

Sept. 7, 1926.

C. O. PETITJEAN

1,598,655

DRILLING MACHINE

Filed Sept. 15, 1924

6 Sheets-Sheet 1

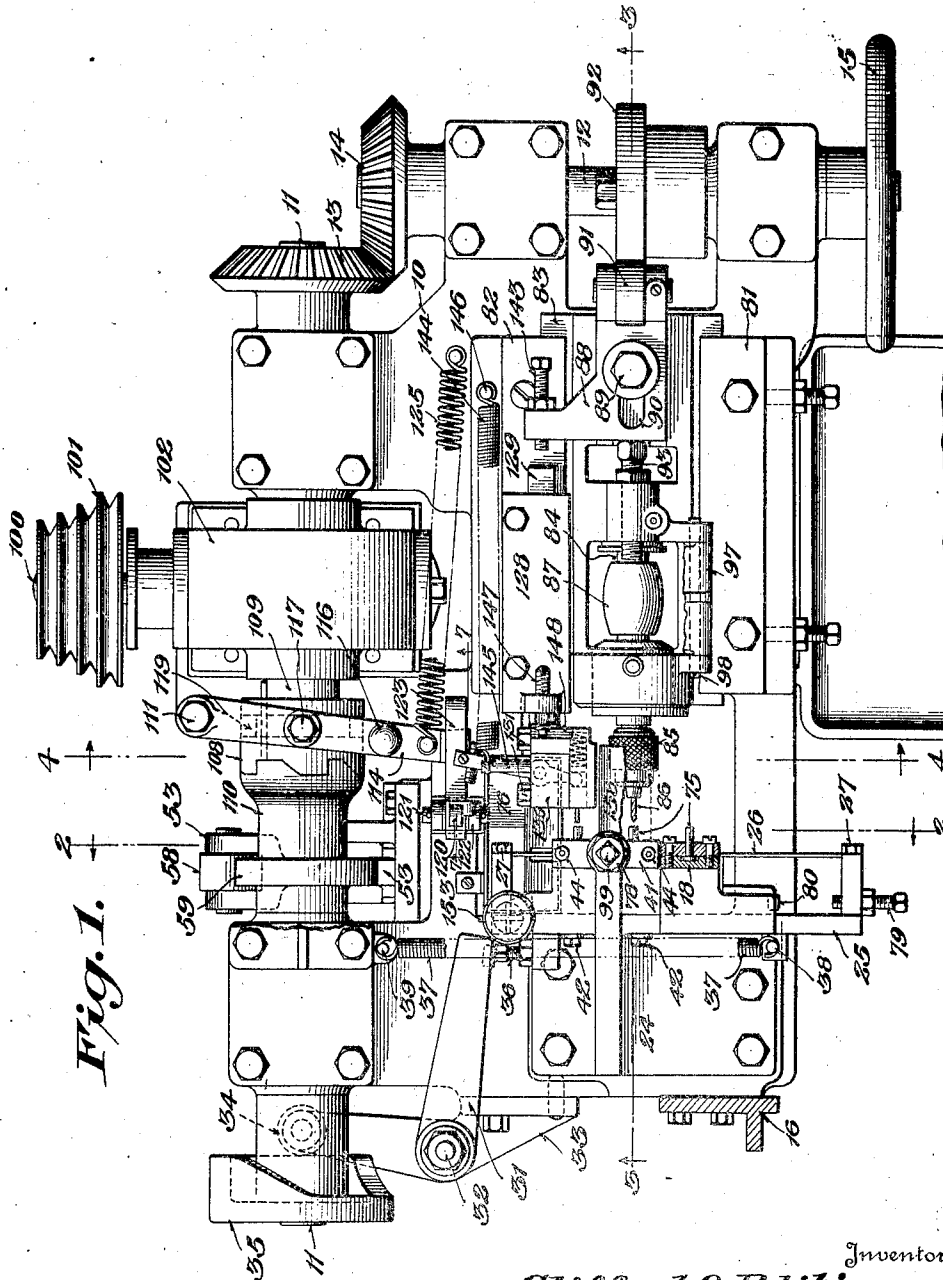


Fig. 1.

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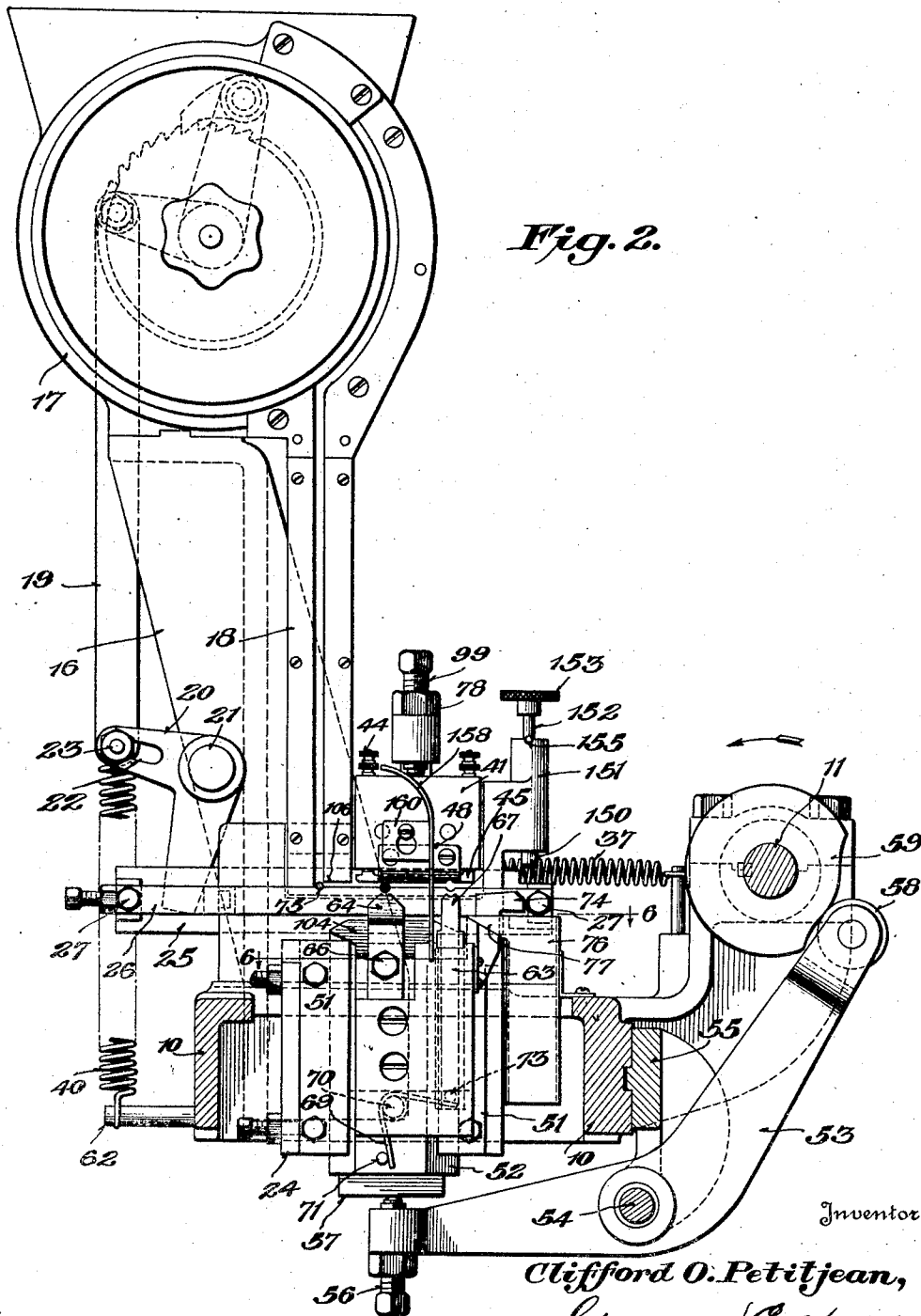
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DRILLING MACHINE

