

(No Model)

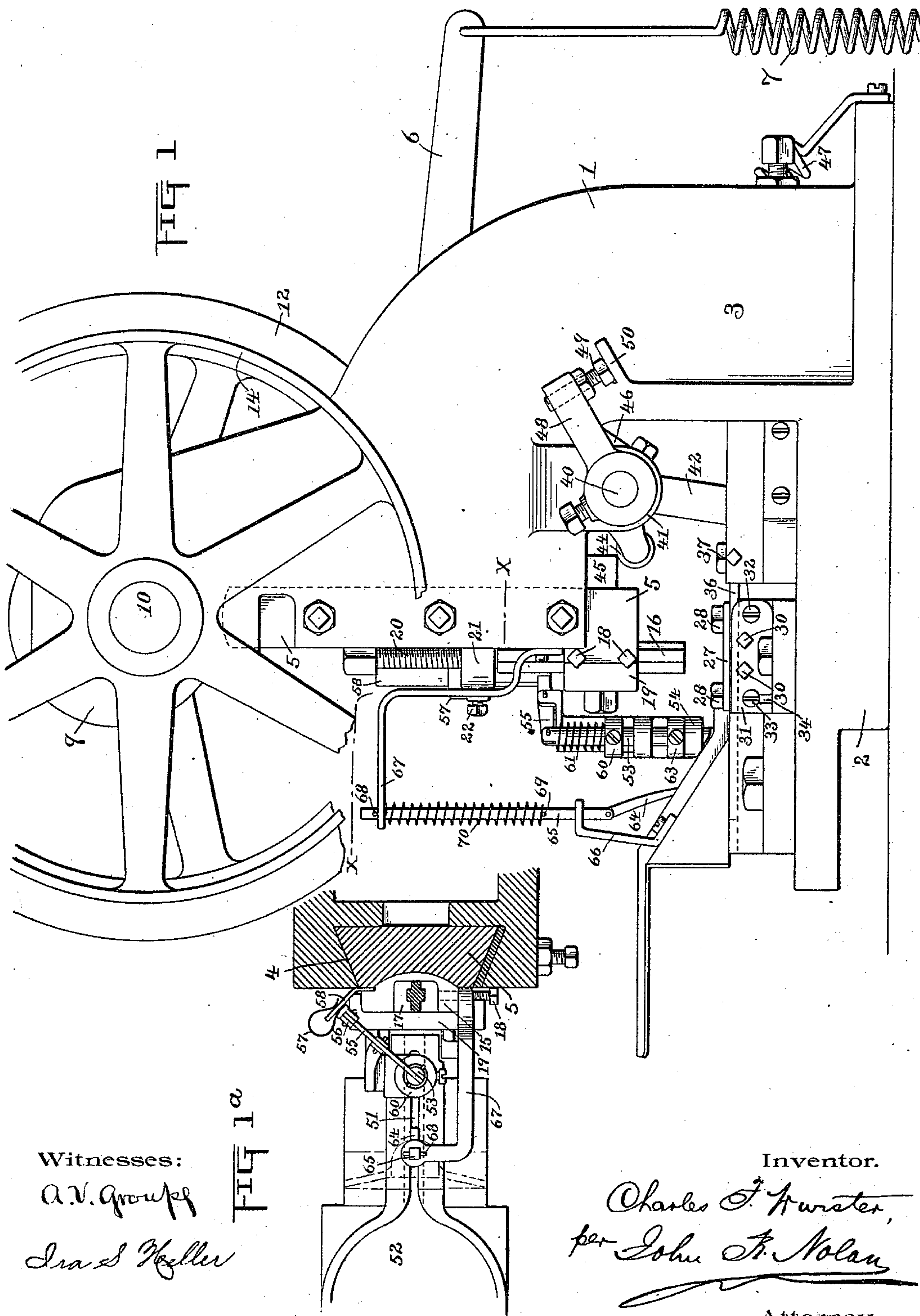
4 Sheets—Sheet 1.

C. F. WURSTER.

MACHINE FOR FORMING CONNECTIONS FOR UMBRELLA RIBS.

No. 553,603.

Patented Jan. 28, 1896.



Witnesses:

A. V. Group

Ira S. Keller

Inventor.

Charles F. Wurster,  
per John F. Nolan

Attorney.

(No Model.)

