

(No Model.)

5 Sheets—Sheet 1.

D. L. HILL.
MACHINE FOR MAKING WIRE HANDLES.

No. 554,444.

Patented Feb. 11, 1896.

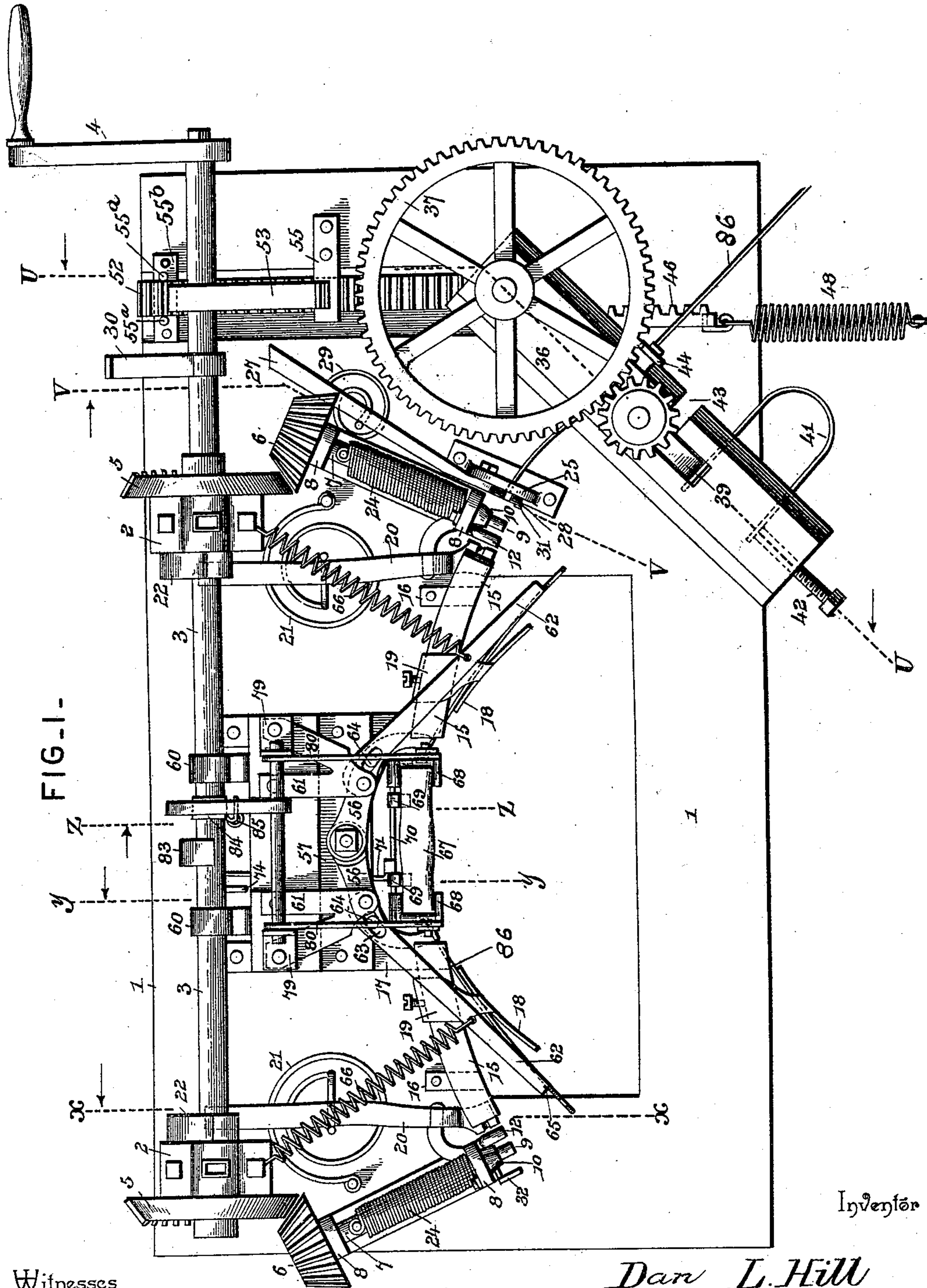


FIG. 1-

Inventor

Witnesses

Jas. K. McLathran
V. B. Hillyard.

By His Attorneys,

Dan L. Hill

C. A. Snow & Co.

(No Model.)

5 Sheets—Sheet 2.

D. L. HILL.
MACHINE FOR MAKING WIRE HANDLES.

No. 554,444.

Patented Feb. 11, 1896.