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6 Sheets-Sheet 2



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DRILLING MACHINE

Filed Sept. 15, 1924

6 Sheets-Sheet 3

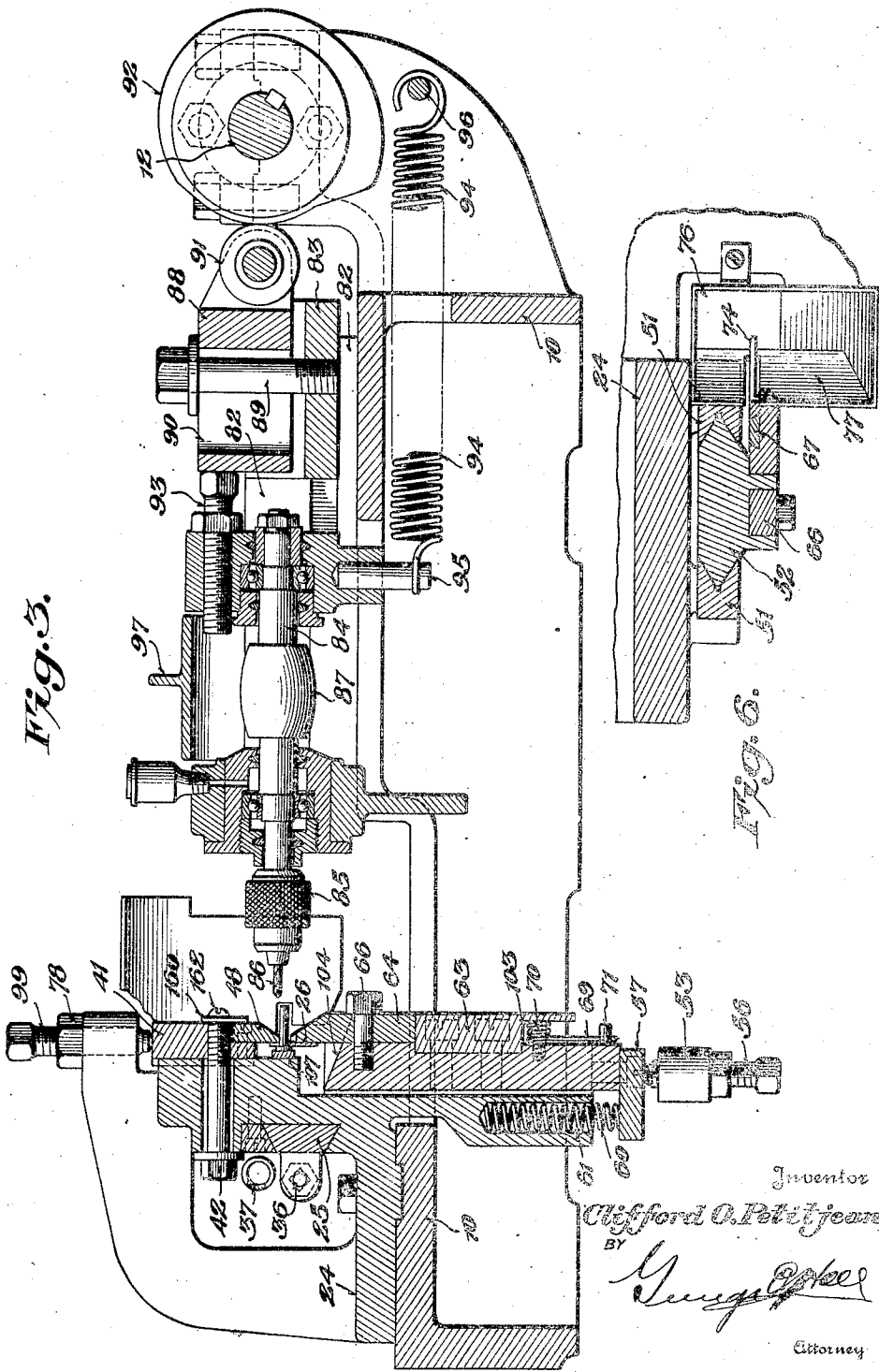


Fig. 5.

Fig. 6.

