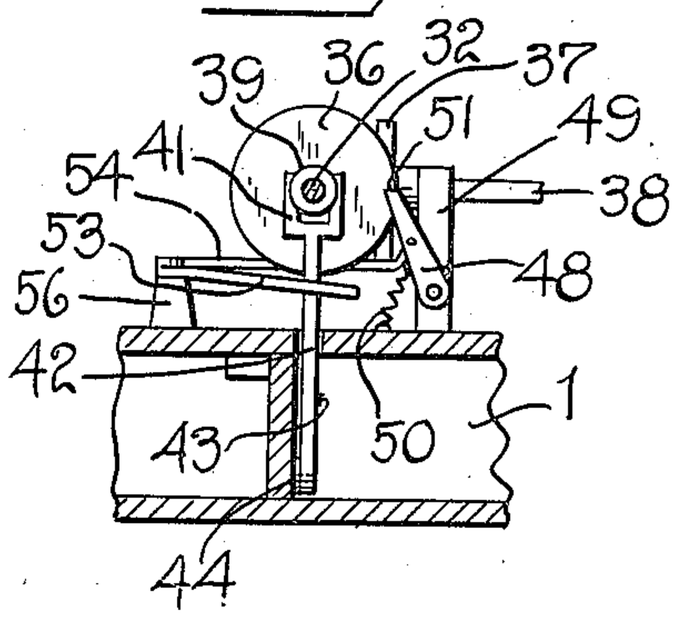


Fig. 17.

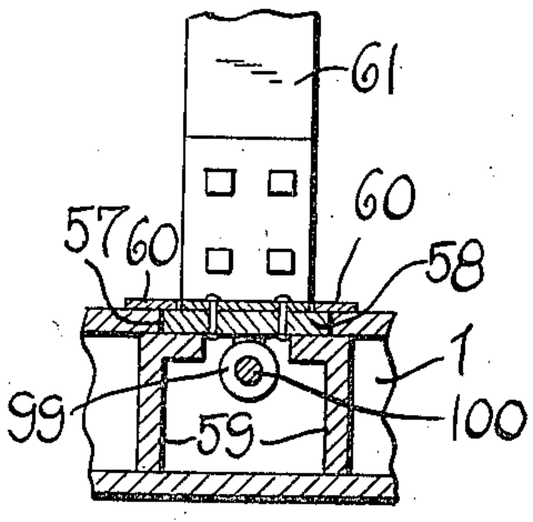


Fig. 18.

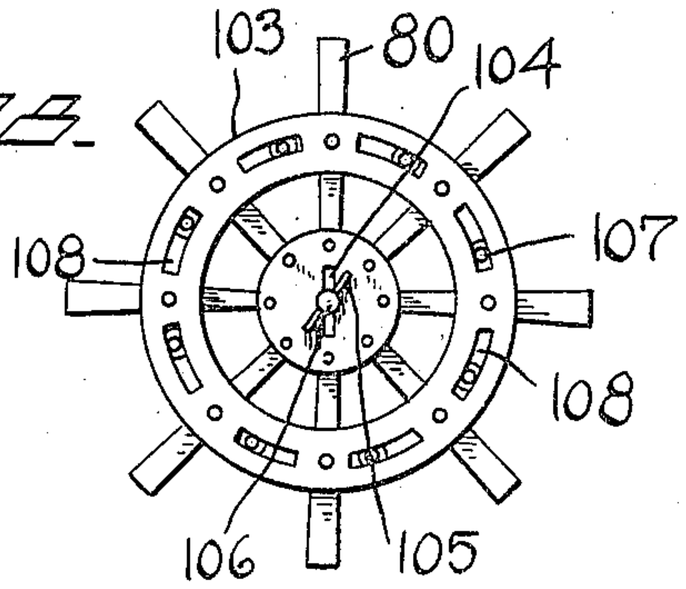


Fig. 19.