FIG. 3-

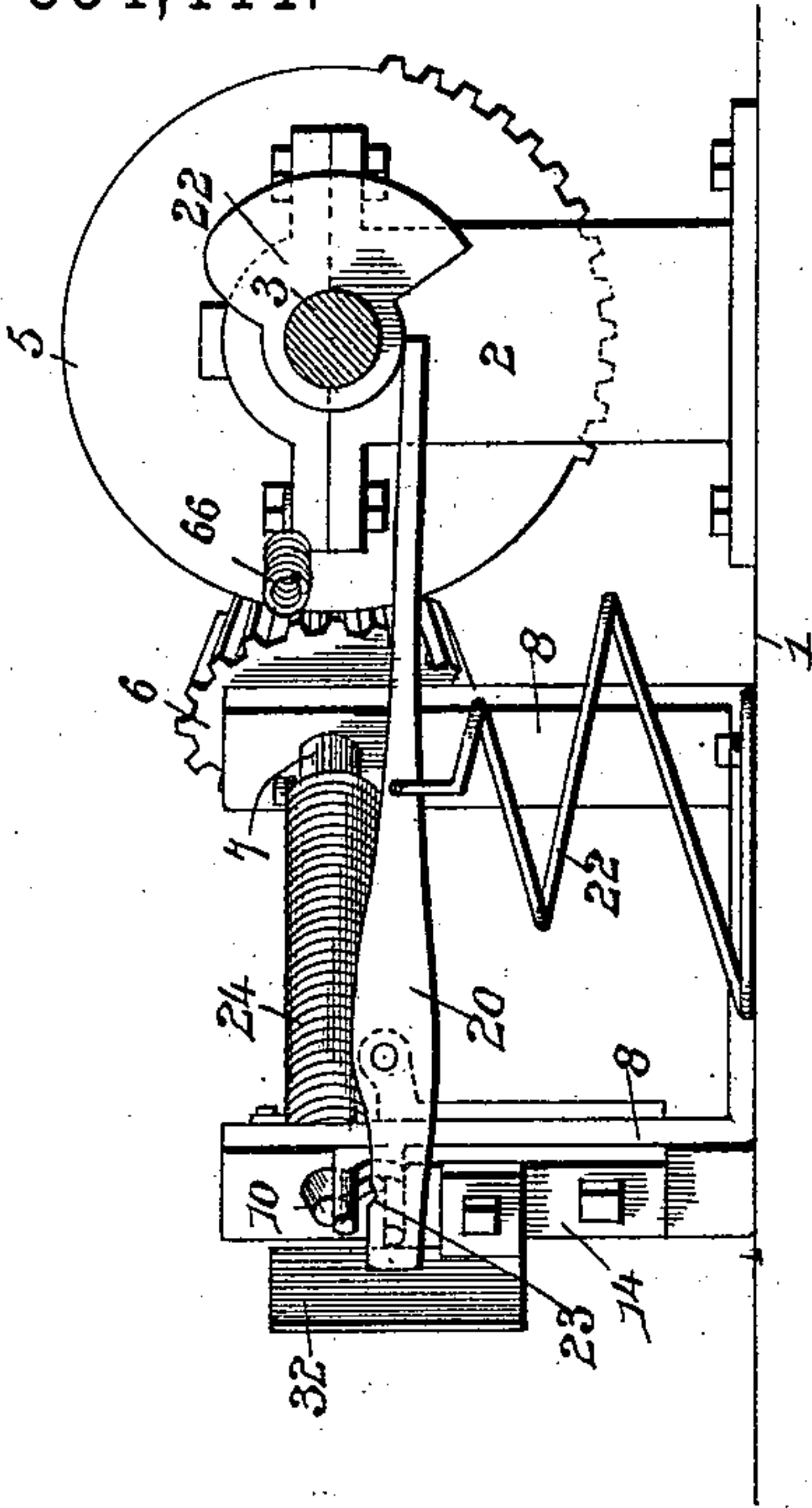


FIG. 2-

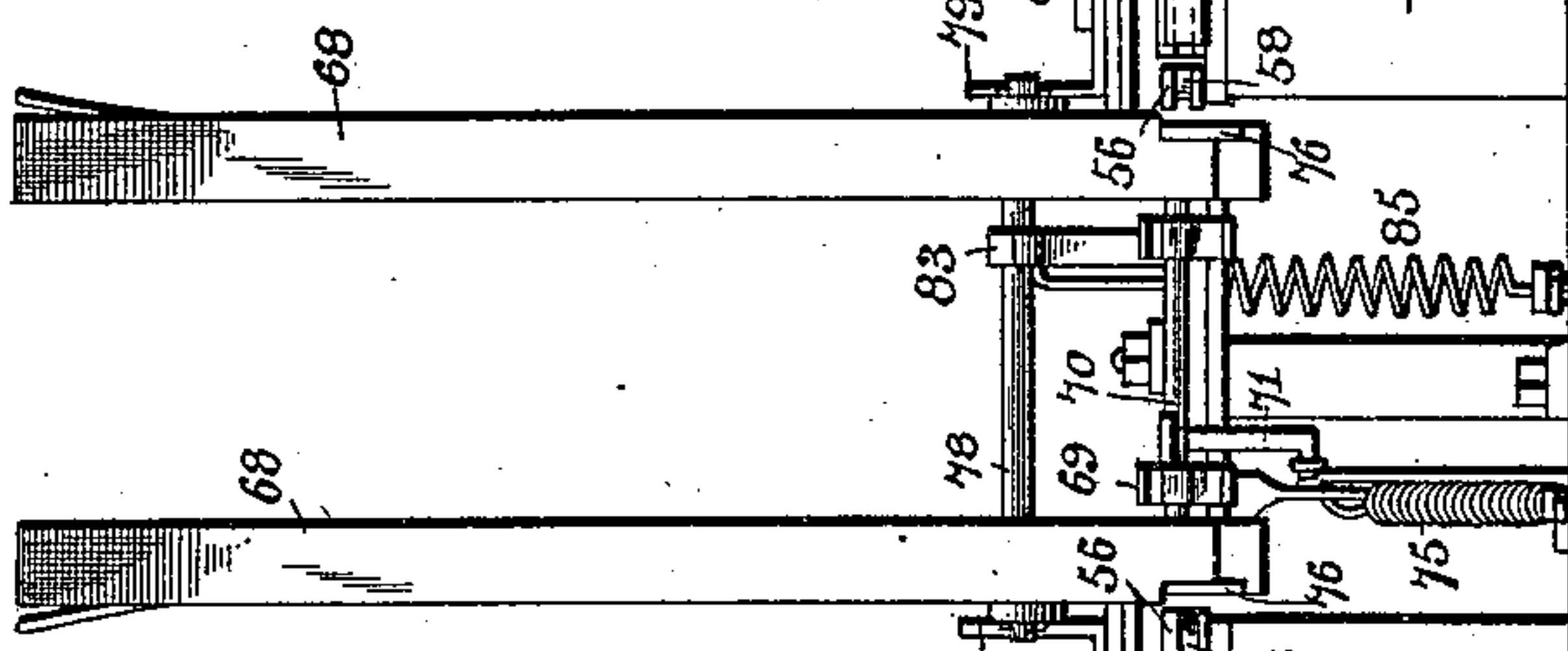
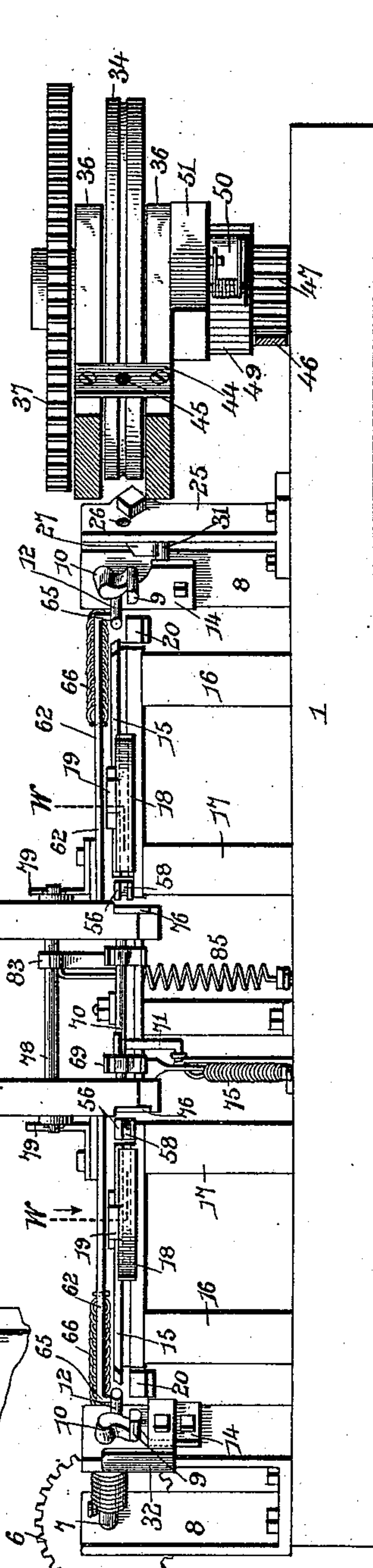
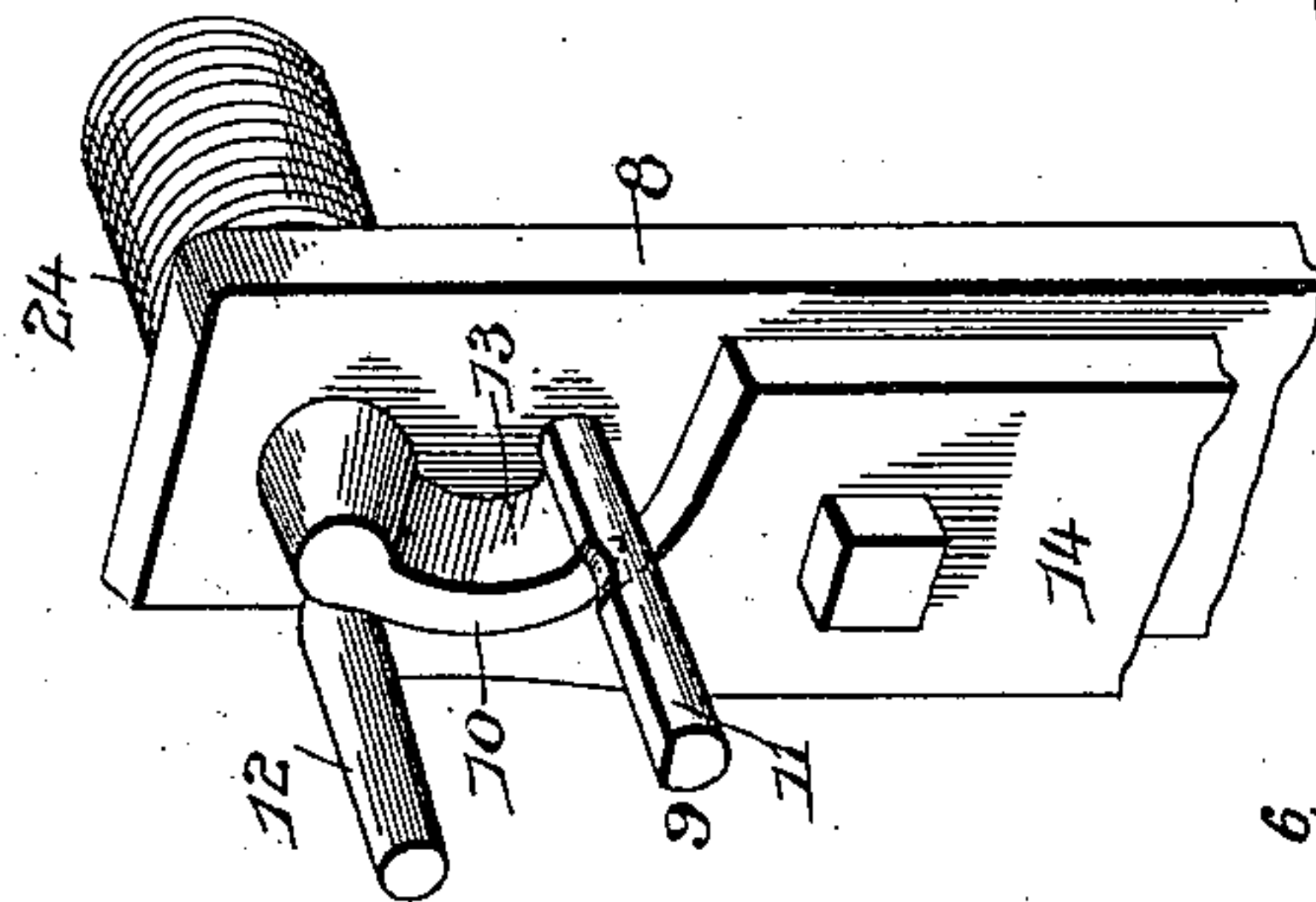


FIG. 1-



Inventor

Witnesses

Jas. L. McLaughlin
V. B. Hillyard

By his Attorneys.