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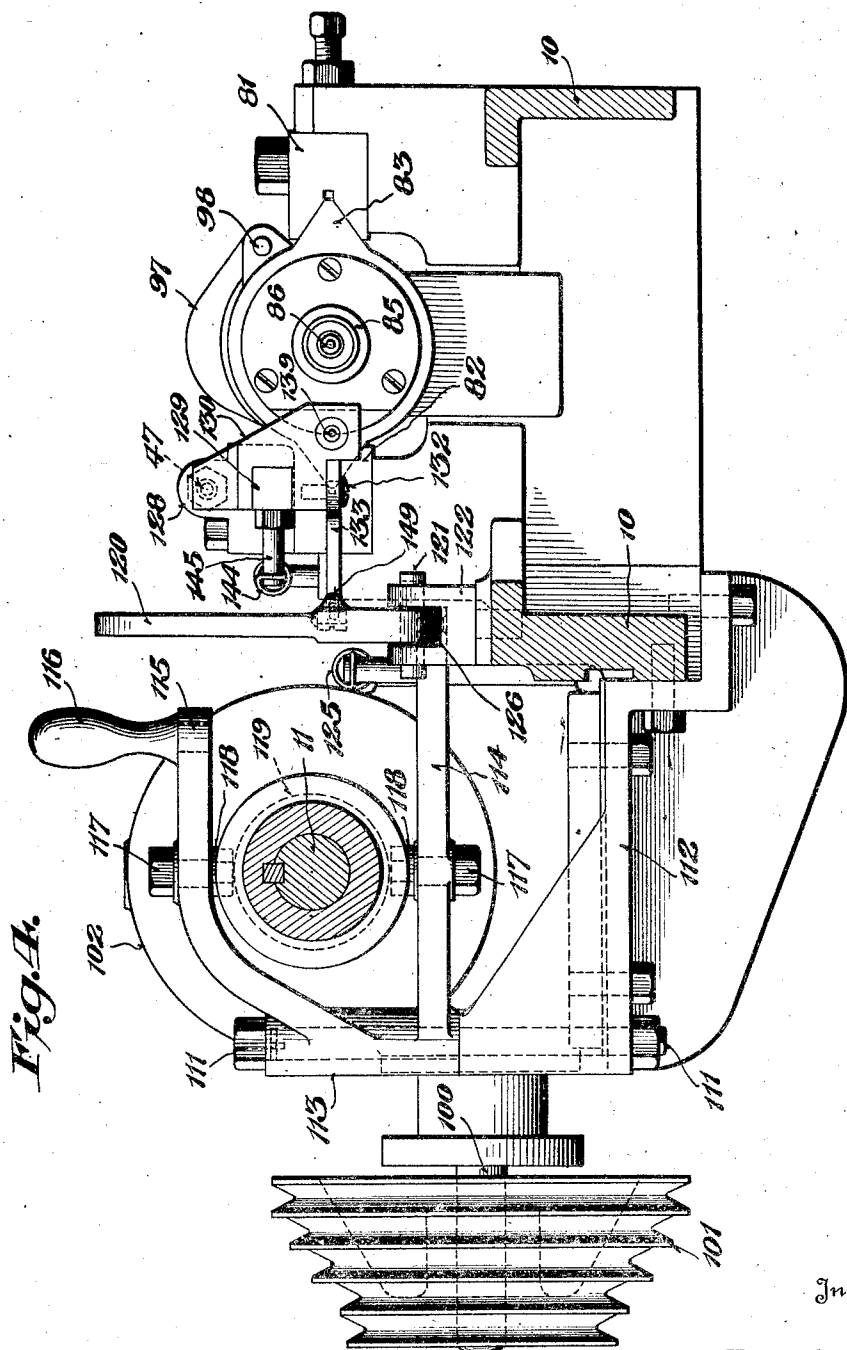
1,598,655

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DRILLING MACHINE

Filed Sept. 15, 1924

6 Sheets-Sheet 4



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DRILLING MACHINE

Filed Sept. 15, 1924

6 Sheets-Sheet 5

Fig. 5.

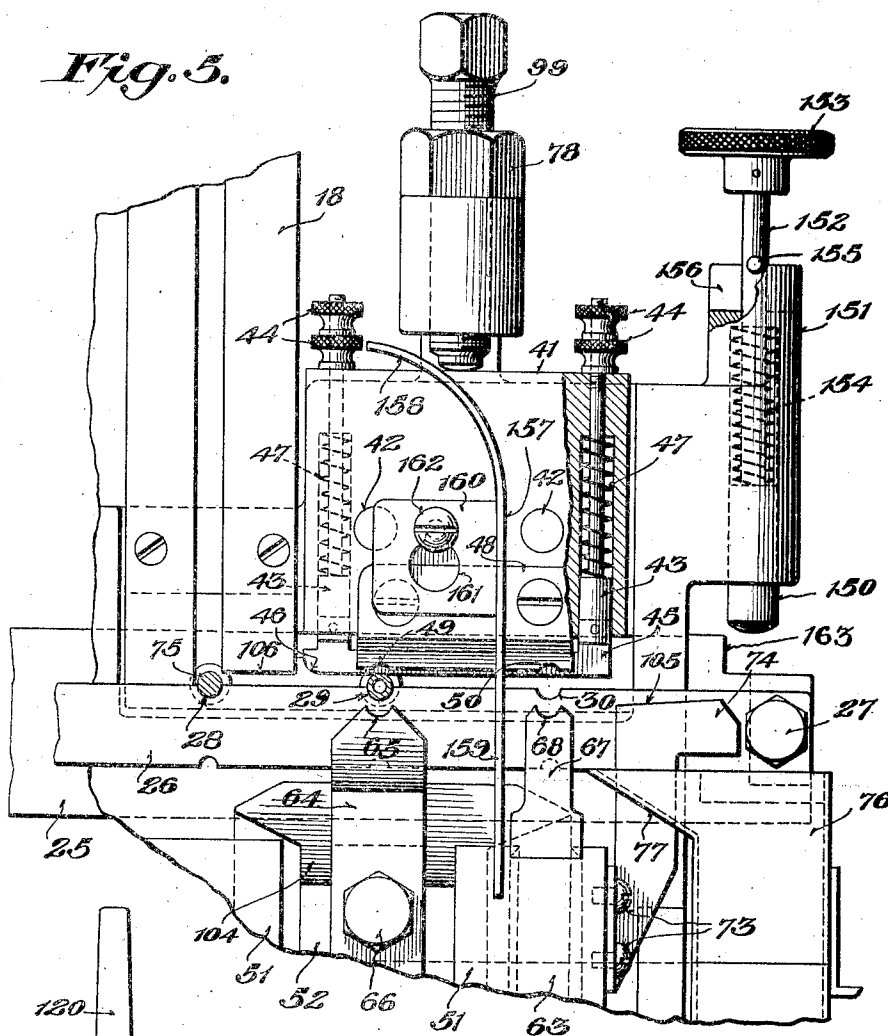
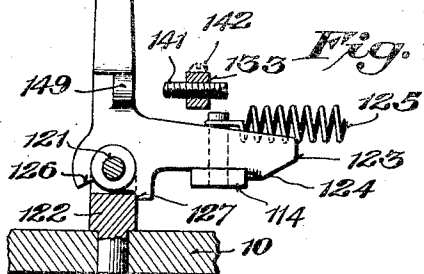


Fig. 7.