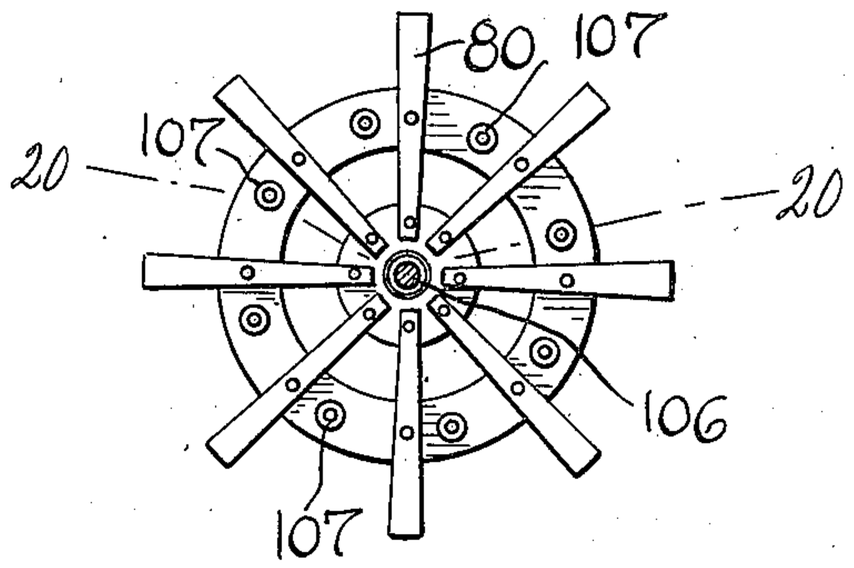
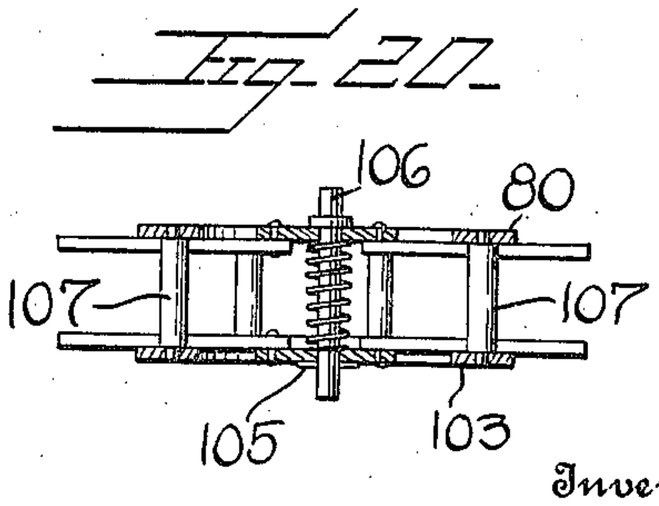


Fig. 20.



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UNITED STATES PATENT OFFICE.

ABNER BYRON SMITH AND HENRY JAMES GOFF, OF McCLOUD, CALIFORNIA.

BUNDLE-TYING MACHINE.

1,166,720. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed March 6, 1915. Serial No. 12,662.

To all whom it may concern:

Be it known that we, ABNER B. SMITH and HENRY J. GOFF, citizens of the United States, residing at McCloud, in the county of Siskiyou and State of California, have invented certain new and useful Improvements in Bundle-Tying Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain improvements in bundle tying machines and has relation more particularly to a device of this general character wherein the tying medium consists of wire or the like; and an object of the invention is to provide a device of this general character having novel and improved means whereby the tying medium is conveniently and readily disposed around the bundle and whereby the meeting extremities of the tying medium are effectively tied or interlocked.

The invention also has for an object to provide a novel and improved device of this general character including means whereby the tying medium may be severed after the same has been operatively disposed about a bundle.

Furthermore, the invention has for an object to provide a novel and improved device of this general character including a movable support on which the bundle, to be tied, is positioned and having coacting therewith driven means whereby such support is caused to move in one direction in order to permit the tying medium to be properly disposed therearound.

It is a still further object of our invention to provide a novel and improved device including a reciprocating needle coacting with the tying medium and movable in a direction angular to the path of travel of the bundle support whereby the tying medium may be caused to properly surround the bundle.

Our invention also contemplates novel and improved means whereby the machine may be employed with convenience and facility in connection with bundles of varying widths.

It is another object of our invention to provide a novel and improved machine of this general character including a bundle support capable of reciprocatory movement, the movement of said support in one direction being under control of positively driven means, while movement in the opposite direction being under control of automatic means, said automatic means normally maintaining the support at the limit of its movement under the influence of said last mentioned means.

