March 6, 1951 W. PECHY 2,543,802

SORTING MECHANISM FOR BLANKS

Filed Jan. 14, 1947 3 Sheets-Sheet 1

Fig 1

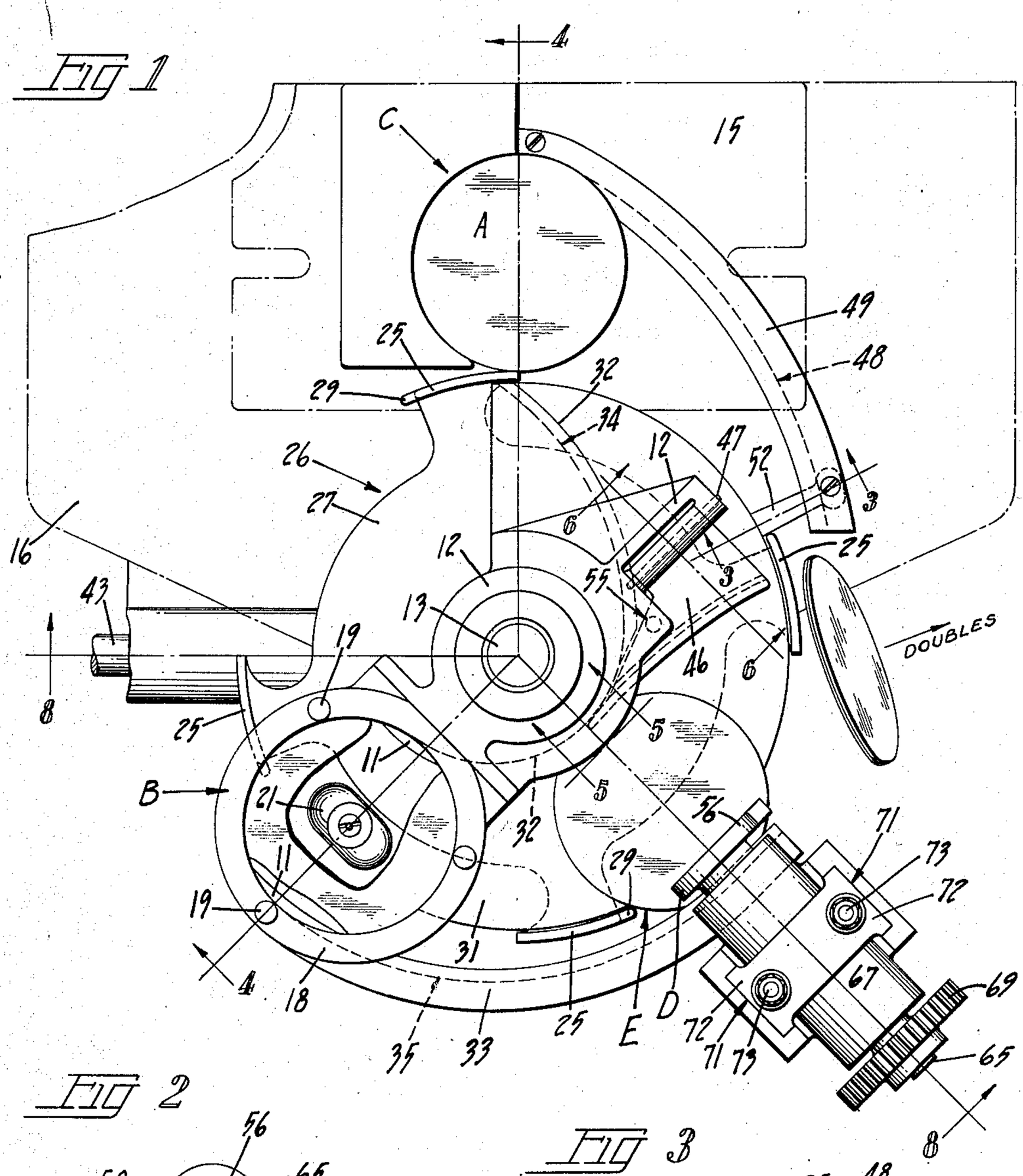

Fig 2

Fig 3

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SORTING MECHANISM FOR BLANKS