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DRILLING MACHINE

Filed Sept. 15, 1924

6 Sheets-Sheet 6

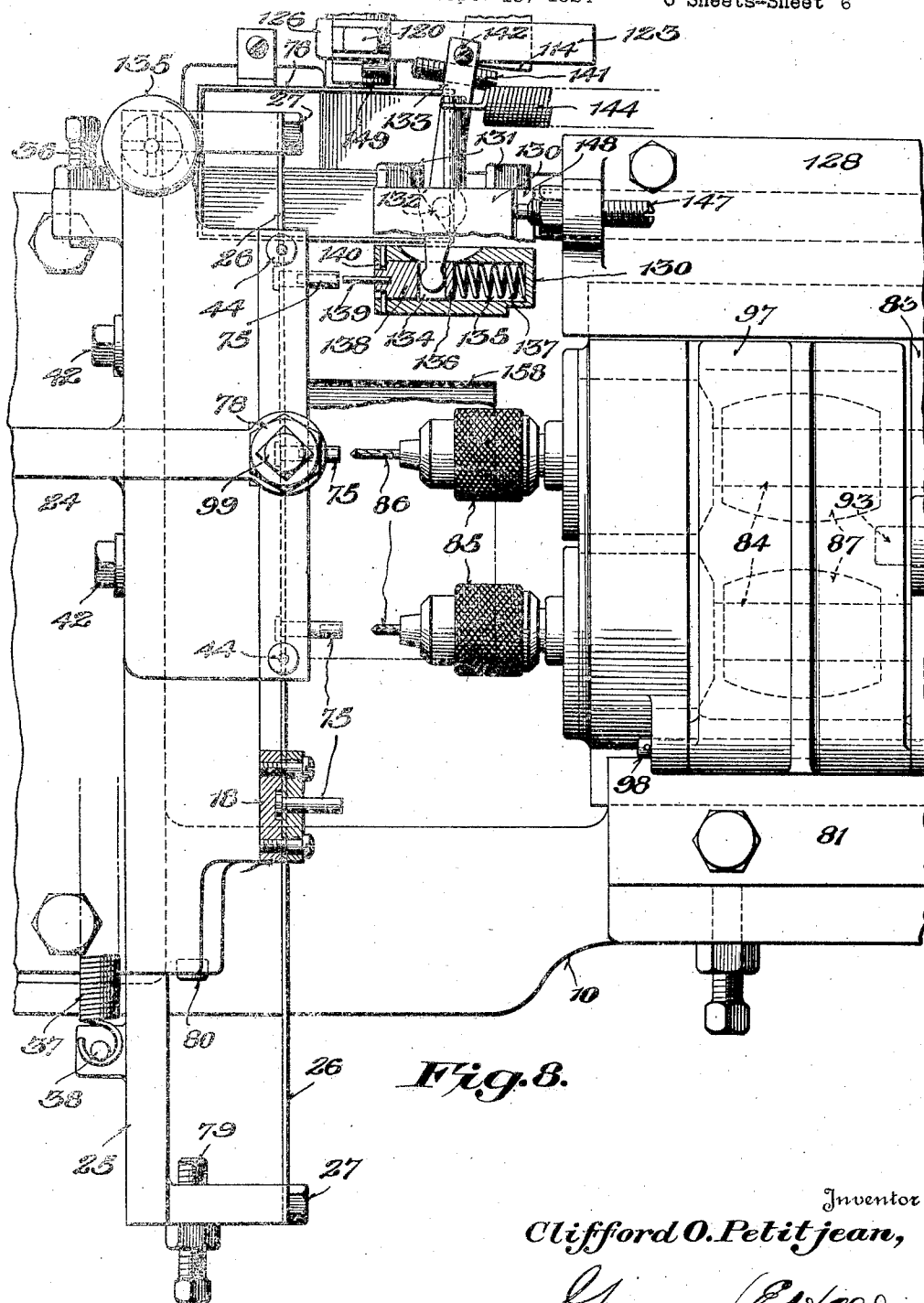


Fig. 8.

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UNITED STATES PATENT OFFICE.

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DRILLING MACHINE.

Application filed September 15, 1924. Serial No. 737,808.

This invention relates to a new and improved drilling machine, having particular reference to machines for drilling blanks or articles, such as rivets, screws or the like.

5 It is the object of this invention, among other things, to provide a machine of this character that will be entirely automatic in its operation and wherein the blanks or articles to be operated upon will be presented
10 one at a time to a drill for a drilling operation, or successive drills, if desired, then to a device which will inspect the blank for the presence and depth of the drilled hole, if any, and subsequently delivered from the machine as a completed article, and to provide
15 in such a machine means whereby the mechanism will stop automatically if a blank is found by the inspecting mechanism that has no drilled hole or one of less
20 than the required depth.

These, and other novel features, are embodied in my improved machine, as will be apparent from the following description of the same and the accompanying drawings, wherein:—

Figure 1 is a plan view of my new and improved machine;

Figure 2 is an enlarged fragmentary elevation of a portion thereof with the parts
30 in section, upon line 2—2 of Figure 1;

Figure 3 is an enlarged sectional elevation of a portion thereof with the parts in section, upon line 3—3 of Figure 1;

Figure 4 is an enlarged transverse sectional elevation of a portion thereof with the parts in section, upon line 4—4 of Figure 1;

Figure 5 is an enlarged fragmentary elevation of the transfer slide and adjacent mechanism;

Figure 6 is a fragmentary plan view of the slide with which the gripping die and gripping slide are connected and some of the adjacent parts, taken generally upon
45 line 6—6 of Figure 2;

Figure 7 is a side elevation of the trip lever and some of the adjacent parts, those in section being taken generally upon line 7—7 of Figure 1; and

50 Figure 8 is an enlarged fragmentary plan

view of a portion of my improved machine modified to the extent that there are a plurality of drills shown instead of one as in Figure 1.

My improved machine is shown and described herein as arranged for drilling rivets and the like but other forms of articles may be operated upon equally as well.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures; 10 designates the bed of the machine, upon two sides of which and at substantially a right angle to each other, are rotatably mounted the shafts 11 and 12, which are connected by beveled gears 13
65 and 14.

Upon the shaft 12 is a balance wheel 15.

The shafts 11 and 12 are rotated through a reduction unit 102, of usual construction, by a shaft 100, upon which is a cone pulley 101. This reduction unit 102 is connected
70 with the shaft 11 by a clutch of any preferred form, the one herein shown comprising a clutch ring 108 slidably mounted upon a hollow shaft 109, connected with the reduction unit, and loosely mounted upon the shaft 11 and the clutch coupling 110 fixed
75 upon the shaft 11, the adjoining faces of both the clutch ring 108 and clutch coupling 110 having suitable interlocking teeth thereon.

Pivotaly mounted upon a stud 111, fixed in the bracket 112, connected with the bed 10, and to which the reduction unit 102 is secured, is a clutch lever 113, having two
85 arms 114 and 115, in the latter of which is a handle 116.