Dan L. Hill.

C. A. Snow & Co.

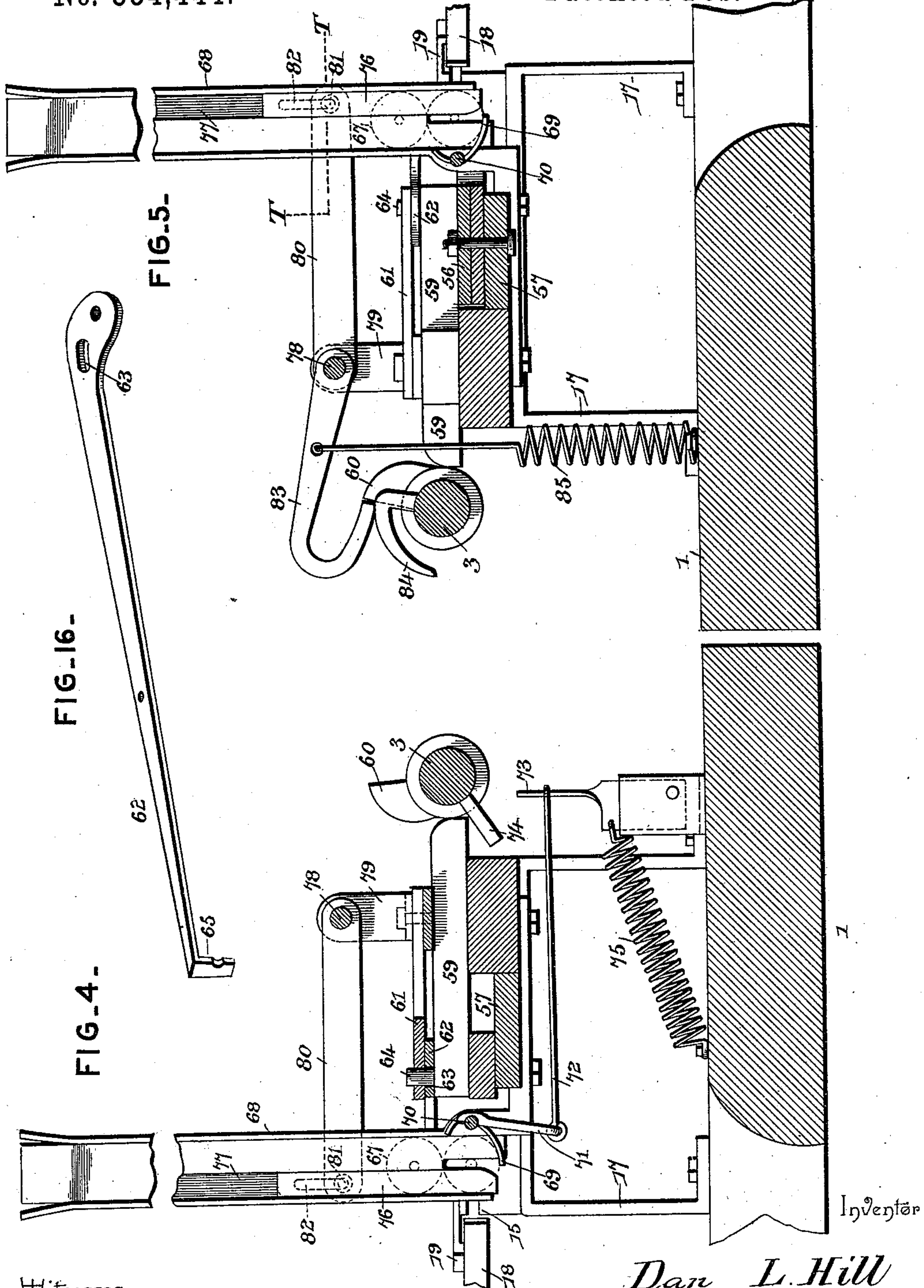
(No Model.)

5 Sheets—Sheet 3.

D. L. HILL.
MACHINE FOR MAKING WIRE HANDLES.

No. 554,444.

Patented Feb. 11, 1896.



Witnesses

Jas. K. McLaughlin
U. B. Hillyard.

By *his* Attorneys.

Dan L. Hill

Chas. Snow & Co.

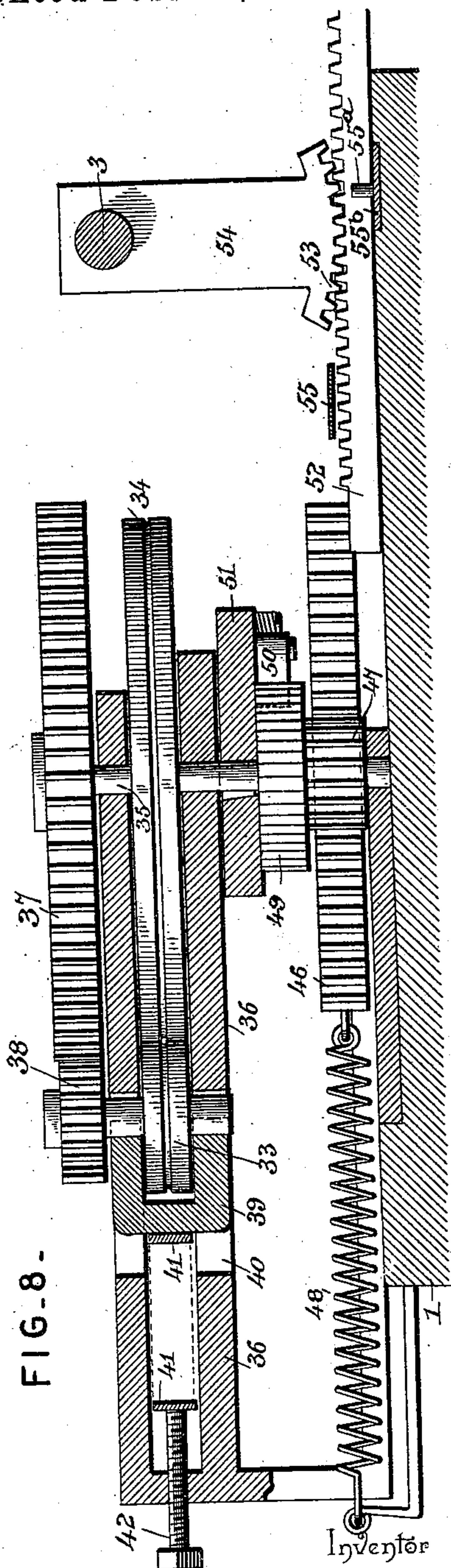
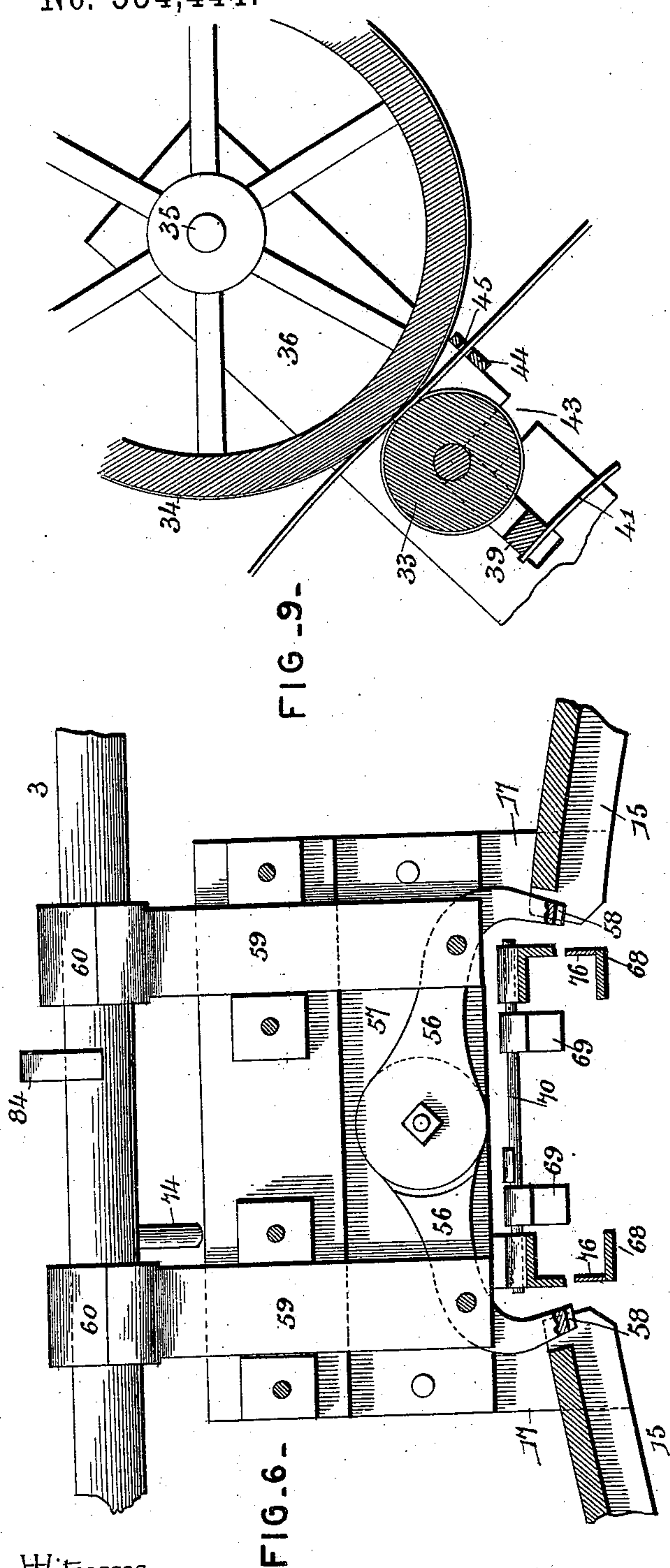
(No Model.)