Filed Jan. 14, 1947 3 Sheets-Sheet 2

Fig 4

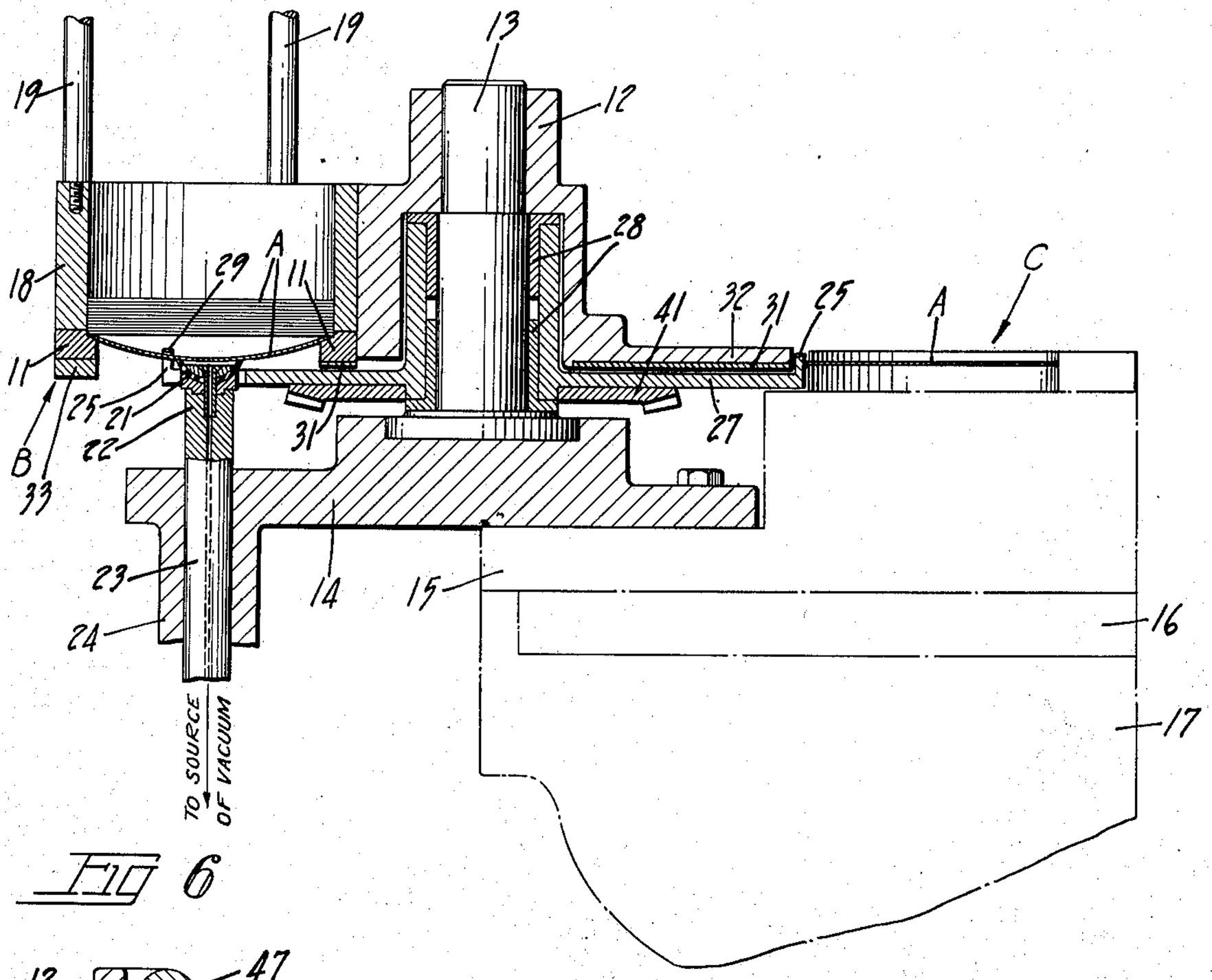


Fig 6

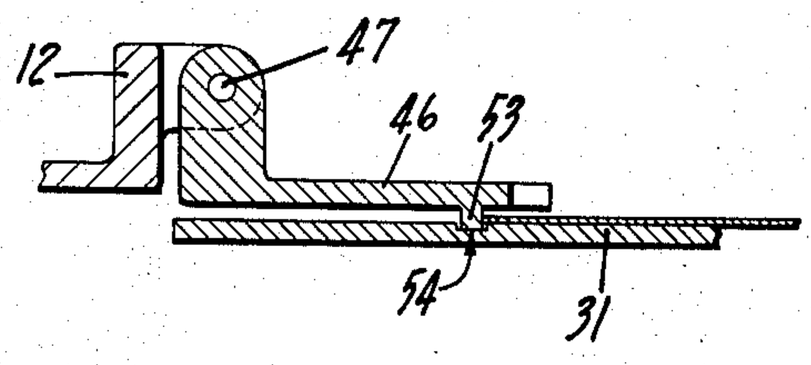
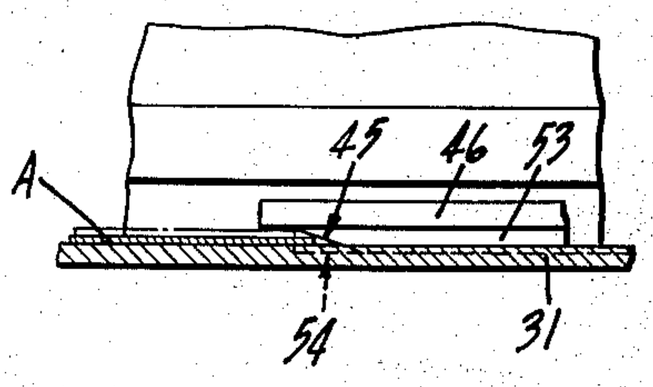


Fig 5

Fig 7



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SORTING MECHANISM FOR BLANKS