Journaled upon each of the studs 117 in the arms 114 and 115 is a roll 118 which lies within an annular groove 119 in the clutch
90 ring 108.

When the clutch ring 108 and clutch coupling 110 are in the relative positions illustrated in Figure 1, the connection between the reduction unit 102 and the shaft 11 is
95 such that rotation is imparted to the shaft from the driving pulley 101, as above described.

The clutch ring and clutch coupling are held in this relative position by a trip lever 100

120 which is journaled upon a pin 121 in a yoke stud 122 fixed in the bed 10.

One face of the arm 123 forming part of the trip lever has a lip 124, against which one face of the arm 114 is held by means of the spring 125.

The clutch ring 108 may be moved toward the reduction unit so as to disengage the teeth thereon from those of the coupling 110 and thus break the connection between the reduction unit 102 and shaft 11, causing the latter to come to a full stop. This is accomplished by moving the clutch lever 113 upon its pivot mounting, after releasing it from the trip lever, by rocking the trip lever, thus lifting the lip 124 above the arm 114, when the spring 125 will exert its tension upon the clutch lever 113 and thereby move the clutch ring 108 away from the clutch coupling 110 and disengaging the intermeshing teeth thereon.

The clutch lever 113 is moved in the opposite direction to restore the clutch ring 108 and clutch coupling 110 to their initial positions manually by means of the handle 116 until the lip 124 of the trip lever drops over the edge of the arm 114, as above described, and as illustrated in Figure 7.

The shoulders 126 and 127 upon the trip lever 120, by engagement with the yoke stud 122 determine the limits of movement of the trip lever about the axis of the pin 121.

Fixed to the bed 10 is a standard 16 that supports a hopper 17 with which is connected the upper end of the chute 18, through which blanks are conducted from the hopper in correct relative alignment for delivery to the transfer slide.

The hopper mechanism is actuated through a link 19 from a bell crank 20 journaled upon a stud 21 in the standard 16, through which is a slot 22 in one arm thereof to receive a pin 23 in the link 19. This link 19 is actuated positively by the bell crank 20 in one direction and in the opposite direction by the spring 40 fixed at its lower end to a post 62 in the bed 10.

The form of hopper mechanism shown is so well known in the art that it requires no further description herein. Any other form of hopper mechanism may be substituted or the blanks may be placed by hand in a chute suitably arranged if desired.

Fixed to the bed 10 adjacent to the standard 16 is the bracket 24, within which is slidably mounted the transfer slide 25, to which is fixed, by the screws 27, or the like, the transfer plate 26, in the opposite edges of which are the notches 28, 29 and 30. The notches in the opposite edges of the transfer plate may be of different sizes so that the same plate may be used for blanks of various diameters, thereby minimizing the number of required plates. These notches also, instead of being rounded, as illustrated, may

be squared, V-shaped, or otherwise formed, as may be desired.

Motion is imparted to this transfer slide positively in one direction through the rock arm 31 that is journaled on a stud 32 in the bracket 33 and having a roll 34 thereon that rides against the cam face of the cam 35 fixed on the shaft 11 and also engages the head of a screw 36 in the transfer slide. It is moved in the opposite direction by yielding means, such as the spring 37, fixed at one end to a pin 38 in the transfer slide and the other end to a pin 39 secured either to the bed 10 or a part connected therewith. By adjusting the screw 36 the relative position of the transfer slide plate 26 and the chute 18 may be varied.

Adjustable vertically upon the bracket 24 is the die holder 41 that is held in any of its adjusted positions by the screws 42, and held against premature movement by the screw 99 and check nut 78. Movably mounted in the die holder 41 are the plungers 43, the movement of which in one direction is limited by the thumb nuts 44. Secured to the lower end of the plungers 43 is the guide plate 45, the inner end of which is rounded at 46 so as to provide a flaring throat adjacent to the chute 18. A spring 47 surrounding the shank of each of the plungers 43 normally exerts its tension so as to hold the guide plate 45 in its down position.

Secured to the face of the die holder 41 is the upper gripping die 48 that is provided in its lower edge with the notches 49 and 50, these being spaced the same distance as the notches 28, 29 and 30.

Within the ways 51, secured to the bracket 24, is movably mounted the slide 52. This slide is moved in one direction by the rock lever 53 that is journaled upon a stud 54 in the fixed bracket 55 and having a screw 56 in one end thereof, which contacts with a plate 57 on the slide 52, and having a cam roll 58 at the opposite end, which rides against the face of the cam 59 on the shaft 11. A spring 60, which is in part within the pocket 61 in the bracket 24, engages the plate 57 and moves this slide in the opposite direction. Thus the gripping movement of the slide 52 is derived by positively actuated mechanism, and its return movement by yielding actuated mechanism. I prefer to have an inclined upper face 104 upon the slide 52 to facilitate the movement of both oil and chips therefrom.

Connected with the slide 52 is the die block 63, to which is secured the gripping die 64, by means of the bolt 66, or the like, and having a notch 65 therein. Movably mounted within the die block 63 is the gripping slide 67 having a notch 68 in one end thereof. This slide 67 is normally held in the relative position shown in Figures 2 and 5 and when out of engagement with the

blank by a spring 69, which is coiled about a post 70 in the slide 52 and contacts near one end with a fixed pin 71 and at the other end against a pin 72 in the gripping slide 67. The extreme up position of the gripping slide 67 relative to the slide 52 is determined by the contact of the pin 72 with a shoulder 103 on the die block 63. Fixed to one side of the die block 63 by the screws 73, or the like, is the stripper plate 74 having an inclined upper edge 105.

At the beginning of a sequence of operations by this machine, the transfer plate 26 is in the relative position substantially as shown in Figure 5, with the notch 28 therein in register with the groove in the chute 18, the notch 29 in register with the notch 49 of the upper gripping die 48, and the notch 65 of the gripping die 64, and the notch 30 with the notch 50 of the upper gripping die 48, and the notch 68 of the gripping slide 67. The lowermost blank in the column of blanks in the chute, designated 75, then drops into the notch 28 and as the transfer plate 26 moves to the right, when viewing the parts as shown in Figures 2 and 5, is carried so that it is opposite the notches 49 and 65. When in this position the slide 52 moves upwardly and the notch 65 in the gripping die 64 engages the blank and lifts it out of the notch 28 against the tension of the springs 47 and into the notch 49 of the upper gripping die 48 and there grips the blank rigidly in these notches 49 and 65. At this point, known as the drilling station, a hole is drilled in the end of the blank by means hereinafter described. During the drilling operation the transfer plate 26 is returned to its former position with the notch 28 again in register with the slot in the chute 18 and the notch 29 is opposite the blank at the drilling station.