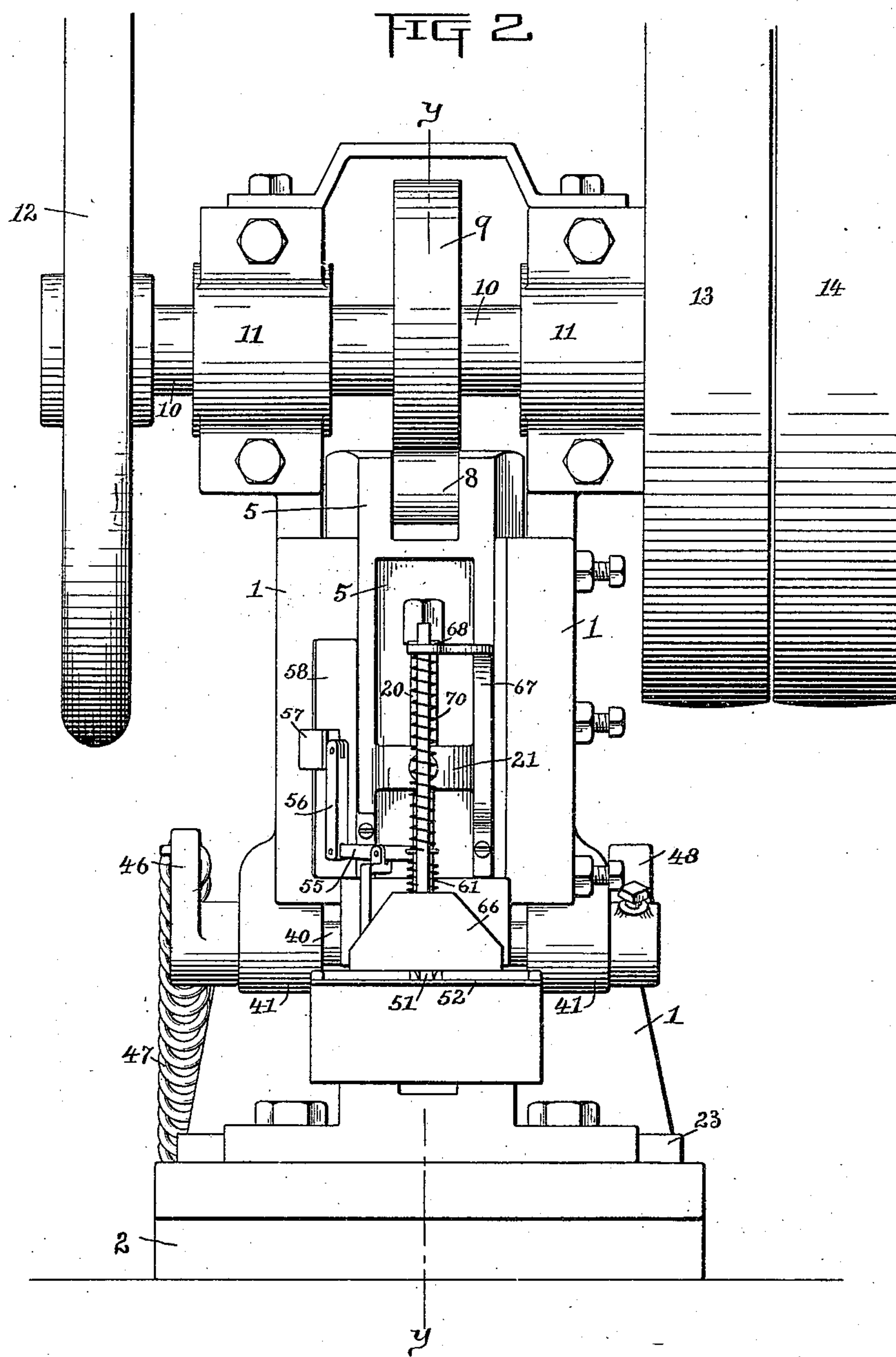
4 Sheets—Sheet 2.

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(No Model.)