Filed Jan. 14, 1947 3 Sheets-Sheet 3

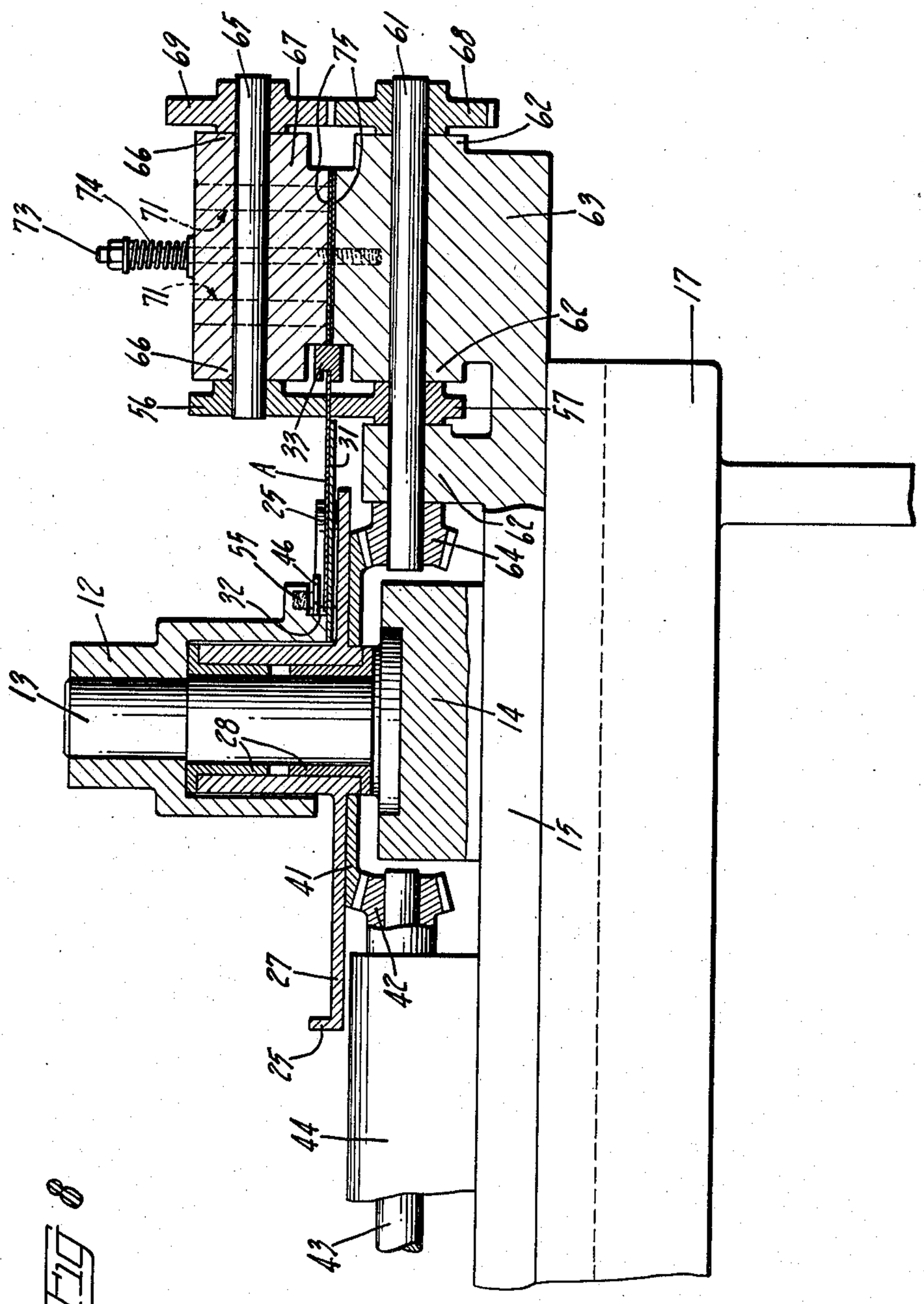

Fig 8

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Patented Mar. 6, 1951

2,543,802

UNITED STATES PATENT OFFICE

2,543,802

SORTING MECHANISM FOR BLANKS

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Application January 14, 1947, Serial No. 721,946

6 Claims. (Cl. 209—91)

1

This invention relates to an improved feeding mechanism for blanks or discs and the like and has particular reference to a segregating device for diverting blanks in excess of a predetermined thickness from the normal line of feed so that the thick blanks are by-passed from a work performing station.

The instant invention contemplates a blank feeding mechanism which operates continuously for advancing blanks along a curved path of travel and includes rotating segregating and thickness detecting instrumentalities between which the moving blanks pass which operate to divert from the path all blanks having a thickness in excess of a desired thickness the normal thinner blanks passing to a work performing station such as a die press or the like, the segregating instrumentalities engaging the blanks of excessive thickness to divert them from their curved normal path of travel before reaching the work performing station.

An object of the invention is the provision of a feeding mechanism for continuously transferring blanks along a curved path of travel and between thickness detecting and blank segregating instrumentalities and into a work performing station, the detecting instrumentalities engaging only those blanks having a thickness in excess of a predetermined thickness the engaged blanks being diverted from the curved path of travel the diverted blanks by-passing the station while the other blanks pass into the station.