5 Sheets—Sheet 4

D. L. HILL.
MACHINE FOR MAKING WIRE HANDLES.

No. 554,444.

Patented Feb. 11, 1896.



Witnesses

Jas. K. McLathran
V. B. Hillyard.

By His Attorneys.

Dan L. Hill

C. A. Snow & Co.

(No Model.)

5 Sheets—Sheet 5.

D. L. HILL.
MACHINE FOR MAKING WIRE HANDLES.

No. 554,444.

Patented Feb. 11, 1896.

FIG. 13.

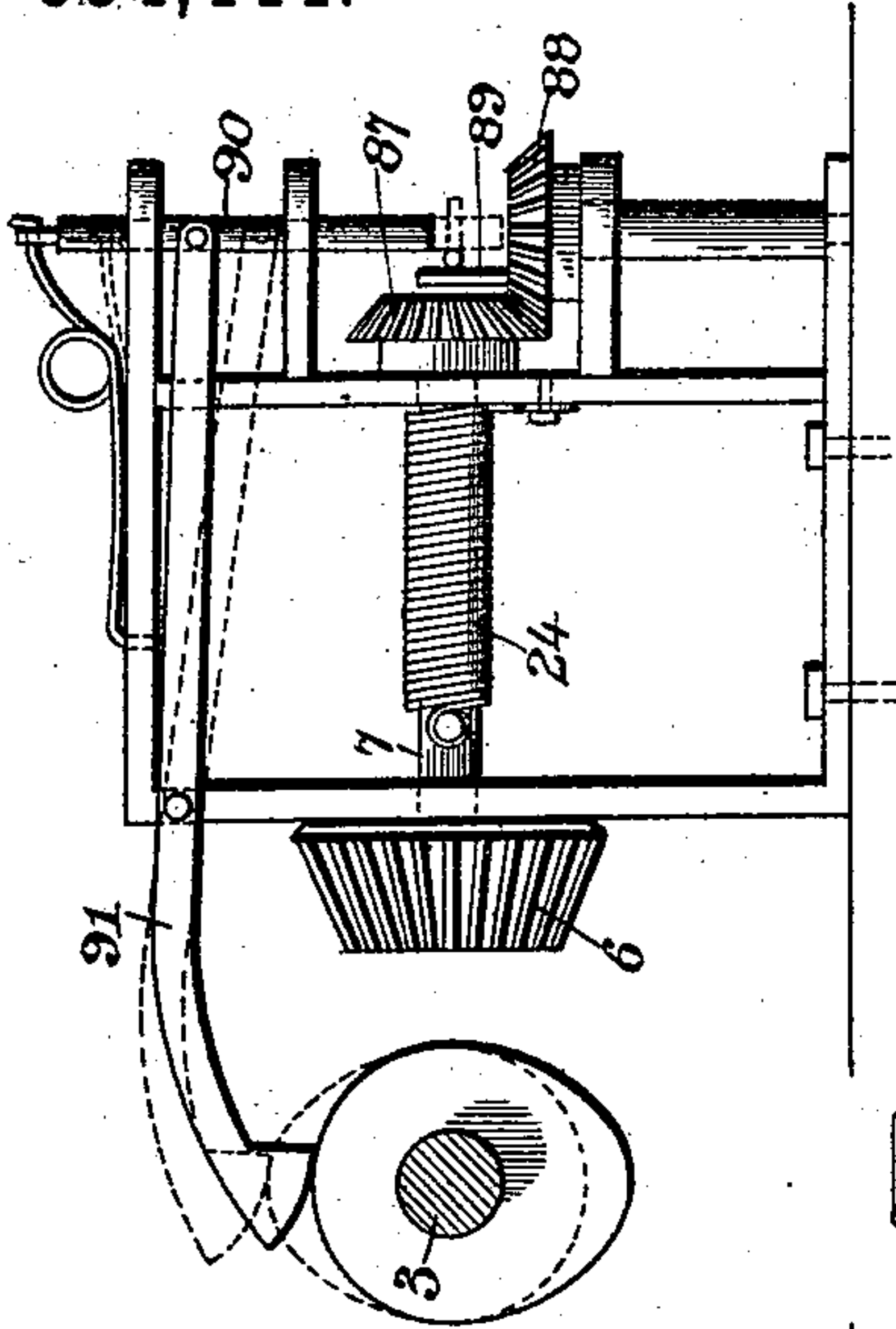


FIG. 14.

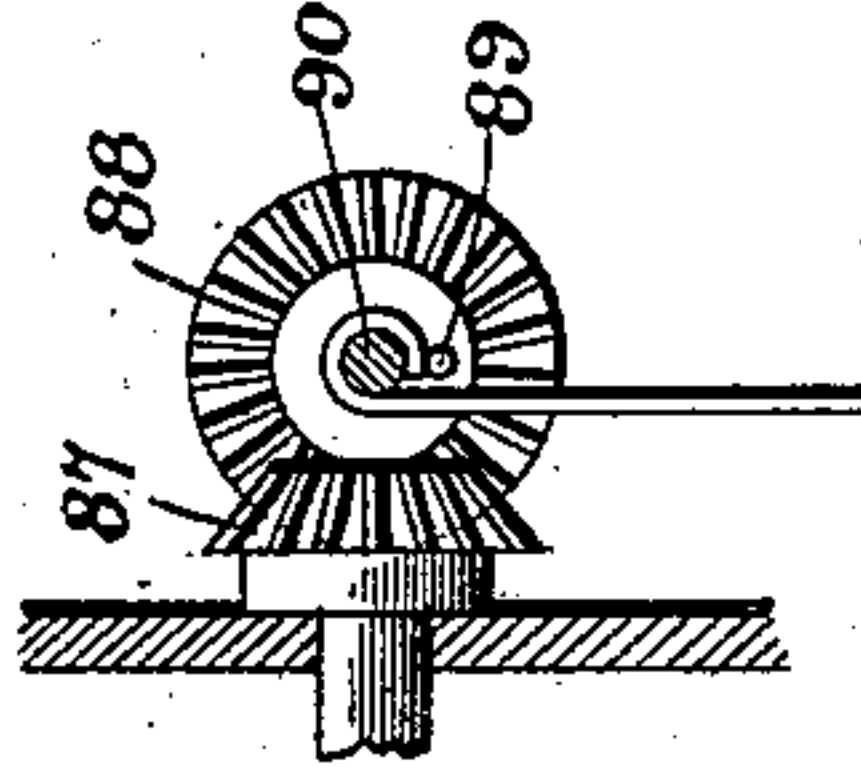


FIG. 15.