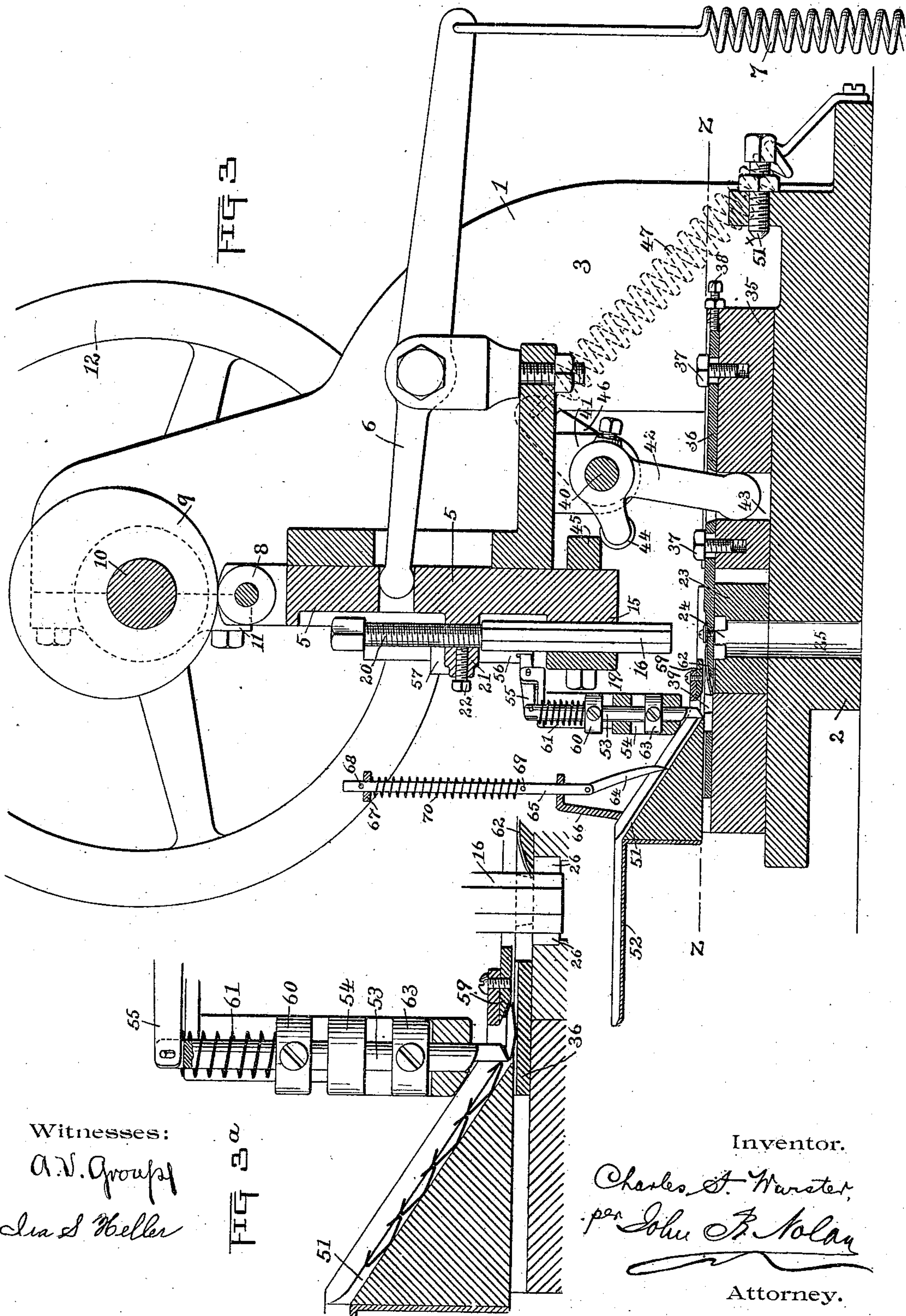
4 Sheets—Sheet 3

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Witnesses:

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FIG 3a

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FIG 4

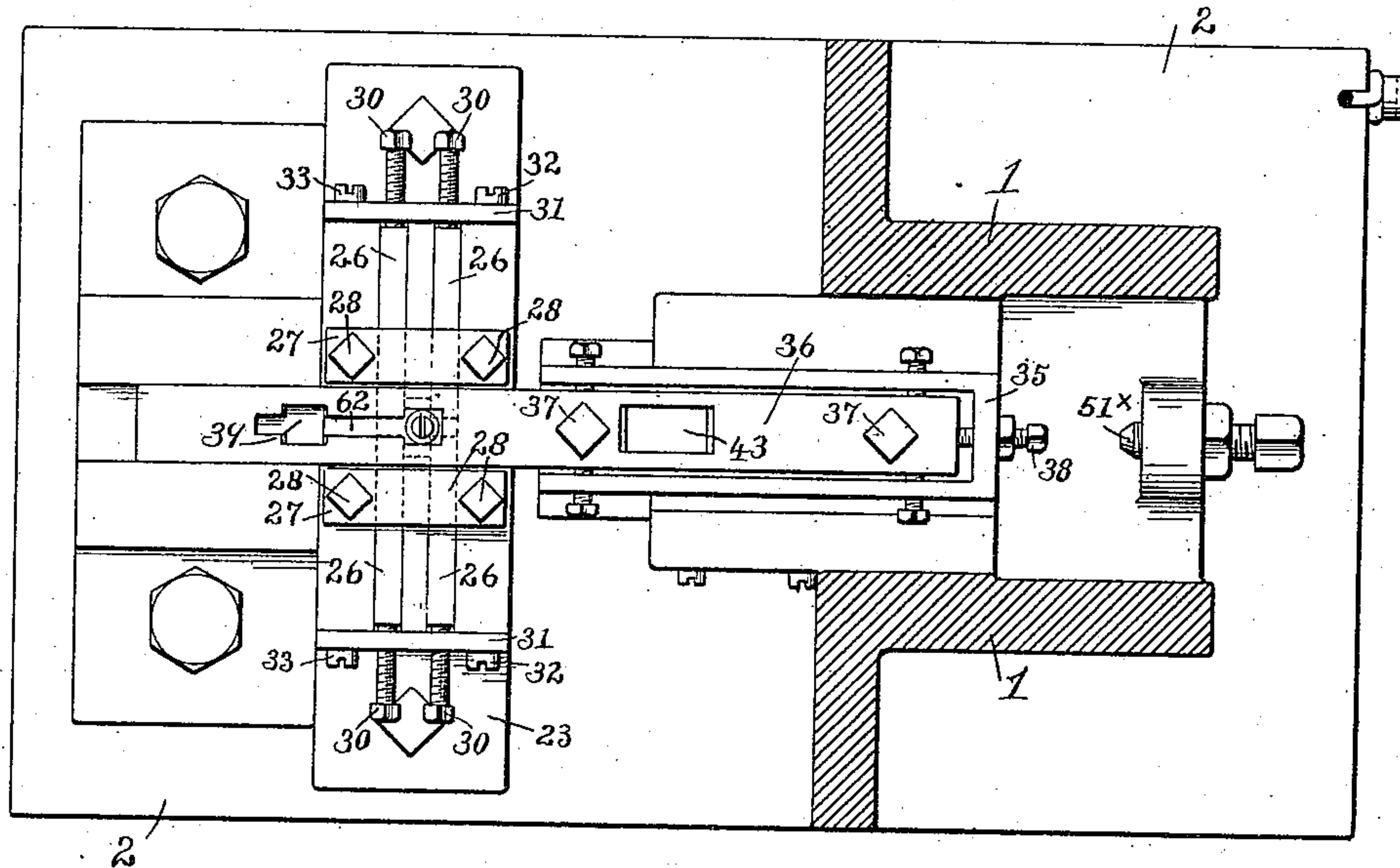


FIG 5

FIG 6

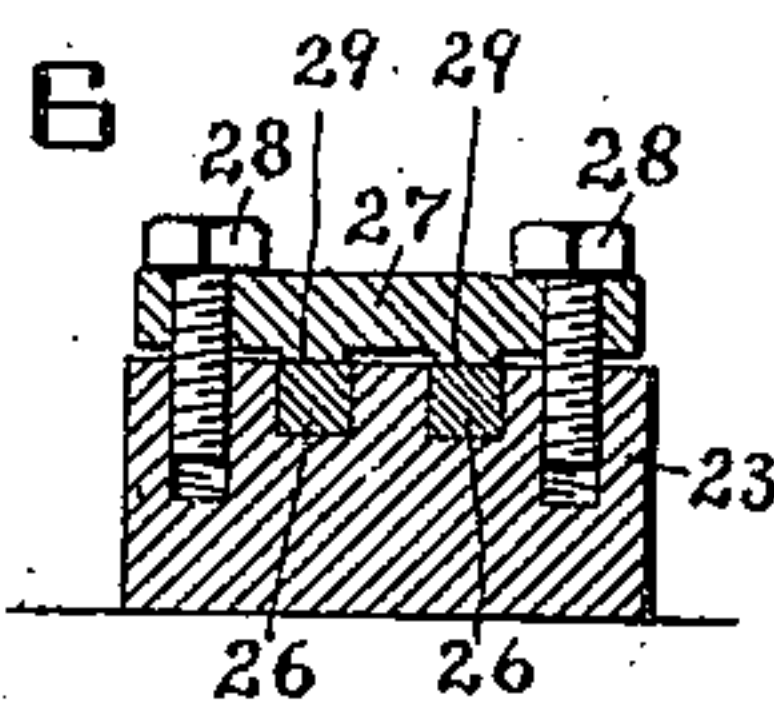


FIG 11

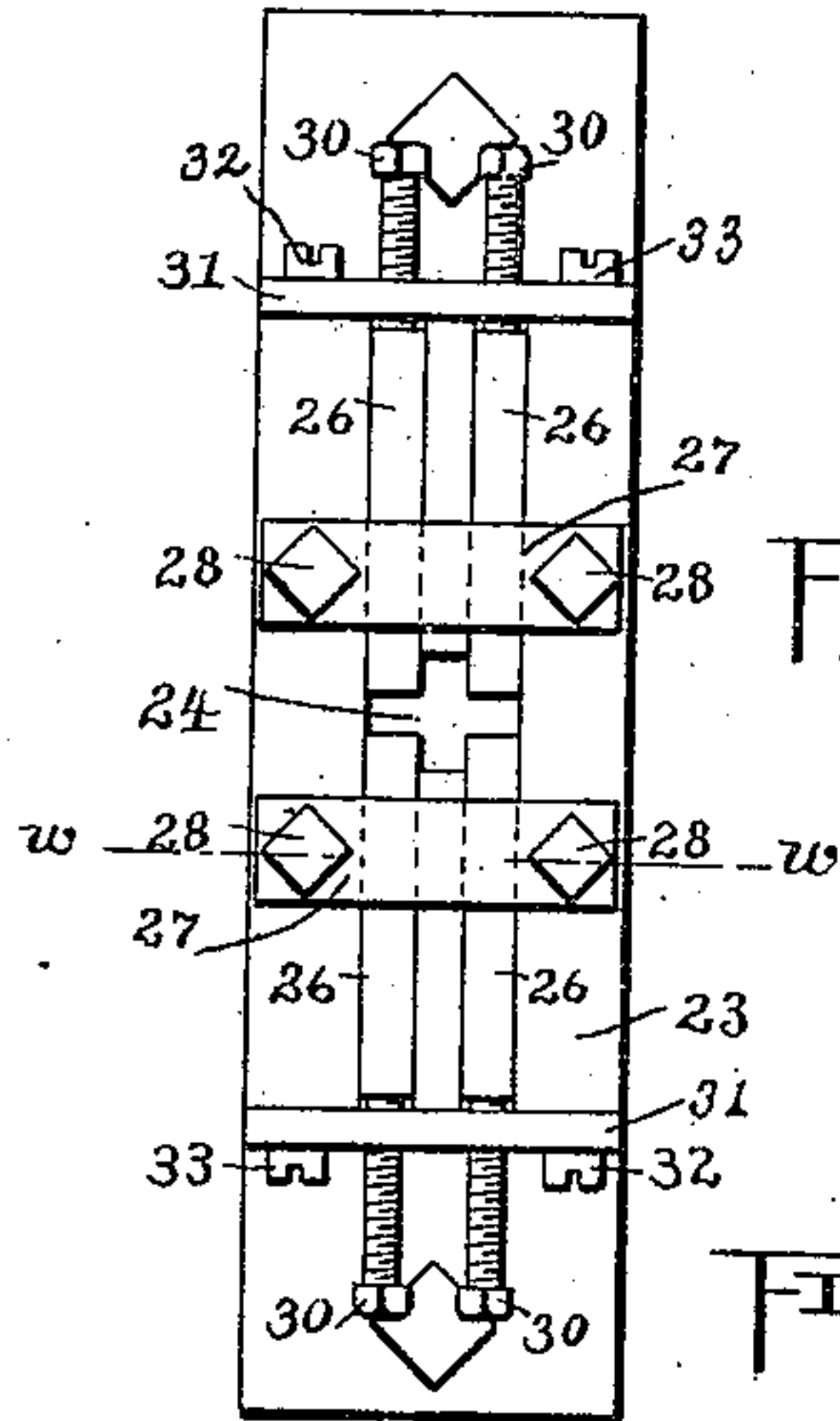
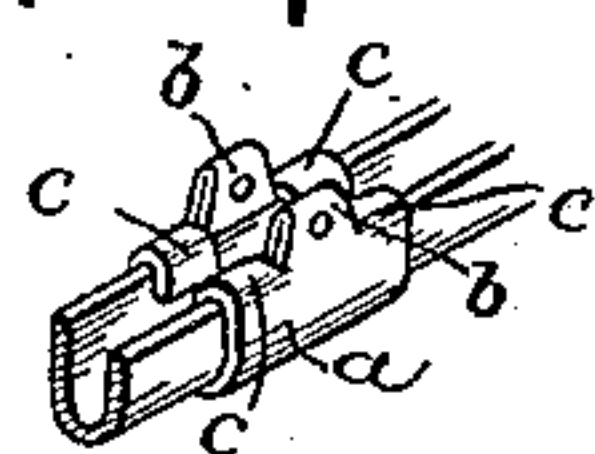