Another object of the invention is the provision in such a feeding mechanism of rotating thickness detecting and blank segregating instrumentalities between which the moving blanks pass, blanks which are less than a predetermined thickness continuing without interruption along the path while blanks having a thickness in excess of the selected predetermined thickness are engaged and are diverted by the segregating instrumentalities without interrupting operation of the feeding mechanism.

Another object of the invention is the provision in a feeding mechanism of the character described, of a rotatable turret for transferring blanks along a curved path of travel to a work performing station the blanks while in the rotating turret being subjected to a thickness test and the blanks having a thickness not in excess of the predetermined dimension further passing along the path of travel where they are swept out of the turret into the work performing station.

Numerous other objects and advantages of the

2

invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a top plan view of a feeding mechanism embodying the present invention with parts broken away;

Fig. 2 is a detail view illustrating the rotatable rolls as they come into engagement with an excessively thick single blank or double blanks having a combined excessive thickness;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along the line 3—3 in Fig. 1;

Fig. 4 is a sectional view of the mechanism taken substantially along the broken lines 4—4 in Fig. 1;

Fig. 5 is an enlarged detail of a portion of the blank segregating device as viewed along the section line 5—5 in Fig. 1;

Figs. 6 and 7 are enlarged fragmentary sectional views taken substantially along the line 6—6 in Fig. 1, Fig. 6 showing an excessively thick blank and Fig. 7 a blank of normal or acceptable thickness; and

Fig. 8 is a sectional view taken substantially along the broken lines 8—8 in Fig. 1.