The invention consists in the details of construction and in the combination and arrangement of the several parts of our improved bundle tying machine whereby certain important advantages are attained and the device is rendered simpler, less expensive and otherwise more convenient and advantageous for use, all as will be hereinafter more fully set forth.

The novel features of the invention will be carefully defined in the appended claims.

In order that our invention may be the better understood, we will now proceed to describe the same with reference to the accompanying drawings, wherein—

Figure 1 is a view in side elevation, with parts broken away, of a bundle tying machine constructed in accordance with an embodiment of our invention; Fig. 2 is a front elevational view of the device as disclosed in Fig. 1; Fig. 3 is a rear elevational view, with the reel and its supporting medium omitted; Fig. 4 is an enlarged vertical sectional view taken longitudinally of the device as herein disclosed; Fig. 5 is an enlarged fragmentary view in section illustrating the twisting and cutting mechanism herein included; Fig. 6 is a rear elevational view of Fig. 5, with a part of the twisting member broken away and the operating means therefor omitted; Fig. 7 is a sectional view taken substantially on the line 7—7 of Fig. 5; Fig. 8 is a sectional view taken substantially on the line 8—8 of Fig. 4; Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 8; Fig. 10 is an enlarged fragmentary sectional view taken longitudinally of a tubular standard, herein embodied, and illustrating in detail certain features of construction; Fig. 11 is a sectional view taken substantially on the line 11—11 of Fig. 10; Fig. 12 is an elevational view, with a part broken away, of the reciprocating needle herein embodied; Fig. 13 is a sectional view taken substantially on the line 13—13 of Fig. 12; Fig. 14 is a fragmentary view in perspective of the attaching extremity of the needle; Fig. 15 is a fragmentary view, partly in top plan and partly in section, illustrating the control of the positively driven means herein embodied

and coacting with the bundle support; Fig. 16 is a sectional view taken substantially on the line 16—16 of Fig. 15, with the base of the machine shown in section; Fig. 17 is a sectional view taken substantially on the line 17—17 of Fig. 4; Fig. 18 is an elevational view of a reel, as herein included; Fig. 19 is an elevational view of the side of the reel opposite to that disclosed in Fig. 18; and Fig. 20 is a sectional view taken substantially on the line 20—20 of Fig. 19.

As disclosed in the accompanying drawings, 1 denotes a hollow base member of any predetermined configuration but herein disclosed as substantially rectangular in form and having projecting upwardly therefrom the transversely alined tubular posts 2 and with which are telescopically engaged the rods 3 having their upper extremities 4 disposed rearwardly at substantially right angles to afford a bundle supporting medium, the freed ends of the portions 4 being tied or connected by the bars 5 whereby it will be perceived that the rods 3 and 4 may be caused to move in unison, in a manner which will hereinafter be more particularly set forth. We also find it of advantage to have the upper extremities of the vertically disposed portions of the rods 3 tied or connected by the bar 6 and in pivotal engagement with the bar 6 at substantially its longitudinal center is the depending link 7 having its lower extremity pivotally engaged with the elongated arm 8 disposed through and pivotally engaged, as at 9, with the tubular standard 10 carried by the base 1 and positioned a predetermined distance rearwardly of the post 2. The outer or free extremity of the arm 8 has operatively engaged therewith a weight 11, for a purpose which is believed to be self-evident. The bars 5 and 6 are tied or connected by the straps 12 disposed in parallelism and having their rear portions 14 disposed vertically and with which the bundle B to be tied is engaged, as is believed to be particularly shown in Fig. 4. The upper extremity of the tubular standard 10 is provided in its forward portion with the elongated longitudinally disposed slot 15 of predetermined length and in which is slidably positioned the block 16 having secured to its opposite faces the plates 17, said plates 17 overlying the adjacent faces of the tubular standard 10 and are provided with the antifriction members 18 whereby it will be perceived that the block 16 is effectively maintained in applied position by the plates 17 and may be reciprocated with a minimum of frictional resistance.