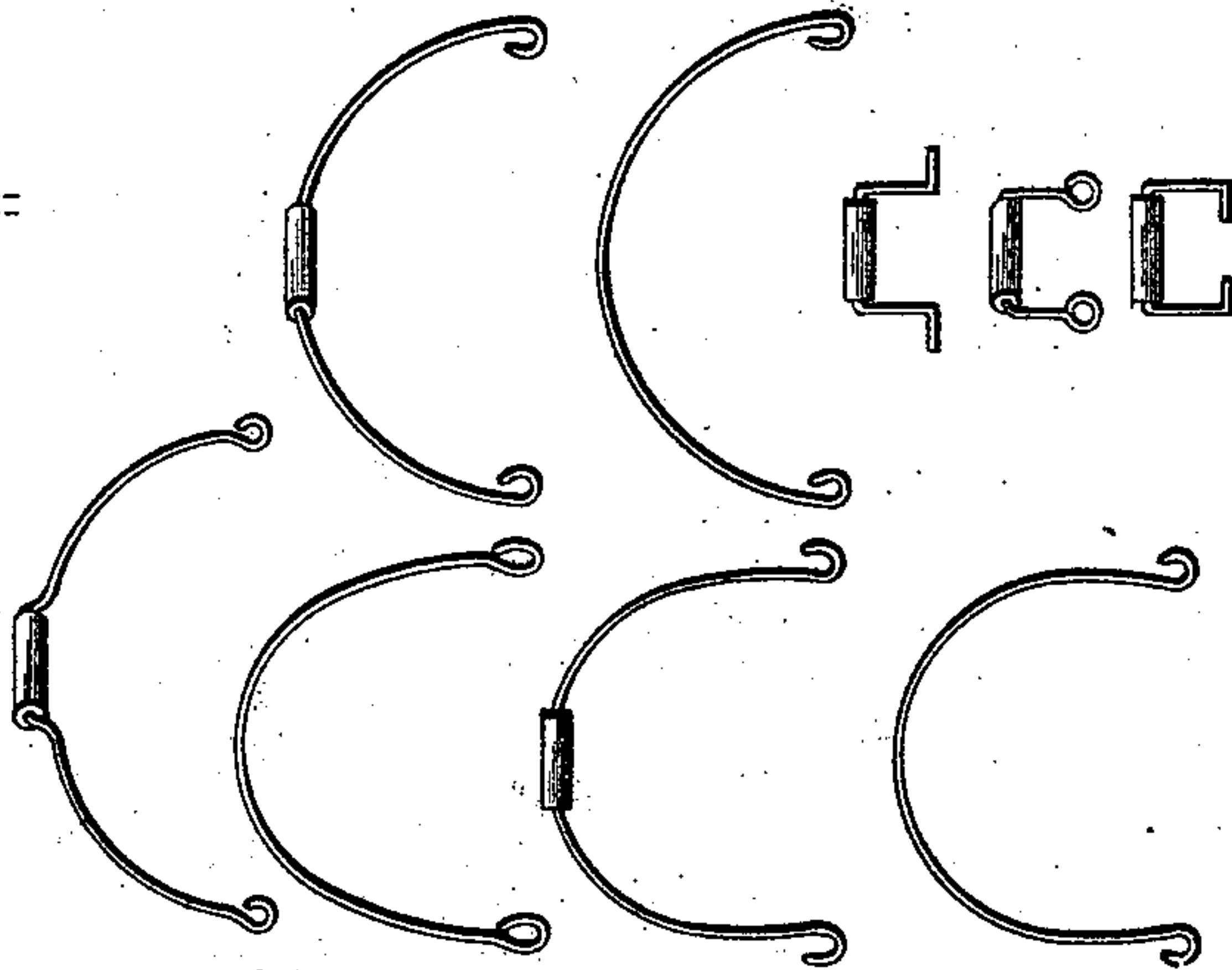


FIG. 12.

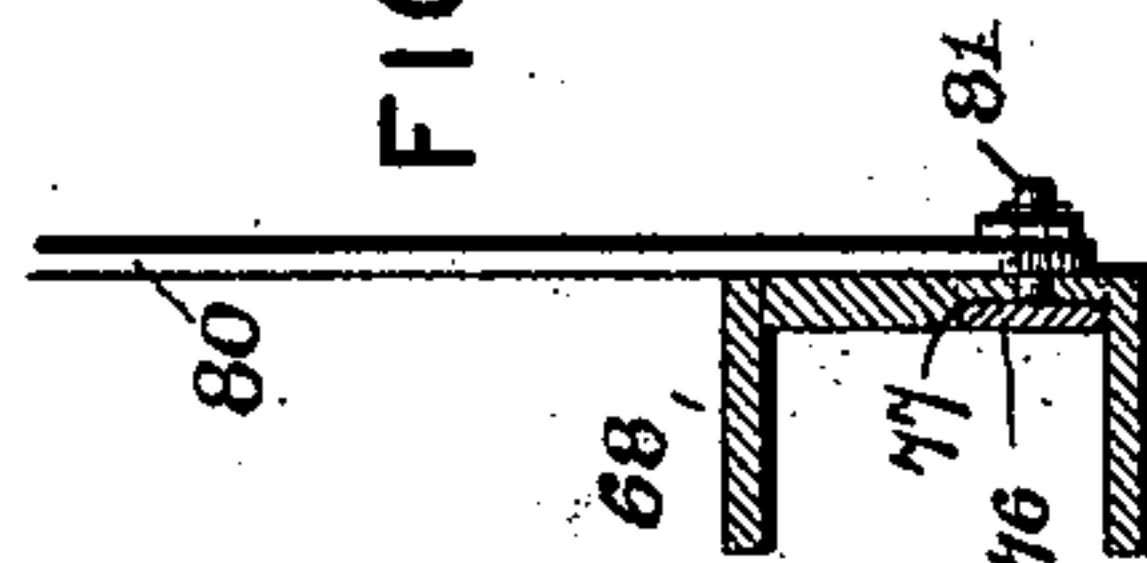


FIG. 7.

