J. A. GRAY.

DISK BLANK FEED MECHANISM.

APPLICATION FILED APR. 16, 1914.

1,196,676.

Patented Aug. 29, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

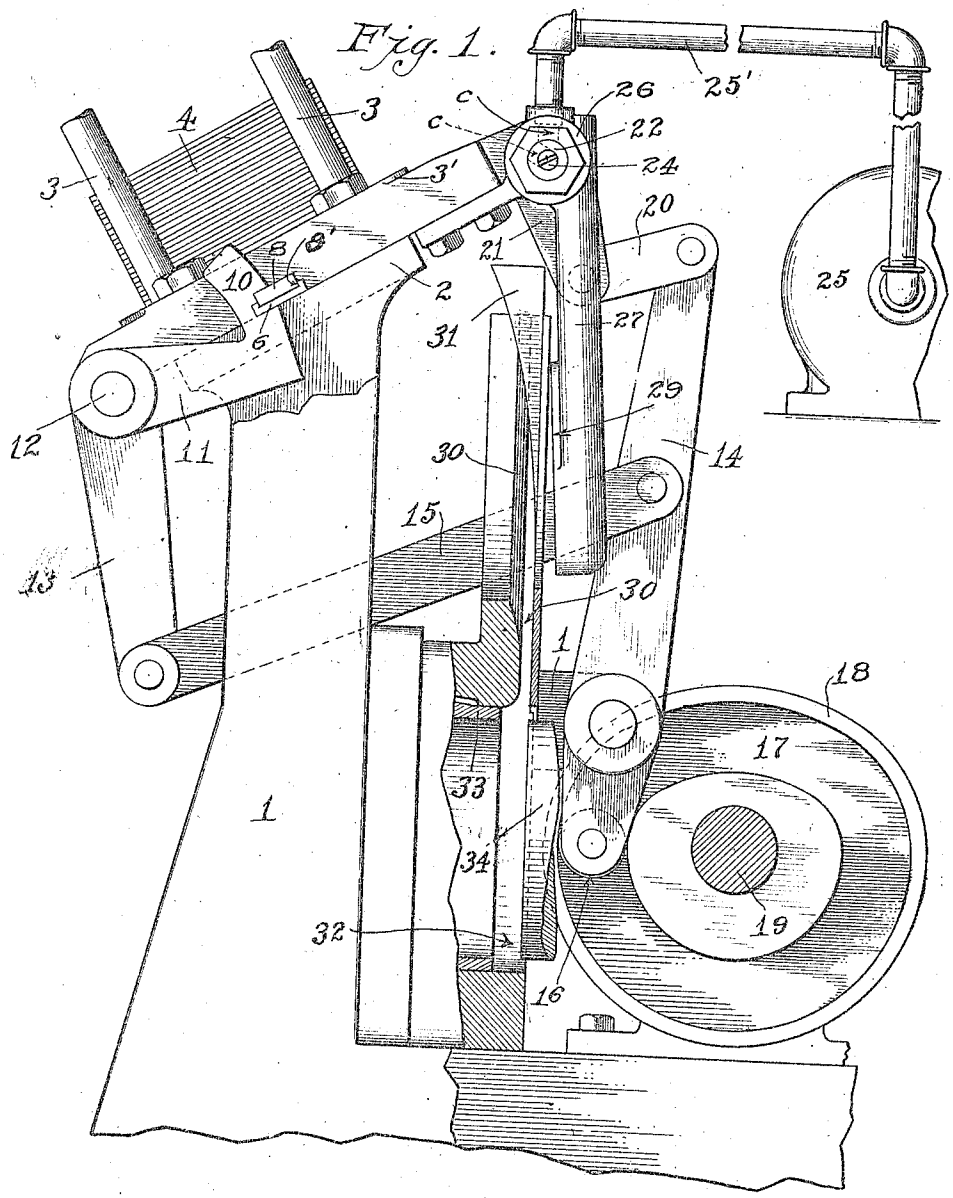
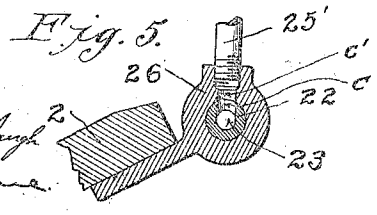


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 2.