Projecting forwardly from the outer plate 17 and in longitudinal alinement are the engaging members 19 intersecting the path of travel of the inwardly disposed extremities 4 of the post 2 and adapted to contact with the upper face of the bundle B to depress said bundle, for a purpose to be later explained.

Suitably engaged, as at 20, with the inner plate 17 is the flexible member 21 disposed around the pulley 22 operatively supported within the bracket 23 and having secured to its outer extremity the weight member 24 which serves to normally maintain the block 16 at the limit of its upward movement which is determined by the upper extremity of the slot 15. It will be readily perceived that with the block 16 at its limit of upward movement, the weight 11 will maintain the posts 3 at the limit of their upward movement, such position being controlled by the contact of the arms 8 with the forward slot 25 produced in the tubular standard 10 and through which the arm 8 is directed, as is particularly set forth in Fig. 4. Also operatively engaged, as at 26, with the inner plate 17 is a flexible member 27 which is disposed downwardly through the tubular standard 10 and beneath the pulley 28 projecting within the post 10 through a slot 29 and fixed to a shaft section 30 having one extremity rotatably supported within the bearing 31 projecting laterally from the tubular standard 10 while the opposite extremity is telescopically engaged with a shaft section 32 rotatably and slidably supported by the bearing 33 projecting upwardly from the base 1. The adjacent extremities of the shaft sections 30 and 32 are provided with the means 34 whereby said sections may rotate in unison yet permit independent longitudinal movement of the section 32, said movement of the section 32 toward the section 30 being limited by the collar 35 carried by the section 32 and adapted for contact with the bearing 33.

The outer extremity of the shaft section 32 has fixed thereto the disk 36 adapted to be operatively engaged by the friction wheel 37 fixed to the driven shaft 38 adapted to be operatively coupled with a suitable source of power in any desired manner, it being understood that during the operation of our improved machine said shaft 34 is continuously rotating in a predetermined direction.

The disk 36 is provided with a hub 39 provided with an annular groove 40 engaged by the forked extremity 41 of the upstanding arm 42 of the bell lever 43 pivotally engaged, as at 44, within the base member 1 and having its second arm 45 projecting forwardly of the base member 1 a predetermined distance and having its extremity 46 terminating exteriorly of and above the base member 1 and provided with the pedal 47 whereby it will be readily perceived that upon depression of the pedal 47, the disk 36 will be operatively engaged with the wheel 37 resulting in a depression

of the block 16 and a second depression of the rods 3 upon contact of the engaging members 19 with the bundle B. Upon the block 16 reaching the limit of its downward movement under the influence of the wheel 37 and as determined by the lower end of the slot 15, the pressure upon the pedal 47 is slightly released to effect a disengagement between the disk 36 and the wheel 37 and the block 16 is maintained in such position under the influence of the dog 48 pivotally engaged with an adjacent bearing 49 of the shaft 38 and adapted to engage under the influence of the retractable member 50 a suitable notch 51 produced in the periphery of the disk 36 at a predetermined point thereon. It is also to be observed that inward movement to the arm 42 of the bell lever 43 is created under the influence of the retractable member 52 operatively engaged with said arm 42 and with the adjacent bearing 33.

When it is desired to return the block 16 to the limit of its upward movement under the influence of the weight member 24, the pressure on the pedal 47 is entirely removed whereupon the arm 42 of the bell crank lever 43 will engage an extremity of the horizontally disposed bell crank lever 53 and resulting in an inward movement of the opposite extremity of such bell crank lever with which is pivotally engaged the rigid link 54, which in turn is operatively engaged with the dog or pawl 48 whereby it will be perceived that such dog or pawl will be disengaged from the disk 36 and be maintained in such inoperative position until the pedal 47 is again depressed to cause an operative contact between the disk 36 and the friction wheel 37. As herein disclosed, the bell crank lever 53 is pivotally engaged, as at 55, with the upstanding bracket 56 carried by the base 1.