As an exemplary embodiment of the invention the drawings illustrate a feeding mechanism for advancing flat circular blanks or discs A from a magazine or supply source B, along a curved path of travel to a work performing station at which is located a die press or the like C, where an operation is carried out on the blank in a desired manner.

The blanks A are fed in a continuous procession through the instant mechanism and the thickness of the blank is checked to the extent that only blanks less than a predetermined thickness will be fed to the die press. All blanks having a thickness in excess of such a predetermined thickness are deflected from the curved path of travel and are by-passed and discharged before reaching the die press.

A supply of blanks A are stacked in the magazine B (Figs. 1 and 4) and are supported therein on inner and outer angular ledges 11 in a manner which permits separation of the lowermost blank from the remainder. Magazine B is secured to a bracket 12 which is mounted on a vertical stationary shaft 13 carried in a magazine frame 14 which is secured to a bolster plate 15. Bolster plate 15 is secured to a sub-plate 16

mounted on a press frame 17 which constitutes the main frame of the machine.

Magazine B includes an annular element 18 having a plurality of vertically disposed magazine or stack rods 19 secured therein. The lowermost blank in such a magazine is drawn downwardly (Fig. 4) in order to separate it from the supply of blanks in the magazine. This is effected by means of a suction cup 21 which engages the bottom surface of the lowermost blank and draws it into a bowed position preparatory to feeding it from the magazine.

Suction cup 21 is part of a suction head 22 carried on the upper end of a vertically movable vacuum source tube 23. Tube 23 is slidably carried in bearing 24 of the magazine frame 14 and is raised and lowered in any suitable manner.

The lowermost bowed blank A is separated from the stack by one of four turret feed fingers 25 (Figs. 1, 3 and 4) each located back of a turret pocket 26 of a horizontally rotatable turret 27. The turret 27 rotates on bearings 28 carried on the stationary shaft 13.

The turret feed finger 25 is formed with a finger extension 29 which hooks over the blank and holds it in the turret pocket. The blanks A are fed along a horizontal platform 31 which extends outwardly from the magazine from the inner angular ledge 11 (Figs. 1 and 4). The blanks are guided in their passage along the platform by an inner guide rail 32 and an outer guide rail 33. These guide rails are formed with oppositely disposed grooves 34, 35. The inner guide rail 32 is formed as an intergral part of the bracket 12 and for a part of its extent is concentric with the stationary shaft 13. The outer guide rail 33 is secured to the magazine B and is also concentric with shaft 13 extending as far as the rotating thickness detecting instrumentalities D.

The turret 27 is rotated by a gear 41 (Figs. 4 and 8) which is secured to the bottom of the turret. A drive gear 42 meshes with and operates the bevel gear 41. The drive gear 42 is mounted on the inner end of a shaft 43 journaled in suitable bearings 44 which may be secured to the bolster plate 15. The shaft 43 constitutes the main drive shaft and may be driven in any suitable manner.

After leaving the magazine B, the separated blanks A pass between the rotating thickness detecting instrumentalities D at a detecting station E (Fig. 1). Blanks having a thickness less than a predetermined maximum pass freely between these instrumentalities and continue along their path of travel toward the die press C. Such blanks upon passing between the rotatable instrumentalities engage an inner beveled lower face or cam surface 45 (see Fig. 5) of a gate 46 which is pivoted on a pin 47 carried in the bracket 12 (Figs. 1 and 6). As the moving blank passes along the inclined surface it raises the gate and continues along its curved path and beyond the end of the outer guide rail 33.

A blank which has lifted the gate 46 passes into a groove 48 formed in an outer curved guide rail 49. The guide rail 49 serves as a continuation of the guide rail 33 but the circular path now becomes a spiral path, the groove 34 of the inner guide rail 32 from that point on gradually extending outwardly in its spiral form. The continued rotation of the turret propelling the blank forward along its spiral path sweeps or wipes the blank into a position for delivery into the die press at station C. The final action of locating a blank into the die press is effected by the outer periphery of the feed finger 25 sweeping by the blank as it reaches its position.

The guide rail 49 is supported by an arm 52 (Fig. 3) which extends out underneath the rail. Preferably the arm 52 is integral with the magazine frame 14.