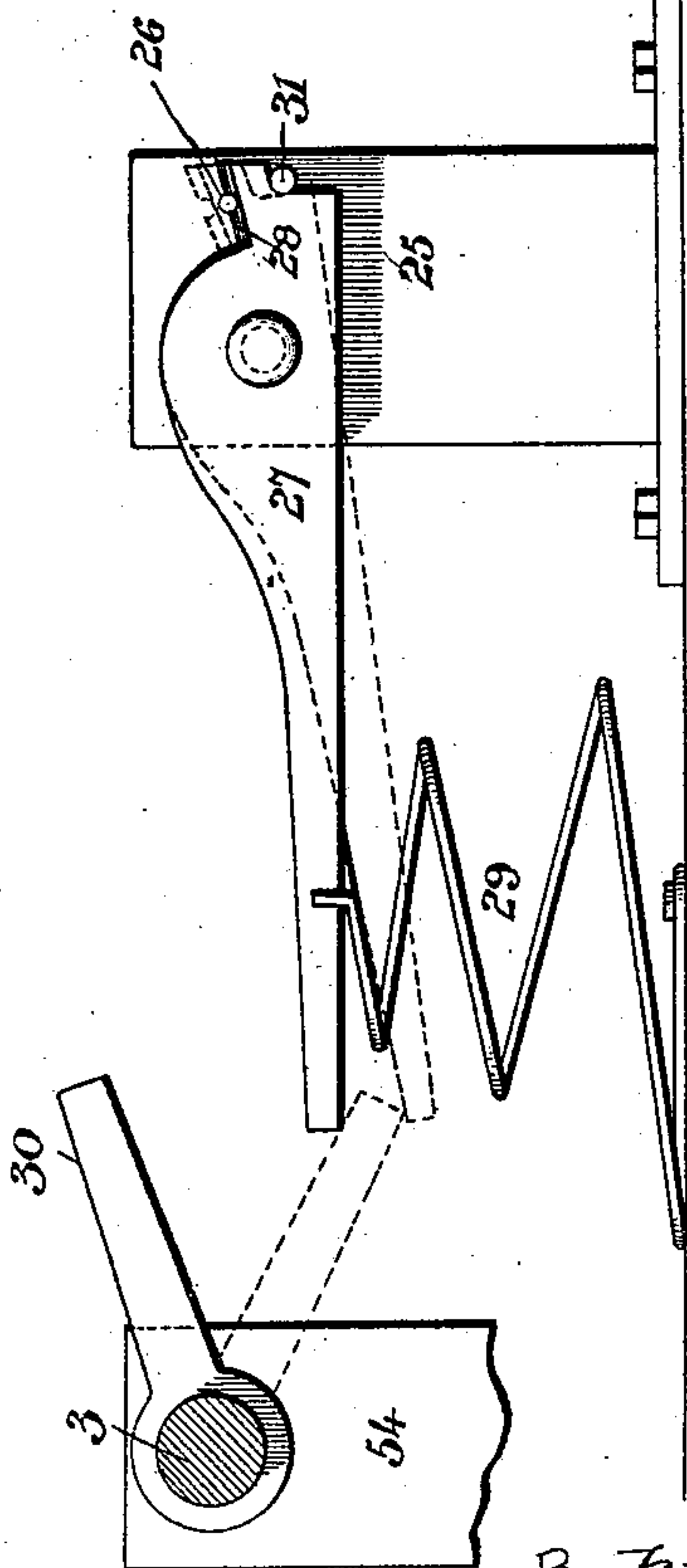
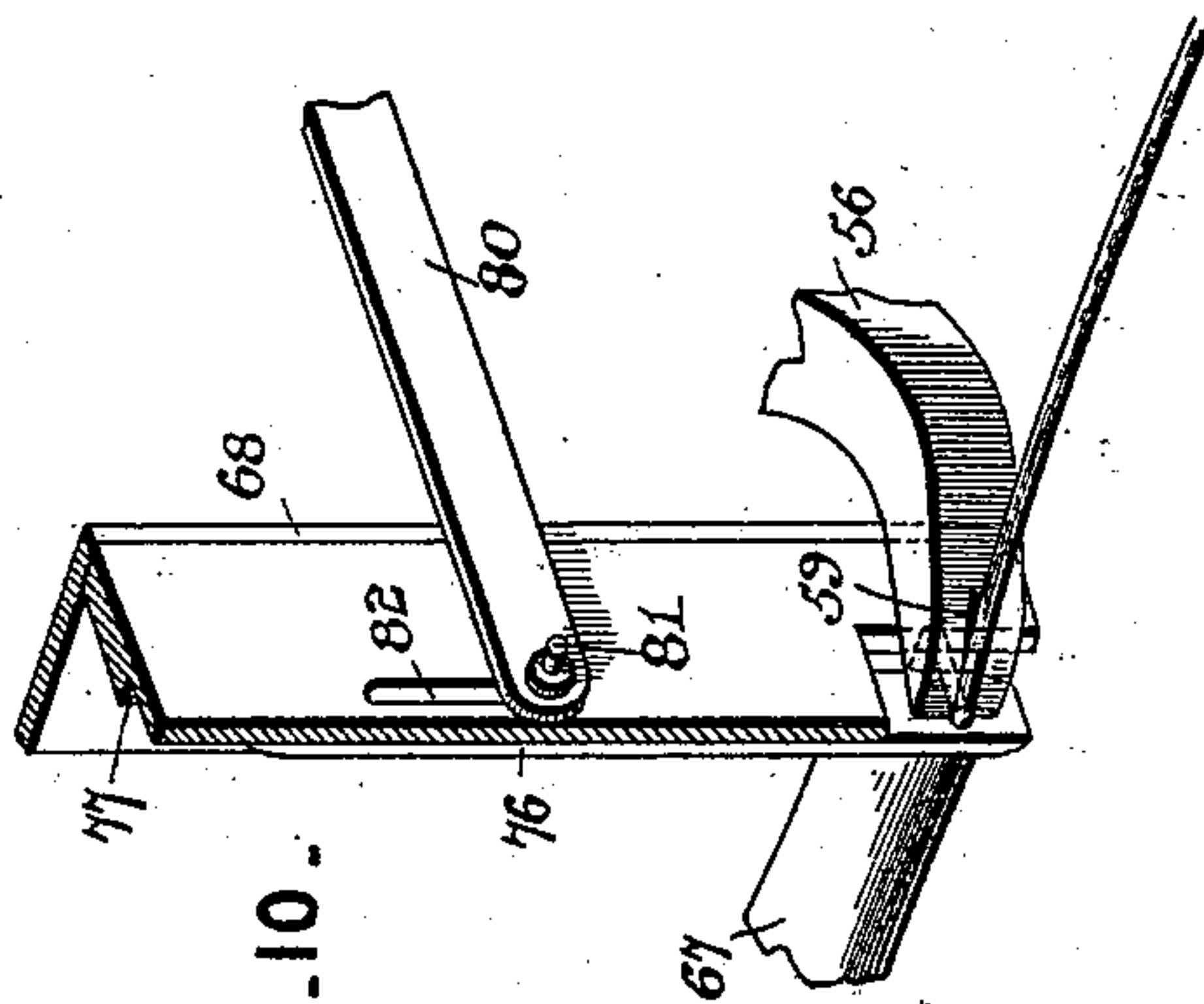


FIG. 10.



Inventor.

Dan L. Hill

By *his* Attorneys.

C. A. Snow & Co.

Witnesses

Jas. E. McLaughlin
V. B. Hillyard.

UNITED STATES PATENT OFFICE.

DAN L. HILL, OF KEENE, NEW HAMPSHIRE.

MACHINE FOR MAKING WIRE HANDLES.

SPECIFICATION forming part of Letters Patent No. 554,444, dated February 11, 1896.

Application filed July 9, 1895. Serial No. 555,394. (No model.)

To all whom it may concern:

Be it known that I, DAN L. HILL, a citizen of the United States, residing at Keene, in the county of Cheshire and State of New Hampshire, have invented a new and useful Machine for Making Wire Handles, of which the following is a specification.

This invention relates to machines for bending wire bails for buckets, pails, tubs, and like packages generally provided with wire handles or bails to facilitate the carrying of the same.

The object of the invention is the provision of a machine which with slight modifications can be adapted for forming a variety of handles and bails and for bending the extremities of the said bails to any required angle or into hooks or eyes, as required, and to suit the means employed for fastening the said bails or handles to the pails or packages for which they are designed.

Further objects and advantages will become apparent on reference to the following description and the accompanying drawings, in which—

Figure 1 is a top plan view of a machine constructed in accordance with and embodying the principles of the present invention. Fig. 2 is a front view thereof. Fig. 3 is a detail section on the line X X of Fig. 1, looking in the direction of the arrow. Fig. 4 is a cross-section on the line Y Y of Fig. 1, showing the instrumentalities for regulating the feed of the wooden handles. Fig. 5 is a section on the line Z Z of Fig. 1, looking in the direction of the arrow, showing a spacer and the spacer-actuating mechanism. Fig. 6 is a plan section of the central portion of the machine on the line W W of Fig. 2. Fig. 7 is a section on the line V V of Fig. 1, looking to the right, showing the cutter and its actuating mechanism. Fig. 8 is a detail view in section, about on the line U U of Fig. 1, of the wire-feeding devices, the gearing being shown in full. Fig. 9 is a detail view of the grooved wire-feeding wheels. Fig. 10 is a detail view showing the co-operation of the wire-crimpers and the spacers. Fig. 11 is a detail view of the wire-coiling mechanism. Fig. 12 is a detail view in section on the line T T of Fig. 5, showing the relative disposition of the spacer to a guide of the hopper. Fig. 13 is a modification of a wire-coiler. Fig. 14 is a de-

tail view thereof. Fig. 15 shows a variety of forms of bails and handles adapted to be formed by a machine constructed in accordance with the present invention. Fig. 16 is a detail view of an arm for bending the wire about the former.