Disposed longitudinally in the upper wall of the base 1 and in alinement with the tubular standard 10 is a slot 57 in which is slidably positioned the plate 58 resting upon the track-ways 59 positioned within the base, as is particularly illustrated in Fig 17, said plate having overlying its marginal portions the strips 60 carried by the upper surface of the base 1, whereby it will be perceived that the plate 58 is effectively maintained in applied position, yet capable of adjustment relative to the standard 10, or more particularly the posts 2. Suitably connected to the plate 58 is the upright 61 of predetermined height and affixed to the upper extremity of the upright 61 in any desired manner is the bearing block 62 having disposed therethrough the shaft 63 projecting beyond the opposite sides thereof, and to the outer extremity of said shaft is affixed the gear 64 in mesh with the annular internal gear 65 carried by the disk 66 loosely and rotatably supported upon the stationary shaft 67 also directed through the bearing block 62 and positioned below and in vertical alinement with the shaft 63. The disk 66 is provided with an operating member 68, herein disclosed as a conventional hand crank, whereby it will be perceived that the desired axial rotation may be imparted to the disk 66 as required, which rotation will result in the axial rotation of the shaft 63 and in practice we find it of advantage to have the ratio between the gears 64 and 65 substantially five to one.

Affixed to the inner extremity of the shaft 63 is the twisting member 69 provided with the oppositely disposed radial slots 70 and 71 extending from substantially the axial center of the member 69 and through which are adapted to be directed the extremities of the strands to be twisted and in order to maintain such strands within the slots, we find it of advantage to have said slots normally intersected at a point adjacent their inner extremities by the spring pressed dogs 72, particularly illustrated in Fig. 6, said dogs or pawls being slidably disposed through the member 69.

The inner extremity of the stationary shaft 67 is provided with the enlargement or head 74 having detachably engaged therewith, as at 75, the vertically disposed cutter member 76 which has its upper extremity positioned intermediate the bearing block 62 and the twisting member 69 and is provided with the cutting edges 73 and 77 whereby it will be perceived that upon initial rotation of the twisting member 69, the strands projected beyond the cutting member 76 will be readily severed.

In the operation of our improved machine, the tying medium W is initially disposed across the bundle support so as to be positioned beneath the bundle B when placed thereon, with the outer extremity of said tying medium, which is preferably a strand of wire of predetermined gage disposed through the slot 71 and secured within the recess or opening 78 produced through the shaft 63 adjacent the cutter 76, said member 76 being provided with an enlarged opening 78[a] through which the shaft 63 projects and which permits the passage therethrough of the tying medium W. The strand W is also disposed through an elongated tubular needle 79 mounted for reciprocatory movement through the tubular standard 10 with the strand W leading from a supply coil mounted upon the reel 80, herein disclosed as rotatably supported by the bracket 81 secured to and projecting rearwardly of the tubular standard 10. The outer extremity of the needle 79 is provided with an anti-friction roller 82 over which the strand W is directed and whereby it will be perceived that upon depres-

sion of the bundle B, the strand W will be free to pass through the needle 79 whereby said tying medium may be caused to surround the bundle B except the top face or surface thereof.

In the present embodiment of our invention, the rear extremity of the needle 79 is pivotally engaged, as at 83, with the endless member 84, herein disclosed as a linked chain, having the upper stretch thereof horizontally disposed, and said chain is directed around the sprockets 85 rotatably supported by the arm 86 projecting rearwardly of the tubular standard 10, with the shaft 87 of the innermost sprocket 85 provided with a drum 88 having operatively engaged therewith a flexible member 89 disposed downwardly and within the base 1 and around the guide pulleys 90 operatively supported within said base, with the extremity of said flexible member 89 secured to the bell lever 91 having its upper or outer arm pivotally engaged, as at 92, intermediate its length with the upstanding bracket 93 carried by the base 1 and with the upper or free extremity of the arm 91 affording a foot treadle 94 whereby it will be readily perceived that upon depressing the treadle 94, the drum 88 will be so rotated as to cause the needle 79 to move forwardly and to carry the strand W across the top or upper surface of the bundle B and to direct said strand through the slot 70.

In order to assure return movement of the needle 79 upon release of pressure upon the foot pedal or treadle 94, we also have operatively engaged with the drum 88 the retractable member 95, herein disclosed as a conventional coil spring, having its opposite extremity suitably secured to the bracket 86 at a predetermined distance in advance of the shaft 87 operating in a manner and for a purpose which is believed to be clearly apparent to those skilled in the art to which our present invention appertains.