After the blank 75 has passed under the chute plate 106 it is engaged by the guide plate 45 with a yielding pressure and thus held against disengagement from the transfer plate 26. The rounded end 46 of the guide plate 45 facilitates the ready passage of the blank thereunder.

A backing plate 107, which is engaged by the head of the blank, forms a guide for the blank during its transfer and a support at the drilling and inspection stations.

After the drill has been withdrawn from the blank, the slide 52 moves downwardly and the gripping die 64 out of contact with the blank, the guide plate 45 by its contact with the blank moving the same downwardly and out of the notch 49 and into the notch 29 of the transfer plate 26. When so positioned, the transfer plate 26 is given another movement to the right and the blank at the drilling station is carried to the right into register with the notch 50 in the upper gripping die 48 and the notch 68 in

the slide 67. At the same time another blank is conveyed to the drilling station from the feed chute in the manner as above described. The slide 52 now moves upwardly again and grips the new blank at the drilling station and the gripping slide 67 grips the old blank 75 at the inspecting station in the notches 50 and 68, at which point the presence and depth of the hole in the blank is tested. Thus a hole is made at the drilling station and a previously drilled blank is inspected at one and the same time. The blank at the inspecting station is held with a yielding pressure by reason of the action of the spring 69 against the gripping slide 67.

As there are no operations performed at the inspection station that require the blank to be held against rotation, I have provided a yielding grip mechanism thereat, thus obviating the necessity of finely adjusted mechanism at this station.

While the blank is held, as above described, at these two stations, the transfer plate 26 is again moved to the left and the notch 28 is again brought into register with the slot in the chute 18 and the notch 29 with the blank at the drilling station and the notch 30 with the blank at the inspecting station. Upon the next succeeding downward movement of the slide 52 the blanks at the drilling and inspecting stations are released from the gripping die 64 and gripping slide 67 and are projected into the notches 29 and 30 respectively by the guide plate 45. The transfer slide plate 26 is now moved again to the right, at which time the blank at the inspecting station is moved to a point beyond the guide plate 45 and above the stripper plate 74, the blank from the drilling station is conveyed to the inspecting station, and a new blank from the feed chute is conveyed to the drilling station. During this movement of the transfer plate 26, the blank last at the inspecting station rides against the inclined upper face 105 of the stripper plate 74 and is thus lifted out of the notch in the transfer plate and drops therefrom into the delivery chute 76 conveniently arranged to receive and convey it to a discharge point. The slide 52 now moves upwardly again and the blanks are gripped at the several stations, as above described, and the stripper plate 74 passes over the top of the transfer slide plate 26 and strips therefrom the finished blank, if perchance it has not already dropped therefrom. The delivery chute 76 has an offset portion 77 at its upper end with a flaring bottom that projects laterally to a point below the inside of the edge of the guide plate 45 so that immediately any blank passes from under said guide plate and drops off the transfer plate 26 it will fall into the chute 76.

The stop screw 79 threaded through a part of the transfer slide 25 engages a button 80 fixed in the bracket 24 and limits the movement of the transfer plate 26 in one direction to insure the notch 28 registering with the slot in the chute 18 and the notches 29 and 30 with the notches that register therewith. I have provided mechanism to stop if desired the movement of the transfer plate 26 and presentation of a blank to the several stations without stopping the other parts of the machine. This mechanism comprises a stop plunger 150 mounted in a lug 151 on the bracket 24 and having a shank 152 with a knob 153 thereon. Surrounding this shank and within the pocket in the lug 151 is a spring 154, which exerts its tension so as to move the stop plunger 150 toward the slide 25.

Fixed in the shank 152, and projecting upon opposite sides thereof, is a stop pin 155, which rests in notches in the top of the lug 151, as shown in Figure 5 when the plunger 150 is in its up position, at which time the transfer slide 25 operates in the usual manner. To hold this transfer slide against movement, the plunger 150 is moved upwardly by manually grasping the knob 153 to lift the pin 155 out of the notches in the end of the lug 151, as shown in Figure 5 and then rotating the plunger through a quarter of a circle, which will bring the pin 155 into register with the notches 156 in the lug 151 at a right angle and much deeper than the aforementioned notches. The spring 154 then pulls the plunger downwardly until the pin 155 rests against the bottom of the notch 156, at which time the lower end of the plunger projects below the top of the slide and prevents further movement thereof by the spring 37.

Between the drilling and inspecting stations I have provided a guard 157 to prevent chips and oil from being thrown into the zone of the inspecting mechanism. The guard is constructed with a curved upper end 158, which projects over the drilling station and a lower end 159 that projects to a point below the top of the ways 51, and is provided with an offset portion 160 having an opening 161 therein, through which projects a screw 162 threaded into the die holder 41 and by means whereof separably secures the guard in its fixed position.

In the structure disclosed, it will be noted that all of the transfer, gripping and stripping mechanisms and associated parts, are connected with a single member, the bracket 24, thus simplifying the construction thereof and insuring a permanent relation of each of these mechanisms with each of the others and facilitating the fitting and assembly of the parts.

Fixed to the bed 10 are the ways 81 and 82, in which is movably mounted the spindle

slide 83, within which is journaled a spindle 84, having a drill chuck 85 on one end, within which is secured a drill 86. This spindle is rotated by a belt or other means connected with a pulley 87 on the spindle and is provided with suitable journals and means for preventing endwise movement thereof, which constitute no part of my present invention.

A roll block 88 is adjustably secured to this slide 83 by a screw 89 that passes through a slot 90 therein and is held against relative movement in one direction by a screw 93 which engages one face of the block. Journaled in this roll block is the cam roll 91 which rides against the face of the cam 92 on the shaft 12. The slide 83 is moved forward positively by the cam 92 during the drilling operation and in the opposite direction by yielding means, such as a spring 94 fixed at one end to a pin 95 in the slide and at the other end to a pin 96 connected with the bed 10. This drill spindle is moved in such timed relation to the other parts that when the blank is held at the drilling station between the gripping die 64 and upper gripping die 48 the drill moves forwardly and drills a hole in the end of the blank, the depth of which is determined by the relative position of the roll block 88 upon the slide 83, assisted by the manipulation of the screw 93.

Secured to the way 82 is the frame 128, within which is movably mounted the inspector slide 129, upon one end of which the inspector head 130 is fixed by the screws 131, or the like. Pivotaly connected with the inspector head 130 by the screw 132 is a plunger lever 133 having a round head 134 upon one end that projects into a pocket 135 with a washer 136 held against one side thereof by the pressure of a spring 137. In the forward end of this pocket, with its rear face in contact with the round head 134, is a plunger 138 having an inspecting pin 139 fixed therein and the outward position of which is limited by a stop pin 140 that projects across the end of the pocket 135.