Similar reference-numerals indicate corresponding parts in the various views.

The bed 1 has brackets 2, in which is journaled a shaft 3 adapted to be driven in any convenient manner and from any suitable source of power, and for the sake of simplicity of illustration the said shaft is shown supplied with a crank 4 for the application of manual power to drive the same. Mutilated bevel gear-wheels 5 are secured upon the shaft 3, and the cog-teeth thereof are adapted to mesh with bevel-pinions 6 secured upon the rear ends of shafts 7, which shafts are journaled in brackets 8 made fast to the bed 1. These shafts 7 incline in opposite directions and are formed on their front ends with wire-coilers 9, which will vary accordingly as the ends of the bails or handles are to be simply bent, formed into eyes or fashioned into hooks, and, as shown, these coilers consist of arms 10, extending at right angles to the shafts 7, and outward extensions 11 at the extremities of the arms 10. These extensions 11 project across the path of the end portions of the wire and in the rotation of the shafts 7 bend the end portions of the wire about mandrels 12, and to admit of the end portions of the wire being formed into eyes the outer sides of the arms 10 have recesses 13 which receive the mandrels 12, so as to admit of the extensions 11 moving around the said mandrels so as to form and complete the eyes when it is required to form the latter at the ends of the bails or handles. The mandrels 12 are formed at the upper end of plates 14, which are firmly bolted to the brackets 8.

Guides 15 are supported at their outer ends upon standards 16 and at their inner ends upon brackets 17, and these guides curve slightly in the direction of their length and are open at their front sides for the outward escape of the wire when the latter is bent into the required shape to form the completed bail or handle. Formers 18 are located opposite the inner ends of the guides 15 and are secured to the latter by plates 19, and these formers may have any required shape

to suit the pattern and finish of the completed bail or handle, and, as shown, are curved so as to adapt the machine for the construction of bails for buckets and kindred vessels.

5 Levers 20 are fulcrumed near their front ends to the brackets 8 and normally occupy a horizontal position, being supported upon springs 21, which return the levers to an initial position after being operated upon by
10 cams 22 arranged upon the shaft 3. The frontends of the levers 20 operate in the space between the outer ends of the guides 15 and the mandrels 12 and are intended to grip the end portions of the wire between the man-
15 drels 12, overhanging portions of the guides 15, and the extremities of the said levers 20. To prevent any possible slipping of the wire the levers 20 are formed with depressions 23, in which the wire is seated when gripped
20 during the operation of the wire-coilers.

Coil-springs 24 are mounted upon the shafts 7, and are secured at one end to the said shafts and at their opposite ends to the brackets 8, and these springs serve to return the shafts 7
25 and wire-coilers 9 to a normal position after the bevel-pinions 6 become disengaged from the cog-teeth of the mutilated bevel gear-wheels 5. The arms 10 engage with the upper portion of the plates 14 and limit the back-
30 ward movement of the shafts 7, and maintain the wire-coilers in an initial position.

A wire-cutter (see Figs. 1 and 7) is placed in proximate relation to the outer end of one of the guides 15, and consists of a standard 25
35 having an opening 26 for the passage of the wire and a lever 27 fulcrumed upon the standard 25 and having a cutting-edge 28 to co-operate with the cutting-edge at the inner end of the opening 26, so as to sever the wire. A
40 spring 29 operates upon the lever 27, so as to return the latter to a normal position after being actuated by means of a trip 30 secured upon the shaft 3, and a stop 31, provided on the standard 25, engages with the lever 27 and
45 limits the backward movement thereof and holds it in a normal position against the tension of the spring 29. A stop 32 is located at the outer end of the guide opposite and remote from the wire-cutting mechanism and
50 limits the movement of the wire when the latter is fed into the machine.

The wire-feeding mechanism (see Figs. 1 and 8) comprises grooved wheels 33 and 34, the latter having a diameter about four times
55 the diameter of the smaller grooved wheel 33 and being secured to a vertical shaft 35, which is journaled in a frame 36. A gear-wheel 37 on the upper end of the vertical shaft 35 meshes with a pinion 38 on a journal of the
60 grooved wheel 33, so as to rotate the latter. A yoke 39 operates in a slot 40 in the frame 36, and its ends bear against the journals of the grooved wheel 33, and a U-spring 41 has one end bearing against the yoke 39 and its oppo-
65 site end is engaged by a set-screw 42, by means of which the tension of the spring 41 is regulated, so as to press the grooved wheel 33 with

a greater or less force against the grooved wheel 34. The set-screw 42 operates in a threaded opening at the end of the frame 36, 70 and is adapted to be turned by means of a wrench or other suitable tool, so as to vary the tension of the spring 41 when required. The grooved wheel 33 is removable from the frame 36, and the latter has notches 43 extend- 75 ing inward from its edges to admit of the free passage of the journals of the said grooved wheel 33 when it is required to remove or replace the latter. A plate 44 is secured to the frame 36, and has an opening 45 in the plane 80 of the grooves in the peripheral edges of the wheels 33 and 34, and serves to receive and guide the wire into the passage formed by the grooves in the edges of the said wheels.

A rack-bar 46 meshes with a pinion 47 85 loosely mounted upon the lower end of the vertical shaft 35, and is held and returned to a normal position by means of a spring 48. A ratchet-wheel 49 is formed with or secured to the pinion 47 and turns loosely upon the shaft 90 35, and its teeth are engaged by a spring-actuated pawl 50 carried by a plate 51 secured to the shaft 35, so as to turn with the latter. Hence when the rack-bar 46 is moved rear- 95 wardly it will rotate the pinion 47, ratchet-wheel 49, and cause a corresponding movement of the shaft 35 and its attached parts by means of the pawl 50 and the plate 51, thereby causing a movement of the grooved wheels 33 and 34 and a corresponding feed of the 100 wire. A second rack-bar, 52, is attached to or forms a continuation of the rack-bar 46, and its teeth occur at right angles to the teeth of the rack-bar 46 and are adapted to be en- 105 gaged by the cog-teeth 53 at the outer end of a toothed segment 54 fixed upon the shaft 3, and by means of which the rack-bar 52 is actuated in the operation of the machine. A guard 55 is secured to the bed 1 and extends 110 over the rack-bar 52 and holds the latter down upon the bed and assists in directing it in its reciprocating movement, and pins 55^a are disposed upon opposite sides of the said rack-bar to prevent lateral displacement thereof. The pins 55^a have attachment with a plate 55^b se- 115 cured to the bed 1.

By reason of the ratchet-and-pawl connection the rack-bars 46 and 52 are returned to a normal position under the influence of the spring 48 the instant the toothed segment be- 120 comes disengaged from the rack-bar 52 after actuating the latter to operate the wire-feeding mechanism.

The wire-crimpers 56 are pivotally connected at their inner ends to a plate 57, sup- 125 ported upon the brackets 17, and have their front ends notched or depressed, as shown at 58, and terminating opposite the inner ends of the guides 15, the lower portion of the said guides projecting and having the notched 130 ends 58 of the wire-crimpers operating thereover. Short bars 59 have their front ends pivotally connected with the wire-crimpers 56, and their rear ends are beveled and engaged

by cams 60 secured upon the shaft 3, and these bars 59 are guided in their movements upon the plate 57. Plates 61, extending parallel with the plate 57, are firmly and bracingly attached at their rear ends to the latter, and arms 62 are pivoted at their inner ends to the plates 61 and have elongated openings 63 near their pivotal ends, through which extend pins or studs 64 attached to or forming a part of the short bars 59, and by means of which the said arms 62 are actuated when the short bars 59 are moved forward by engagement therewith of the cams 60. These arms 62 operate over the guides 15, and their outer ends 65 are bent so as to extend across the grooves of the guides 15 and engage with the end portions of the wire forming the bail or handle and remove the latter from the mandrels 12 and from the guides 15 and shape them over the formers 18. Springs 66 are attached to the arms 62 and to the brackets 2 and are designed to return the arms 62 to a normal position and at the same time reset the wire-crimpers 56 and the short bars 59 after the latter are disengaged from the cams 60.