The disk 66 is normally held against axial rotation under the influence of the spring pressed latch 96 movable through the disk 66 and adapted to be received within a recess 97 produced in the stationary block 98 secured to the stationary shaft 67, as is particularly illustrated in Figs. 8 and 9, such recess 97, being so positioned as to assure the slot 70 of the cutting member 69 to be maintained normally in a vertical position, for a purpose which is believed to be self-evident.

Depending from the plate 58 is the collar 99 having in threaded engagement therewith the elongated member 100 mounted for axial movement in a side wall of the base 1, as particularly shown in Fig. 4, and held against endwise movement by the collar 101 and operating wheel or member 102. By this arrangement, it will be seen that upon proper rotation of the member 100, the upright 61 may be readily and conveniently adjusted with respect to the posts 2 in order to compensate for bundles of varying widths.

In referring to the bundle B, we do not wish to be understood as limiting ourselves to any particular material, although our machine, as herein disclosed, is particularly adapted for use in connection with lumber products.

While the reel 80 may be of any construction which will operate with convenience and facility, we find it of advantage to have the same include the removable side member 103 and having its axial center intersected by the slot 104 through which the locking pin 105 carried by the supporting shaft 106 for the reel may be readily directed upon requisite adjustment of the side member 103, and in order that this adjustment of the side member may be effected with convenience and facility, we have the extremities of the cross members 107, around which a coil of wire or the like is initially disposed, loosely engaged within the segmental slots 108, the purpose of which being, it is thought, obvious.

In practice, we also find it of advantage to provide means whereby the bundle B is prevented from contacting with the twisting member 69 and, as herein embodied, this is accomplished through the medium of the elongated guide 109 substantially in the form of an inverted U, which is positioned inwardly of the upright 61 and rotatably supported thereby through the medium of the shaft 110 mounted in the bearings 111, said guide terminating above the twisting member 69, as is clearly shown in Figs. 1 to 4 inclusive. Under the influence of the spring 112 the lower extremity of the guide 109 normally intersects the path of travel of the bundle supporting member (see Fig. 1) and is adapted to engage the bundle as said supporting member moves downwardly which is believed to be clearly shown in Fig. 4. As the supporting member moves upwardly with the tied bundle, it will be perceived that the cross member 113 of the guide will engage the twisted extremities of the tying wire and bend said twist downwardly.

It is also our purpose to have the vertical portions 14 adjustable longitudinally of the straps 12 so that the device may be employed with convenience and facility with bundles which may be unusually narrow.

From the foregoing description, it is thought to be obvious that a bundle tying machine constructed in accordance with our invention is of an extremely simple and comparatively inexpensive nature and is particularly well adapted for use by reason of the convenience and facility with which it may be assembled, and it will also be obvious that our invention is susceptible of some

change and modification without material departure from the principles and spirit thereof and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice.

We claim:

1. A bundle tying machine comprising a movable bundle support, means adapted to engage the bundle upon the support for imparting movement to the support in one direction.

2. A bundle tying machine comprising a movable bundle support, a bundle engaging member adapted to engage the bundle upon the support for imparting movement to the support in one direction, positive means for imparting movement to the engaging member toward the bundle support, and means for imparting movement to the engaging member in an opposite direction.

3. In a machine of the character described, a movable bundle support, automatic means coacting therewith for normally maintaining the support at the limit of its movement in one direction, a bundle engaging member movable relative to the support and adapted to engage the bundle thereon for moving the support in an opposite direction, driven means for imparting movement to the engaging member toward the support, and automatic means for imparting movement to the bundle engaging means in an opposite direction.

4. In a machine of the character described, a movable bundle support, automatic means coacting therewith for normally maintaining the support at the limit of its movement in one direction, a bundle engaging member movable relative to the support and adapted to engage the bundle thereon for moving the support in an opposite direction, driven means for imparting movement to the engaging member toward the support, automatic means for imparting movement to the bundle engaging member in an opposite direction, and means for maintaining the bundle engaging member against return movement under the influence of the automatic means.

5. A device of the character described comprising a tubular post, a rod telescopically engaged with said post and provided at its outer extremity with supporting means, a rock lever operatively engaged with the rod, means coacting with the rock lever for automatically imparting movement to the rod in one direction, and a bundle engaging member movable relative to the supporting means of the rod.