When blanks having an excess thickness reach station E the rotatable thickness detecting instrumentalities D engage the upper and lower surfaces at an off-center position. This tends to deflect or divert the blanks along a different line of travel and the gate 46 assists in this, the detecting instrumentalties D still urging the blanks forward. Such a thick blank, being thus diverted by instrumentalities D to a path substantially tangent to the curved path, does not pass under the inclined cam surface 45 and accordingly the gate 46 is not lifted but remains in its lowered position.

The gate 46 is formed with a depending wall 53 which projects down and which normally rests within a groove 54 formed in the horizontal platform 31 (Fig. 5). As long as this wall is down in the groove 54 it forms a barrier against passage of a blank. As explained above, a blank having a thickness in excess of the predetermined thickness will not pass under the inclined surface 45 of the gate 46 so that the gate remains in lowered position and is effective, in cooperation with the detecting instrumentalities D, to divert the thick blank from its normal path. A spring 55 carried in the bracket 12 normally holds the gate 46 (Figs. 1 and 8) in blank deflecting position.

Thus the curved or depending wall of the gate 46 forms a barrier for thick blanks and prevents the continuation of their passage along the curved path of travel. The depending wall 53 also forms a barrier for the thinner or acceptable blanks. However, a thick blank moving outwardly along its tangent path will not change the position of the gate as does the thinner blank when engaging the beveled face 45. Usually the thick blanks being ejected barely touch the gate since the detecting instrumentalities D are tending to eject the blanks along a path generally tangent to the former curved path. The gate, therefore, insures that such thick blanks will not pass into the work performing station C.

The instrumentalities D comprise an upper rotating roll 56 and a lower rotating roll 57 (Figs. 2 and 8). These rolls at station E are located respectively above and below the path of travel of the blanks A while moving on their circular path. The outer periphery of each of the upper and lower rolls is cut away as at 58 leaving blank engaging peripheral sections 59 for effecting the thickness detecting operation. This insures that the rollers engage the surface of the blanks inwardly of the blank edge. A false or inaccurate detection as of an irregularity such as a burr on the edge of the blank, is therefore avoided. The relieved periphery of the rolls 56, 57 allows for clearance of the feed fingers 25 as will be obvious.

The lower rotating detecting roll 57 is mounted on a shaft 61 which is journaled in suitable bearings 62 formed in a lower bracket 63 formed integral with the bolster plate 15 (Fig. 8). Shaft 61 is rotated by a gear 64 mounted thereon which meshes with and is driven by the gear 41, hereinbefore described. The upper rotating detecting roll 56 is mounted on the inner end of a shaft 65 which is journaled in suitable bearings 66 of an

upper bracket **67** which is carried by the bracket **63**. The shaft **65** is rotated in unison with the shaft **61** by means of gears mounted on the outer ends of these shafts, gear **68** secured to shaft **61** meshing with a gear **69** secured to the shaft **65**. This simultaneous rotation of rolls **56, 57** is effected at a speed sufficient to move an excessively thick blank or "double" between the rolls at a linear velocity exceeding that of the finger **25** behind the blank and this advances the blank ahead of the finger as shown in Fig. 1.

The upper bracket **67** is carried yieldably in slideways **71** (Figs. 1 and 8) formed in the lower bracket **63** so that the upper bracket may move vertically to compensate for different thicknesses of blanks. This applies only to the blanks having a thickness in excess of the predetermined thickness as already fully explained for it will be recalled that the thinner blanks pass between without touching the detecting rolls.

The upper bracket is formed on its opposite sides with proper corresponding shapes to slide freely within the slideways **71**. The upper bracket **67** is held in its sliding relation to the lower bracket **63** by vertical studs **73** which are anchored in the lower bracket and which pass through vertical bores in the upper bracket. Springs **74** carried on the studs above the upper bracket are kept under the desired compression by suitable nuts threaded on the upper ends of the studs.

The upper and lower detecting rolls **56, 57** are spaced apart the desired distance to insure proper functioning of the peripheral sections **59** of the detecting rolls.

Slight variations of this spacing may be had by means of shims **75** (Fig. 8) which are placed between the lower and upper brackets **63, 67**. By the use of different thickness shims the desired predetermined maximum blank thickness is selected which blank will pass the rolls without being engaged by the peripheral sections **59**.