FIG 7

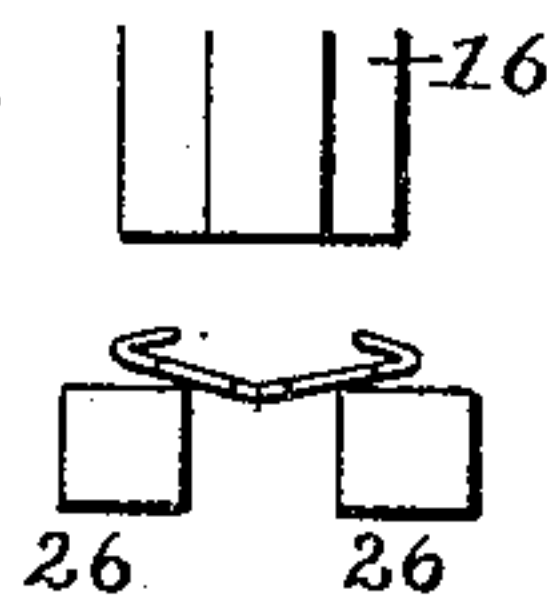


FIG 8

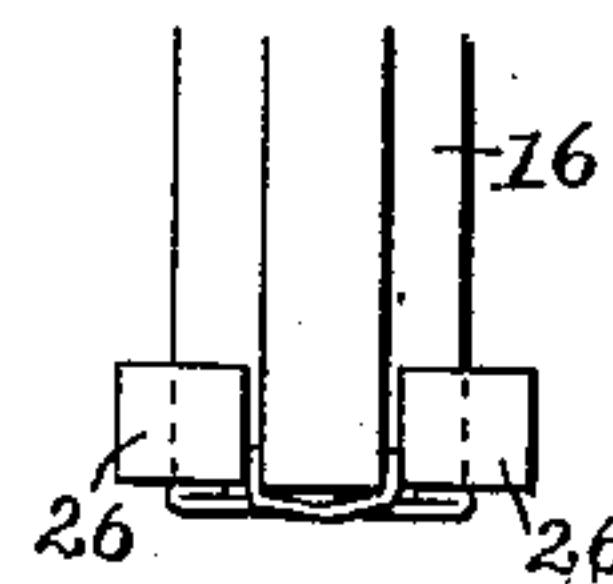


FIG 9

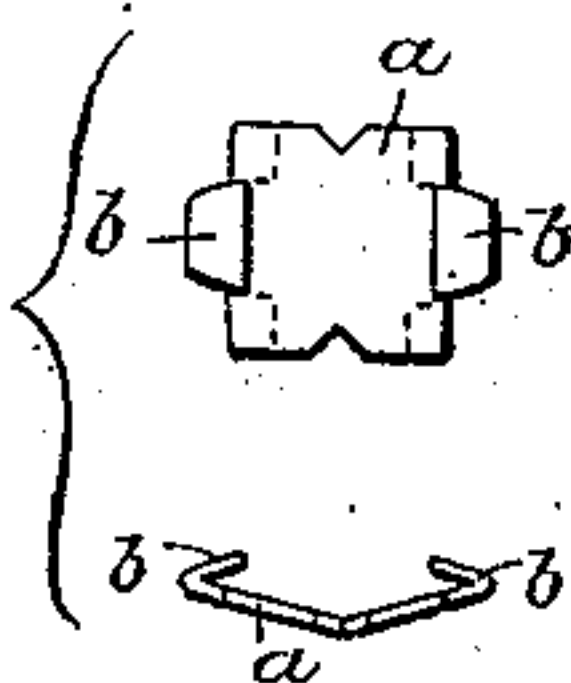
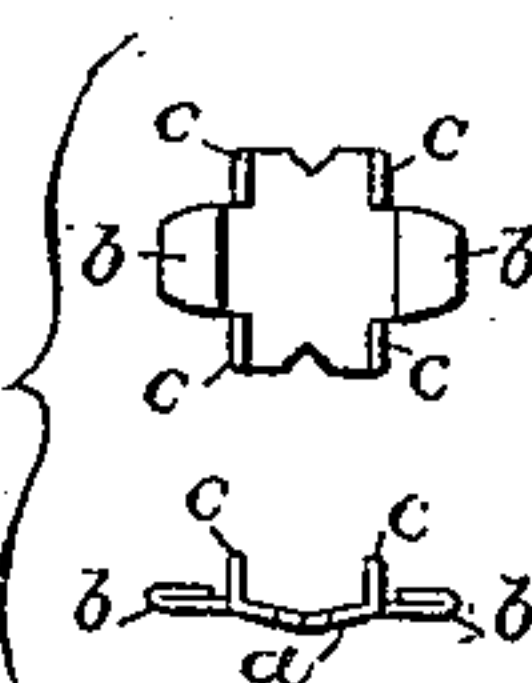


FIG 10



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# UNITED STATES PATENT OFFICE.