Threaded through the split outer end of the plunger lever 133 is a screw 141, which is held against movement in its adjusted positions by pressure of the walls of the split portion of the plunger lever therein applied through the screw 142. The inspector slide 129 is moved toward the bracket 24 with the spindle slide 83 by the engagement of the screw 143, threaded in the block 88, with the slide 129, at which time the inspecting pin 139 enters the hole, if any, in the blank then located at the inspecting station. The inspector slide 129 and parts associated therewith are moved in the opposite direction during the return movement of the spindle 83 by the spring 144 connected at one end to a pin 145 in the inspector head 130 and at the other end to a pin 146 in a

fixed part. Movement in this direction is limited, however, by a stop screw 147 threaded in a lug upon the frame 128 engaging a wall 148 on the inspector head 130.

5 If there is a hole in the blank at the inspecting station, the parts will operate in the manner described. If, however, there is no such hole, a result that occurs if a drill should break or slip in the chuck, or for
10 other reasons, the end of the inspecting pin engages the end of the blank and during the forward movement of the inspector slide 129 moves the plunger 138 rearwardly and rocks the plunger lever 133 upon its pivot mounting against the tension of the spring 137 and
15 brings the end of the screw 141 into contact with the lug 149 on the trip lever 120. This rocks the trip lever and lifts the lip 124 out of engagement with the arm 114 and the spring 125 actuates the clutch lever 113 moving the clutch ring 108, in the manner above described, away from the clutch coupling
20 110, thus disengaging the parts and the shaft 11 and the machine comes to a full stop. The same result occurs if the hole is not drilled a predetermined depth, as engagement of the end of the inspecting pin with the bottom of the hole will result in the operation of the parts as above described
25 and also stopping the operation of the machine. It is apparent, therefore, that with this type of inspecting mechanism the blank is inspected both for presence and depth of the hole.

30 In Figures 1, 2, 4 and 5 the parts are shown as arranged for a single spindle and drill, but it may be desirable in some cases, to provide more than one drill spindle. An illustration of such form of mechanism, with two drill spindles, is shown in Figure 6. In such cases there are two drilling stations instead of one. A still greater number of drills may be used if desired by simply increasing the number of drill spindles and
35 drilling stations. When a plurality of drills are used the hole is drilled only a portion of its depth at the first drilling station and slightly deeper or the full depth at the second drilling station and so on. By the use of a plurality of drills a greater hole depth can be provided for than if the full depth is drilled by a single drill, thus economizing both time and drills. If desired, the hole in the slide 83 above the pulley 87 may
40 be covered, in which case a cover, such as is designated 97, hinged to the slide 83, upon the pin 98, or the like, is a convenient means of accomplishing this purpose.

While my machine is shown and described, 40 for the purpose of illustration, in connection with drilling rivets, it is equally as well adapted for articles other than rivets, and for tools other than drills, such as counter-boring, reaming, pointing, spinning, and
45 tools for turning a shoulder, etc. In this

specification and the appended claims, by drilling, and drilling a hole, and like terms, I intend to include such operations as reaming, pointing, spinning, turning a shoulder, etc.

There are minor changes and alterations that may be made within my invention, aside from those herein suggested, and I would therefore have it understood that I do not limit myself to the exact construction here- 75 in shown and described, but claim all that falls fairly within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the character described, the combination with means for presenting a blank to a tooling station; a tool for making a hole in the blank at such station; and means, the axis of a portion of which is substantially coincident with the axis of such hole, if present, for thereafter automatically inspecting such blank to determine the presence of a hole therein, if any, such inspecting means being movable by mechanism independent of the blank, toward and away from the blank and its progress being stopped by engagement of a part thereof with the blank if the inspection discloses the absence of a hole, and means, the action of which is initiated by said inspecting means, to discontinue further tooling operations.

2. In a device of the character described; a feed station and a drilling station; transfer means for presenting a blank from the feed station to the drilling station; a fixed member; means for taking the blank from the transfer means at the drilling station and holding the same rigidly against the fixed member for the drilling operation; and yielding means for thereafter returning the blank to the transfer means at a point other than that from which it was taken before the drilling operation.

3. In a device of the character described; a feed station, a drilling station and an inspecting station; automatic means for successively presenting a blank from the feed station to the drilling station and thereafter to the inspecting station; means for drilling a hole in the blank at the drilling station; and means for inspecting said blank at the inspecting station to determine if such hole has been drilled and to a predetermined depth composing in part a member that contacts with the blank, if the same is not drilled as aforesaid, but does not contact therewith if so drilled.

4. In a device of the character described; a feed station, a drilling station and an inspecting station; automatic means for successively presenting a blank from the feed station to the drilling station and thereafter to the inspecting station; means for drilling