Inasmuch as the machine is designed for wiring wooden handles to be used in connection with the bails, it is necessary to provide a hopper for receiving the said wooden handles 67 in a pile, and this hopper is composed of similar vertical guides 68 which extend in parallel relation and are closed in on three of their sides, the open sides facing and being adapted to receive the end portions of the handles. In order to facilitate the introduction of the handles into the hopper the upper extremities of the guides flare. Retainers 69 are located at the lower end of the hopper to support the pile of wooden handles and prevent the latter from dropping therefrom, and these retainers are shaped like a pallet and their nibs operate across the path of the handles and admit of the latter being fed one at a time into proper position for the passage of the wire therethrough in the formation of the bail. These retainers are secured to a shaft 70, which is mounted at its ends in the guides 68. An arm 71 projects from the shaft 70 and is connected by means of a rod 72 with a lever 73 near the rear end or side of the bed, and which has its upper end extending within the path of a trip 74 on the shaft 3 so as to be engaged thereby at the proper time for actuating the shaft 70 to control the feed of the handles 67. A spring 75 operates upon the lever 73 and holds the latter in such a position that the lower nibs of the retainers 69 will extend beneath the lowermost handles and support the pile. The spacers 76, for preventing the crimping of the handle or bail close against the ends of the wooden handles, are thin bars which are adapted to reciprocate in grooves 77 formed vertically in one side of the outer walls of the guides 68, and these spacers are tapered slightly at their upper ends to prevent interference with the handles 67 in the vertical movements thereof. The lower edge por-

tions of the spacers are cut away on a curved line so as to facilitate the crowding of the wire beneath the shoulder formed by cutting away the lower portion of the guides 68. A shaft 78 is journaled in brackets 79, rising vertically from the rear ends of the plates 61, and arms 80 extend forwardly from the shaft 78 and engage with projections 81 of the spacers 76, so as to operate the latter. These projections 81 work in slots 82, formed in the outer sides of the guides 68, and limit the movements of the spacers 76. An arm 83 extends rearwardly from the shaft 78 and is adapted to be engaged by a cam 84 on the shaft 3, which cam is so disposed as to actuate the arm 83 and move the spacers 76 across the ends of the handles 67 prior to the operation of the wire-crimpers 56, thereby preventing the crimping of the wire into the end of the handle. A spring 85 is attached to the arm 83 and is intended to return the latter to a normal position when disengaged from the cam 84.

When it is required to form handles and bails and supply the same with wooden handles 67, the latter are fed by hand into the hopper, and the wire for forming the bails or handles is supplied to the grooved wheels 33 and 34 and fed by them to the guides 15, the stop 32 limiting the feed of the wire after a proper length has been fed to the machine. The lowermost wooden handle 67 will occupy such a relative position that the wire 86 will pass through the longitudinal opening thereof. After a proper length of wire has been fed to the machine the wire-feeding mechanism will be thrown out of gear and the cutter will come into play and sever the wire to form the bail or handle from the main portion. Immediately after the action of the cutter the wire-coilers will be actuated and bend the extremities of the wire into the required form. The spacers will be projected across the ends of the lowermost handle 67, and the wire-crimpers will operate and crimp the wire at the ends of the handle. When the crimping is effected the arms 62 will move and shape the end portions of the wire around the formers 18, and an instant later the retainers will move so as to release the completed bail or handle, when the machine is in position for a repetition of the operation just described.

In the modification shown in Fig. 13 the inner end of the shaft 7 will be provided with a pinion 87, which meshes with a corresponding pinion 88 on a vertical shaft, and a pin or stud 89 is eccentrically disposed upon the pinion 88 and is designed to engage with the extremity of the wire forming the handle or bail and bend the same in the form of a hook about the vertically-reciprocating mandrel 90, which is actuated from a suitably-disposed cam on the shaft 3 by means of the lever 91. This is only one of a variety of modifications within the scope of the invention, and by means of which the machine is adapted for forming any one of the variety of bails or handles illustrated in Fig. 15. Therefore it is to be un-

derstood that in the embodiment of the invention various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. A machine for forming wire bails or handles, comprising oppositely-disposed guides, formers placed opposite to the guides, a wire-feeding mechanism for supplying the wire in proper lengths to the guides, a cutting mechanism for severing the wire, wire-coilers at the outer ends of the guides for giving the required shape to the extremities of the wire forming the bail or handle, and arms for removing the end portions of the wire from the guides and shaping the same about the said formers, substantially as set forth for the purpose described.

2. In a machine for forming wire bails and handles, the combination of a hopper, wire-receiving guides placed upon opposite sides of the hopper, and wire-crimpers operating in the space between the inner ends of the guides and the opposing sides of the hopper for crimping the wire at the ends of the wooden handle, substantially as set forth for the purpose described.

3. In a machine for forming wire bails and handles, the combination of oppositely-disposed guides, mandrels disposed in proximate relation to the outer extremities of the said guides, levers independent of and co-operating with the mandrels and the said guides to grip the end portions of the wire, and wire-coilers for bending the extremities of the wire about the mandrels, substantially as set forth for the purpose described.

4. In a machine for forming wire bails and handles, the combination of oppositely-disposed guides having their upper portions overhanging or projecting at their outer ends, mandrels arranged in proximate relation to the projecting end portions of the guides, levers for gripping the ends of the wire between the mandrels and the projecting portions of the guides, and wire-coilers for bending the extremities of the wire about the mandrels, substantially as set forth.

5. In a machine for forming wire bails and handles, the combination of oppositely-disposed guides, formers placed opposite the open sides of the said guides, wire-coilers at the outer ends of the guides, and arms having their end portions operating in the space between the wire-coilers and the outer ends of the guides and extending across the path of the wire to engage with the latter and bend it about the said formers, substantially as set forth.

6. In a machine for forming wire bails and handles, the combination with the hopper for receiving the wooden handles, and wire-crimpers, of spacers adapted to be projected across the ends of the wooden handles and

receive the thrust of the crimpers during the operation of crimping the wire at the ends of the handles, substantially as set forth.

7. In a machine for forming wire bails and handles, the combination with the hopper, and wire-crimpers, of spacers adapted to work in vertical grooves formed in the outer walls of the hopper and having outwardly-extending projections working in slots in the sides of the hopper, and arms engaging with the said projections for operating the spacers simultaneously, substantially as set forth.

8. In a machine for forming wire bails and handles, the combination with the hopper for receiving a pile of wooden handles, of a rocking retainer having nibs for supporting the handles within the hopper and adapted to feed one at a time into proper position, and actuating mechanism for oscillating the said retainer, substantially as set forth for the purpose described.

9. In a machine for forming wire bails and handles, the combination with the hopper, of a shaft located at the lower end of the hopper, pallet-shaped retainers carried by the said shaft, and actuating mechanism for rocking the shaft in its bearings, whereby the handles are fed one at a time, substantially as set forth for the purpose described.

10. In a machine for forming wire bails and handles, the combination of grooved wheels, a shaft supporting one of the grooved wheels, a connected ratchet-wheel and pinion loosely mounted upon the said shaft, a spring-actuated ratchet-bar meshing with the pinion, and a spring-actuated pawl operatively connected with the said shaft and adapted to engage with the said ratchet-wheel, substantially as set forth for the purpose described.

11. A machine for forming wire bails and handles, the same comprising a hopper, guides disposed upon opposite sides of the hopper, formers placed opposite the open sides of the said guides, wire-coilers at the outer ends of the guides, levers disposed to grip the end portions of the wire during the operation of the wire-coilers, a wire-cutter disposed in proximate relation to one of the wire-coilers, a wire-feeding mechanism in proximate relation to the said cutter, retainers for supporting the pile of wooden handles in the hopper and releasing and feeding the same one at a time, spacers at the lower end of the hopper, wire-crimpers for crimping the wire at the ends of the wooden handles, and arms having their end portions extending across the path of the wire to remove the latter from the said guides and shape it about the said formers, substantially in the manner set forth for the purpose described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DAN L. HILL.

Witnesses:

L. W. HOLMES,
E. G. B. HILL.