CHARLES F. WURSTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
JAMES IRWIN BARNHURST, OF SAME PLACE.

## MACHINE FOR FORMING CONNECTIONS FOR UMBRELLA-RIBS.

SPECIFICATION forming part of Letters Patent No. 553,603, dated January 28, 1896.

Application filed February 24, 1894. Serial No. 501,348. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. WURSTER, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming Connections for Umbrella-Ribs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to a machine for shaping those metallic devices technically known as "laps," which are applied to the ribs of umbrellas to enable the pivotal connection therewith of the usual "forks" on the ends of the stretchers.

This invention consists, first, in the combination, with a coacting male and female die, of a reciprocating slide adapted to receive the blanks individually and conduct them into alignment with the dies; secondly, in a check device arranged in respect to said slide and adapted to govern the passage thereto of said blanks; thirdly, in a novel chute or magazine by which the blanks are fed in single file to the slide; fourthly, in a reciprocative finger device constructed and arranged to insure the onward passage of the blanks in the chute or magazine; fifthly, in a receptacle in which the blanks are contained preparatory to being delivered to said chute or magazine, and, finally, in various novel features of construction and organization of parts whereby efficient and harmonious working of the parts may be had, all as will be hereinafter fully set forth in detail and be definitely claimed.

In the annexed drawings, Figure 1 is a side elevation. Fig. 1<sup>a</sup> is a partial cross-section on the line *x x* of Fig. 1. Fig. 2 is a front view. Fig. 3 is a longitudinal vertical section on the line *y y* of Fig. 2. Fig. 3<sup>a</sup> is a sectional detail, enlarged, showing the magazine as charged with blanks, the feed-bar retracted and the male die depressed, and Fig. 4 is a horizontal section on the line *z z* of Fig. 3. Fig. 5 is a plan of the female die as removed from the machine. Fig. 6 is a section on the line *w w* of Fig. 5. Figs. 7 and 8 are diagrams illustrating the operation of

the dies upon the blank. Figs. 9 and 10 are views of the lap-blank before and after its introduction to the machine. Fig. 11 is a perspective view of the lap as applied to an umbrella-rib.

At the outset it may be well to explain that the blanks preparatory to their being fed to the machine are of the form represented in Fig. 9—that is to say, they each comprise a thin centrally-depressed metallic plate provided with laterally-projecting and upwardly-inclined lugs *b*. Upon being introduced to my machine, and being shaped thereby, they are given the form represented in Fig. 10—that is to say, the lugs are flattened and the adjacent portions of the body are cut inward and turned upward to form tongues *c*. The blanks thus formed are designed to be applied to fluted or paragon umbrella-ribs, as represented in Fig. 11, the body portion *a* being bent into *U* form to embrace the rib, the tongues *c* being turned closely around the edges of the rib to secure the device in place, and the double or reinforced lugs *b* being extended outward to receive the forks of the stretchers and thus permit their pivotal connection with the ribs.

The numeral 1 represents the supporting-frame of the machine, comprising a base 2 and a housing 3 rising therefrom. On the front of this housing is provided a guideway 4, to which is fitted a vertically-reciprocative plunger 5. Connected with the plunger is the forward arm of a lever 6, to the other or rearward arm of which is attached a strong spring 7 that tends to pull down said latter arm and thereby to maintain the plunger normally elevated. In the bifurcated upper end of this plunger is supported a roller 8, with which coacts an eccentric 9 on a transverse driving-shaft 10, whereby said plunger will be vertically reciprocated during the rotation of the shaft. This shaft is borne in suitably-disposed bearings 11 on the housing, and is provided with a fly-wheel 12 and fast and loose pulleys 13 14, respectively.

On the lower portion of the face of the plunger is formed a projection 15, to which is firmly secured a vertical die-bar 16 that depends below the plunger. This die-bar is cruciform in cross-section. It is preferably



held in place by means of a two-part block 17 fitted to a recess in the face of the projection, the opposed faces of the block being properly formed to embrace the die-bar. These parts are clamped against the die-bar by means of set-screws 18 working in the respective sides of the projection. A cap 19 secured to the projection covers the front of the recess and confines the block therein. It will be seen that by properly manipulating the set-screws the block may be loosened to permit vertical adjustment of the die-bar. Thus the working end of said bar may be ground from time to time, as required, and the bar then be properly adjusted. A vertical screw 20 working in an upper lug 21 on the face of the plunger, immediately above the die-bar, is provided to effect the vertical adjustment of the bar and serve as an abutment therefor. A small set-screw 22 fitted to the lug is used to fix the vertical screw in its positions of adjustment. Directly below the die 16 is a transversely-disposed block 23, upon which is formed a corresponding female die 24, which communicates with a vertical passage 25 extending through said block and the base. The corners or cutting members of the female die are constructed of the inwardly-projecting ends of steel bars 26 let into grooves in the face of the block. These bars are held within the grooves by means of cross-pieces 27, which are secured to the block by means of set-screws 28, there being on the under sides of the respective pieces ribs or projections 29 that bear upon the contiguous bars. (See Fig. 6.)

It will be seen that by loosening these screws the bars will be free to be adjusted longitudinally, as occasion may require. Set-screws 30 working in plates 31 secured on the ends of the block bear against the ends of the respective bars, and thus afford means whereby nice adjustment of the bars may be had. Each of these plates 31 is pivoted at one of its ends to the block by a screw 32, and detachably connected at its other end by a screw 33, which extends through a slot 34 in the plate. Hence by loosening the last-named screw the plate may be swung upward on its pivot to permit the adjacent die-bars to be drawn from and replaced in their grooves, as required. (See Fig. 1.)