Following the work performing operations on the normal or non-deflected blanks A, at the station C, the parts formed therefrom may be discharged in any suitable manner. Such operations are outside of the scope of the present invention.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of a rotatable turret having a plurality of pockets for receiving and for advancing blanks along a curved path of travel, rotating thickness detecting instrumentalities located in said path of travel for engaging blanks having a thickness in excess of a predetermined thickness to advance them along a different path, and a gate located in the curved path of travel of the blanks and having a cam surface engageable by blanks of acceptable thickness to move said gate out of its path, said gate having also a guide surface for the blanks of excessive thickness moved along said different path by said rotating instrumentalities to prevent their continuance along said curved path.

2. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of a magazine for holding a supply of blanks, means for separating individual blanks from said magazine, a rotatable turret movable beneath said magazine and having turret pockets for receiving the separated blanks, a feed finger at one end of each turret pocket for engaging a blank within said pocket while passing under said magazine and for advancing it along a curved path of travel, rotating thickness detecting instrumentalities located in said path of travel of the blanks and off-center thereof for engaging only those blanks having a thickness in excess of a predetermined thickness, said instrumentalities having relieved clearance spaces for passage of said feed fingers through said instrumentalities, and a pivoted gate located in the path of travel of the blanks and cooperating with said instrumentalities and with said feed fingers as a guide for deflecting from said curved path blanks having a thickness in excess of said predetermined thickness, said gate having a beveled face engageable by blanks not deflected by said detecting instrumentalities to swing said gate into non-deflecting position.

3. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of feeding means for moving said blanks along a predetermined path, a movable gate normally interposed in said path, a cam surface on said gate, said cam surface being engageable by moving blanks of predetermined acceptable thickness to move said gate out of said blank path, means for returning said gate to its normal position in said path, and a rotating detector roll having a peripheral portion spaced from the path of blanks of predetermined acceptable thickness but within the path of blanks exceeding said acceptable thickness to engage the excessively thick blanks and sweep them along said interposed gate and out of said predetermined path.

4. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of feeding means for moving said blanks along a predetermined path, a pivotally mounted gate interposed in said path, a cam surface on said gate, said cam surface being engageable by moving blanks of predetermined acceptable thickness to swing said gate out of said blank path, and a pair of rotating detector rolls having opposed peripheral portions adjacent one side of said predetermined path and spaced apart a distance just sufficient to permit blanks of acceptable thickness to pass freely therebetween, said distance being less than the thickness of excessively thick blanks so that said peripheral portions frictionally engage the excessively thick blanks and sweep them along said interposed gate and out of said predetermined path at that side of the path at which said rolls engage said excessively thick blanks.

5. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of a rotatable turret having a plurality of pockets for receiving blanks, said turret having a feed finger adjacent each pocket for advancing the blanks along a curved path of travel with said turret, inner and outer guide rails disposed adjacent said turret for holding the blanks in their curved paths of travel, said outer guide rail being interrupted intermediate its ends to provide a diverting path, and rotary thickness detecting instrumentalities located in the path of travel of said blanks and on opposite sides thereof and adjacent said diverting

path, said instrumentalities having spaced peripheral sections for engaging opposite surfaces of advancing blanks having a thickness in excess of a predetermined thickness and for deflecting said excessively thick blanks into said diverting path, means interposed in the path of travel of said blanks and providing a barrier to the normal blank path to insure passage of said thick blanks along said diverted path, said feed fingers passing between said detecting instrumentalities in the spaces between said peripheral sections.

6. In a mechanism for feeding blanks and for segregating those in excess of a predetermined thickness, the combination of a rotatable turret having a plurality of pockets for receiving and for advancing blanks along a curved path of travel, rotating thickness detecting instrumentalities located in said path of travel for engaging only blanks having a thickness in excess of a predetermined thickness and for deflecting them from said turret pocket, and a movable gate normally located in the path of travel of the blanks, said gate when in normal position providing a guide for deflecting the blanks of excessive thickness engaged by said detecting instrumentalities, said gate also having a cam surface engageable only by blanks of normal desired thickness advancing with the turret, such a normal blank moving along said cam surface and thereby swinging the gate out of the path of the normal blank advanced by the rotating turret which continues to advance without any interruption from the gate along said curved path.

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