- a hole in the blank at the drilling station; means for inspecting said blank at the inspecting station to determine if such hole has been drilled and to a predetermined depth; and means, the movement of which is initiated by said inspecting means to automatically stop the operation of the drilling and inspecting mechanism if there is no hole in said blank or the same has not been drilled to a predetermined depth.
5. In a device of the character described; a feed station, a drilling station and an inspecting station; transfer means movable in a substantially straight path for presenting a blank successively from the feed station to the drilling station and to the inspecting station; a yielding member; and means for lifting the blank from the transfer means at both the drilling and inspecting stations and holding the same rigidly thereat for operations thereon against the tension of the yielding member, which yielding means thereafter returns to the transfer means the blank at the drilling station and the blank at the inspecting station; and yielding means having contact with the blank while moving into the transfer means that holds the blank from disengagement therefrom.
6. In a device of the character described; transfer means having a substantially straight line reciprocatory movement and so formed as to carry a blank from one station to another in one edge thereof; an independent member having movement at an angle to the transfer means for holding the blank in such transfer means while being carried as aforesaid so as to prevent its disengagement therefrom; and independently actuated mechanism for taking the blank out of the transfer means at a station, the movement of the transfer means being so timed that it will return to receive the next succeeding blank while the first blank is at said station.
7. In a device of the character described; a feed delivery station and a drilling station in substantially the same plane; a slide for presenting a blank from the feed station to the drilling station; means in part yielding, for holding the blank in the slide between these stations; and means for taking the blank from the transfer means at the drilling station and holding the same rigidly for the drilling operation, comprising in part a second slide movable in a part at an angle to the first mentioned slide; means for drilling a hole in said blank at the drilling station; and means for holding the last mentioned slide against movement without affecting the movement of the drilling means.
8. In a device of the character described; a feed station; a drilling station and an inspecting station; a yielding member; means for transferring a blank from the feed station to the drilling station and from the drilling station to the inspecting station; and means for taking the blank from the transfer means at the drilling station and at the inspecting station against the yielding member, said yielding member taking the blank at each of said stations and returning the same to the transfer means in timed relation with the drilling and inspecting operations.
9. In a device of the character described; a feed station, a drilling station and an inspecting station; a yielding member; means for transferring a blank from the feed station to the drilling station and from the drilling station to the inspecting station; means for taking the blank from the transfer means at the drilling station and the inspecting station against the yielding member, said yielding member taking the blank at each of said stations and returning the same to the transfer means in timed relation with the drilling and inspecting operations; and means for stripping the blank from the transfer means after it has passed beyond the yielding member.
10. In a device of the character described; mechanism for presenting a blank to the drilling station; dies at such station; a yielding member; means, comprising in part, one of the dies, for taking the blank at such station from said mechanism and against the resistance of the yielding member and rigidly holding the blank against movement by the dies at such station.
11. In a device of the character described; mechanism for transferring a blank to the drilling station and thereafter to an inspecting station; a slide movable in a path at substantially a right angle to the transfer mechanism; a gripping die fixed to the slide; a gripping slide movably connected with the slide to hold the blank at the inspecting station; and means for positively actuating the first mentioned slide in one direction in timed relation with the movement of the transfer mechanism.
12. In a device of the character described; mechanism for transferring a blank to the drilling station and thereafter to an inspecting station; a slide; a gripping die fixed to the slide; a gripping slide movably connected with the first mentioned slide to hold the blank at the inspecting station; a stripper plate fixed to the slide and passing in its movement across the blank receiving edge of the transfer mechanism; and means for positively actuating the latter slide in one direction in timed relation with the movement of the transfer mechanism.
13. In a device of the character described; mechanism for transferring a blank to the drilling station and thereafter to an inspecting station; a slide; a gripping die fixed to the slide; a gripping slide movably connect-

ed with the slide; a stripper plate fixed to the slide, having an edge at an angle to the straight line movement of the blank from the drilling station to the inspecting station; and means for positively actuating the slide in one direction in timed relation with the movement of the transfer mechanism.

14. In a device of the character described; a transfer slide; a transfer plate connected therewith and having notches therein; a feed station, a drilling station and an inspecting station, each of which is spaced relatively to each other substantially the same as the notches in the transfer plate; a fixed die having notches therein; a slide movable at an angle to the transfer plate and having a gripping die thereon; a yieldingly mounted member adjacent to the fixed die; and means for actuating the slide in timed relation with the transfer plate.

15. In a device of the character described; a transfer slide; a transfer plate connected therewith and having notches therein; a feed station, a drilling station and an inspecting station, each of which is spaced relatively to each other substantially the same as the notches in said plate; a fixed die having notches therein; a slide movable at an angle to the transfer plate and having a gripping die thereon; means for actuating the slide in timed relation with the transfer plate; and a yielding member adjacent to the fixed die with its lower edge below the lower edge of the fixed die when there is no blank in either of the notches thereof.

16. In a device of the character described; a shaft; clutch means for connecting the shaft with a source of power; means for holding the clutch whereby power may be transmitted therethrough to the shaft; inspecting mechanism for determining the presence or depth or both of a hole in a blank and comprising in part an element that enters the hole, if one is present; and means between said inspecting mechanism and clutch holding mechanism whereby the latter is released and the clutch parts disengaged from each other, thereby stopping the rotation of the shaft if there is no hole in the blank, or if a hole, the same is not of sufficient depth, said means comprising in part a lever connected with the inspecting mechanism which moves toward and away from the clutch holding mechanism without engaging therewith except when the inspecting mechanism discloses the absence of a hole in the blank, or if a hole, the same is not of sufficient depth.

17. In a device of the character described; a clutch; a clutch lever; a trip lever for holding the clutch lever; and inspecting mechanism for determining the presence or depth of a hole, or both, in a blank, having a part thereon which is movable toward and away from the trip lever without contact

therewith but shifts into such position that it will engage and actuate said trip lever and release its hold upon the clutch lever if the inspecting mechanism discloses a blank without a hole therein, or if a hole, the same is not of sufficient depth.

18. In a device of the character described; a clutch; a clutch lever; a trip lever for holding the clutch lever; an inspecting mechanism, having a plunger with an inspecting pin connected therewith forming part thereof; a lever pivotally connected with the inspecting mechanism, said plunger during its movement relative to the lever moving the lever upon its pivot mounting; and adjustable means connected with the lever that contacts with and actuates the trip lever when the lever has been moved upon its pivot mounting by the plunger.

19. In a device of the character described; an inspecting mechanism, comprising in part an inspecting head having a pocket therein; a lever pivotally connected with the head, the inner end of which projects into the pocket, a plunger in the pocket, an inspecting pin in the plunger, and spring means in the pocket for moving the lever in one direction; a member connected with the lever adjacent to that end thereof opposite to the pocket; and clutch actuated mechanism for presenting blanks to the inspecting mechanism, the relative position of the lever determining the control of the clutch actuated mechanism.

20. In a device of the character described; a drilling station and an inspecting station; a spindle slide; a spindle in said slide; means for connecting a drill with said spindle opposite to the drilling station; inspecting mechanism to determine the presence of a hole in a blank or if less than a predetermined depth, or both; and means for imparting motion in one direction to the inspecting mechanism with the slide.

21. In a device of the character described; a drilling station and an inspecting station; a spindle slide; a spindle in the slide; means for connecting a drill with the spindle opposite to the drilling station; inspecting mechanism; means for imparting motion in one direction to the inspecting mechanism with the slide; and means for varying the position of the commencement of the movement of the inspecting mechanism relatively to the spindle slide.

22. In a device of the character described; a drilling station and an inspecting station; a spindle slide; a spindle in the slide; means for connecting a drill with the spindle opposite to the drilling station; inspecting mechanism; means for imparting motion to the inspecting mechanism in one direction with the slide; means for varying the position of the commencement of the movement of the inspecting mechanism relatively to

the spindle slide; and yielding means for moving both the spindle slide and inspecting mechanism in one direction.

23. In a device of the character described; a drilling station and an inspecting station; a spindle slide; a spindle in said slide; means for connecting a drill with said spindle opposite to the drilling station; inspecting mechanism to determine the presence or

depth of a hole in a blank, or both; means 10 for imparting motion in one direction to the inspecting mechanism with the slide; and means for limiting the movement of the inspecting mechanism in one direction.

In testimony whereof, I have hereunto 15 affixed my signature.

CLIFFORD O. PETITJEAN.