On the base 2, rearward of the female-die supporting-block, is sustained a longitudinally-reciprocative bed 35 which bears on its upper face a bar 36, the forward end of which extends upon and beyond said block. This bar is secured to the bed by means of set-screws 37, the holes for which are elongated to permit longitudinal adjustment of the plate, a suitably-disposed adjusting-screw 38 being provided in the end of the bed. At a proper point on the bar is formed an orifice 39 which is of an appropriate form to receive the blank preparatory to its being acted upon by the dies—that is to say, the blank is fed to this orifice and the bar retracted to dispose the blank between the dies. The construction is

such that the bar is retracted during the descent of the plunger, the movement of the bar being completed before the plunger has reached the limit of its stroke.

Although there are various ways whereby the movement of the plate in relation to that of the plunger may be effected, I have illustrated in the drawings a construction that is very efficient and desirable, as follows: 40 is a transverse rock-shaft supported rearward of the plunger in suitable bearings 41 in the housing. On this shaft is secured a bell-crank lever 42, the longer or depending arm of which extends into a suitable opening 43 in the bed, the adjacent portion of the bar being, of course, provided with an opening for the passage of said arm. The other or shorter arm, which extends forwardly, is provided on its free end with an antifriction-roller 44. This roller lies normally in the vertical path of a tappet-block 45 on the rear of the plunger, whereby said block, in its descent, will abut against said roller, and thereby depress the shorter arm of the lever. The lower arm of the lever, thus swinging rearward, will retract the bed, and with it the bar 36. When the vertical face of the block is acting against the roller, the bed is at the limit of its rearward movement, and hence said bed will remain quiescent during the continued descent of the plunger. On one end of the rock-shaft is secured an upwardly-extending arm 46, which is normally drawn backward by means of a strong retracting-spring 47 secured thereto and to the base of the machine. Hence when the roller escapes the vertical face of the tappet-block upon the elevation of the plunger the shaft is partially turned in a manner to throw forward the vertical arm of the lever and, perforce, the bed and its connections. On the opposite end of the shaft is secured a rearwardly-inclined arm 48 which is provided near its free end with a set-screw 49, the depending head of which is designed to take against a stop 50 on the adjacent side of the housing when the shaft is turned, as above described, and thereby to determine the advancement of the bed. It will be obvious that by adjusting this screw the forward stroke of the bed may be nicely regulated, as required.

In order to prevent any liability of the bed being thrown back too far during the descent of the plunger, I provide an adjustable stop 51 at the rear end of the base, against which stop the bed abuts when it has reached the prescribed limit of its stroke. In the present instance this stop comprises a set-screw fitted to an up-projecting lug on the base, as shown. (See Figs. 3 and 4.) When the bed is at the end of its forward stroke, the orifice 39 of the feed-bar communicates with an inclined magazine or chute 51, in which a train of the blanks is contained, the channel being of appropriate form in cross-section to insure the proper feeding of the blanks in single file.

A horizontally-disposed hopper-plate 52



communicates with the magazine, as shown. The blanks are placed promiscuously upon this plate by the attendant, who thereupon feeds them individually to the magazine.

5 In order to provide for the delivery of the blanks individually to the orifice in the feed-bar, a vertically-reciprocative rod 53 with a beveled lower end is disposed immediately above the lower or discharge end of the magazine. This rod is supported and guided in a suitably-disposed frame 54, its upper end being connected with the outer end of a horizontal lever 55, which is fulcrumed to lugs on said frame. The inner end of this lever is connected by means of a link 56 with a spring-bow clamp 57, which in turn embraces a vertical plate 58 projecting from the plunger 5, as seen most clearly in Fig. 1<sup>a</sup>. It will be observed by reference to Fig. 3<sup>a</sup> that the rod 53 and lever 55 are joined by a pin-and-slot connection, so that there is a slight movement of the lever before the rod is affected thereby, for a purpose hereinafter appearing.

25 The parts are so arranged in relation to each other that when the plunger is in the elevated position the lower or pointed end of the rod obstructs the outlet of the magazine, as seen in Fig. 3, thereby preventing the delivery of the blanks to the orifice in the feed-bar. The instant the plunger is depressed the connected end of the lever is correspondingly moved, thereby throwing up the forward arm of the lever and, perforce, raising the rod to free the magazine-outlet.

35 In view of the pin-and-slot connection above described the plunger makes a partial descent before the rod is raised, and in consequence the bar is partially retracted before the blank is discharged from the magazine. 40 The body of the orifice thus being drawn beyond the outlet of the magazine, the blank, as it leaves the latter, cannot register with said orifice, and as a result the blank rests upon the face of the rearward portion of the bar during the continued movement of the bar. 45 A suitably-disposed stop-plate 59 prevents the blank being moved rearward by the bar. Hence in the initial movement of the machine no blank is fed to the dies. During the upward stroke of the plunger the bar, and of course the feed-bar, are projected forward to the position first described, the blank on said bar thus being immediately above the orifice 39. In this upward movement of the plunger 55 the rod 53 is depressed, as above stated, its beveled lower end thereupon impinging against the opposed lug of the blank just referred to. Between a head 60 on the rod and the under side of the lever 55 is interposed a small spiral spring 61 that permits the rod to exert a yielding pressure upon said blank, and thus insure its disposition in the orifice at the proper time. (See Fig. 3<sup>a</sup>.) This done, the rod obstructs the mouth of the magazine 65 and temporarily prevents the discharge of a succeeding blank. In the next downward stroke of the plunger the feed-bar is retracted