6. A machine of the character described comprising a standard, a movable bundle support positioned in advance of the standard, a bundle engaging member slidably engaged with the standard and intersecting the path of travel of the bundle support, a shaft, controllable means for rotating the shaft, a flexible connection between the shaft and the engaging member whereby said bundle engaging member is moved toward the bundle support when the shaft is rotated in one direction, automatic means for imparting movement to the bundle engaging member in an opposite direction, and means detachably engaged with the shaft for holding the bundle engaging member against movement under the influence of the automatic operating means.

7. A machine of the character described comprising a standard, a movable bundle support positioned in advance of the standard, a bundle engaging member slidably engaged with the standard and intersecting the path of travel of the bundle support, a shaft, controllable means for rotating the shaft, a flexible connection between the shaft and the bundle engaging member whereby said bundle engaging member is moved toward the bundle support when the shaft is rotated in one direction, automatic means for imparting movement to the bundle engaging member in an opposite direction, means detachably engaged with the shaft for holding the bundle engaging member against movement under the influence of the automatic operating means, and means operable under the influence of the controllable operating means for the shaft for releasing the shaft from the holding means.

8. A machine of the character described comprising a twisting mechanism, a needle reciprocable relative to the twisting mechanism, a movable bundle support normally positioned below the path of travel of the needle, means for reciprocating the needle, and a bundle engaging means movable relative to the bundle support and intersecting the path of travel of said support.

9. A machine of the character described comprising a twisting mechanism, a needle reciprocable relative to the twisting mechanism, a movable bundle support normally positioned below the path of travel of the needle, means for reciprocating the needle, a bundle engaging means movable relative to the bundle support and intersecting the path of travel of said support, and a cutting member coacting with the twisting mechanism.

10. A machine of the character described including a movable bundle support, a bundle engaging member movable relative to the bundle support and intersecting the path of travel of said support, a twisting mechanism positioned in advance of the bundle support, and a reciprocating needle coacting with the twisting mechanism and traveling in a path intersecting the path of travel of the bundle suppor

11. A machine of the character described including a movable bundle support, a bundle engaging member movable relative to the bundle support and intersecting the path of travel of said support, a twisting mechanism positioned in advance of the bundle support, a reciprocating needle coacting with the twisting mechanism and traveling in a path intersecting the path of travel of the bundle support, and means for adjusting the twisting mechanism toward or from the bundle support.

12. A machine of the character described including a movable bundle support, a bundle engaging member movable relative to the bundle support and intersecting the path of travel of said support, a twisting mechanism positioned in advance of the bundle support, a reciprocating needle coacting with the twisting mechanism and traveling in a path intersecting the path of travel of the bundle support, and a cutting member coacting with the twisting mechanism.

13. A machine of the character described including a movable bundle support, a bundle engaging member movable relative to the bundle support and intersecting the path of travel of said support, a twisting mechanism positioned in advance of the bundle support, a reciprocating needle coacting with the twisting mechanism and traveling in a path intersecting the path of travel of the bundle support, and a cutting member coacting with the twisting mechanism, said cutting member being provided with anchoring means.

14. A machine of the character described comprising a twisting mechanism, a movable bundle support normally positioned below the twisting mechanism, a delivery mechanism coacting with the twisting mechanism, and means adapted to coact with the bundle for preventing said bundle contacting with the twisting mechanism.

15. A machine of the character described comprising a twisting mechanism, a movable bundle support normally positioned below the twisting mechanism, a delivery mechanism coacting with the twisting mechanism, and means adapted to coact with the bundle for preventing said bundle contacting with the twisting mechanism, said last named means comprising a member mounted for rocking movement and having an extremity normally intersecting the path of travel of the bundle support.

16. A machine of the character described comprising a twisting mechanism, a movable bundle support normally positioned below the twisting mechanism, a delivery mechanism coacting with the twisting mechanism, and means adapted to coact with the bundle for preventing said bundle contacting with the twisting mechanism, said means also serving as a bending means for the twist.

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

ABNER BYRON SMITH.
HENRY JAMES GOFF.

Witnesses:
GUY E. EKWALL,
H. M. HARGRAVE.