as before, the blank in the orifice, however, being carried to the dies in position to be acted upon thereby. As before described, 70 there is a dwell in the movement of the bar when the orifice is in the path of the dies, to the end that the male die in its continued descent shall strike the blank, and, in conjunction with the female die, impart the requisite form thereto. The male die punches the 75 blank through the lower die into the passage 25, whence it drops by gravity to a suitable receptacle below. (See Figs. 7 and 8.) In the succeeding ascent of the plunger the rod 53 80 is elevated to free the proximate blank in the magazine and permit the same to drop upon the face of the rearward portion of the bar in position to register at the proper time with the orifice in the latter preparatory to 85 being fed to the dies. As the orifice is cruciform to permit the passage through it of the blank and the plunger, there would be liability of the blank as it enters the orifice tipping in the rearward offset of the orifice. To 90 obviate this, I have secured to the feed-bar a light spring-finger 62, that extends into said offset, as seen in Figs. 3 and 4.

The object of the spring-clamp or frictional connection of the link 56 with the plunger is 95 to permit the proper movement of the rod 53 in reference to the male die, there being on the rod a suitable stop 63, which is arranged to abut against the shoulders of the frame 54 and thus limit the stroke of the rod. When 100 this stop takes against one or the other of these shoulders, the plate 58 on the plunger simply slides between the jaws of the clamp. Should one of the blanks be accidentally jammed below the rod, no injury to the parts will ensue, 105 by reason of the sliding connection just mentioned.

As a simple and efficient means to insure the downward passage of the blanks in the magazine, I provide a vertically-reciprocative 110 finger 64, the lower end or point of which extends into the magazine in a manner to act upon the contained blanks. The upper end of this finger is pivoted to the lower end of a vertical rod 65, which extends freely through 115 a guide-bracket 66 rising from the base of the magazine, and through an arm 67 that is connected with the plunger. A pin 68 extends through the upper end of the rod immediately above the arm 67, while another 120 pin 69 extends through the rod near to the guide-bracket. Encircling the rod is a spring 70 the upper end of which bears against the under side of the arm 67, while its lower end bears upon the pin 69. Thus it will be seen 125 that during the descent of the plunger the arm 67, bearing upon the spring, will yieldingly depress the rod and therewith push the finger 64 against the successive blanks in the magazine. Upon the ascent of the plunger 130 the arm abuts against the pin 68 and slightly raises the rod and finger in readiness for a repetition of the operation. Should the finger in its descent strike directly upon a blank



in the magazine, the finger, yielding, will not injure the blank.

I claim as my invention—

1. The combination with the male die, cruciform in cross-section, and the corresponding female die, of the inclined chute, the reciprocative feed bar provided with a cruciform orifice at one end thereof which is adapted to communicate with said chute, the spring secured to said bar to extend into the rearward offset of the orifice, and means for reciprocating said bar in time with the operation of the dies, substantially as described.
2. The combination with the plunger, the male die thereon, the female die, and their supporting parts, of the reciprocative feed bar, and the crank lever, one arm of which is connected with said bar and the other arm is extended into the path of a tappet or abutment on the plunger, together with means for maintaining said last named arm yieldingly toward the tappet or abutment, substantially as described.
3. The combination with the plunger, the male die thereon, the female die, and their supporting parts, of the reciprocative feed bar, and the crank lever, one arm of which is connected with said bar and the other arm is extended into the path of a tappet or abutment on the plunger, together with means for maintaining said last named arm yieldingly toward the tappet or abutment, and means for regulating the throw of said lever; substantially as described.
4. The combination with the co-acting male and female dies, of a reciprocative feed bar provided with a blank receiving portion, means for reciprocating said bar in time with the dies, a magazine to feed the blanks successively to said portion, a vertically reciprocative rod at or adjacent to the discharge end of the magazine, and a loose or partially inactive connection between the rod and the plunger that carries the male die, whereby the lower end of said rod will bear upon the blanks successively discharged from the mag-

azine, and at the same time obstruct the outlet of the latter, substantially as described.

5. The combination with the co-acting male and female dies, of a reciprocative feed bar provided with a blank receiving portion, means for reciprocating said bar in time with the dies, a magazine to feed the blanks successively to said portion, a vertically reciprocative rod at or adjacent to the discharge end of the magazine, a lever connected with said rod, and a frictional connection between said lever and the plunger that carries the male die; substantially as described.

6. The combination with the co-acting male and female dies, of a reciprocative feed bar provided with a blank receiving portion, means for reciprocating said bar in time with the dies, a magazine to feed the blanks successively to said portion, a vertically reciprocative rod at or adjacent to the discharge end of the magazine, a lever having a loose connection with said rod, the spring, acting on said lever, the support for the spring, and a frictional connection between the lever and the plunger that carries the male die, substantially as described.

7. The female die, consisting of the combination of the die block, the bars 26, the cross-pieces 27, the pivoted plates 31 and the adjusting screws 30, substantially as described.

8. The combination with a co-acting male and female die, a magazine, and a feed bar intermediate the magazine and the dies, of a finger extending into the magazine, a vertically reciprocative rod to which said finger is pivoted, and a connection between said rod and the plunger that carries the male die, together with a spring between said connection and the rod, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

CHAS. F. WURSTER.

Witnesses:

THOS. P. OWEN,  
JOHN R. NOLAN.