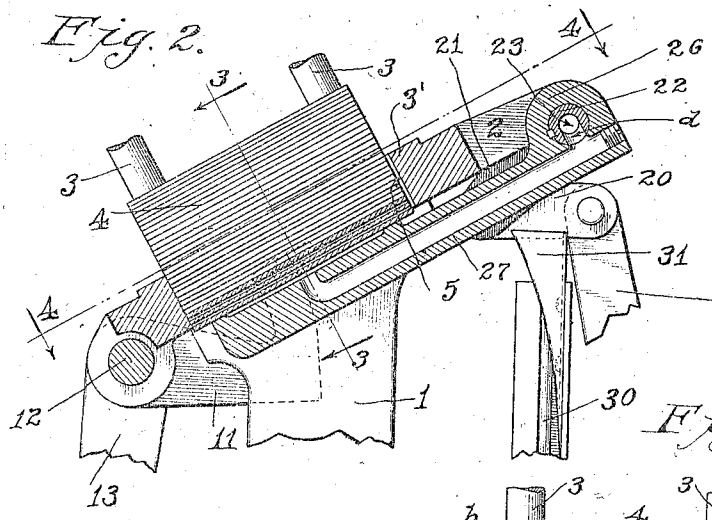


Fig. 3.

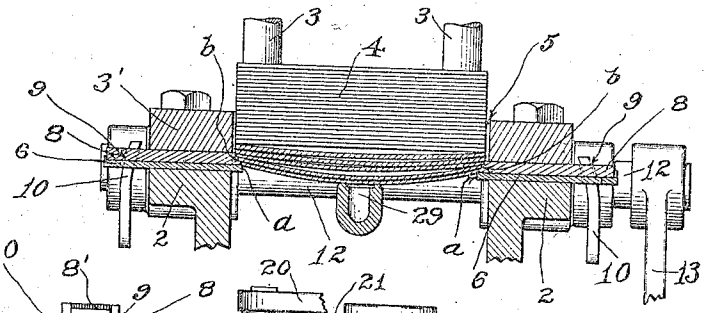
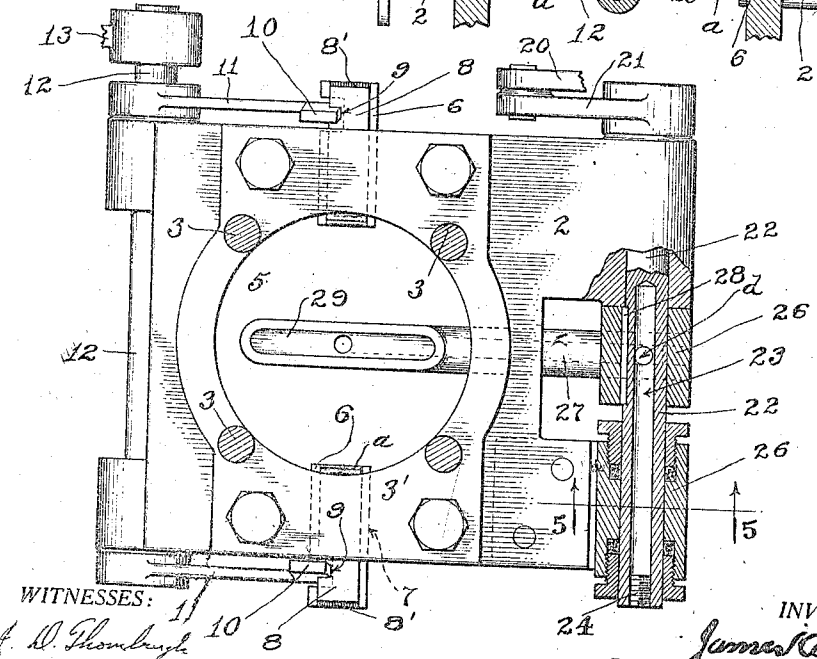


Fig. 4



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DISK-BLANK-FEED MECHANISM.

1,196,676. Specification of Letters Patent. Patented Aug. 29, 1916.

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To all whom it may concern:

Be it known that I, JAMES A. GRAY, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Disk-Blank-Feed Mechanism, of which the following is a specification.

The present invention relates to controlled means for removing successively from a suitably disposed holder, disk blanks for delivery to mechanism for the cutting therefrom of an annulus or ring liner for securing to the flange of a can end or cover, the object being to efficiently and expeditiously actuate suction means for extracting from within the holder the lowermost disk of a stack of disks contained therein and to convey and deliver the removed disk to suitable means for discharging the same to mechanism for cutting the ring liner therefrom.

To comprehend the invention, reference should be had to the accompanying sheets of drawings, wherein—

Figure 1 is a side elevation, part sectional view, of the improved feed mechanism, disclosing the means for actuating the respective working parts thereof, and illustrating the runway for conveying the removed disk blanks to the cutting mechanism. Fig. 2 is a longitudinal sectional view, taken through the feed mechanism, showing the disk blanks in position and the sucker arm positioned for the removal of the lowermost blank from the stack of blanks contained within the holder. Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2 of the drawings, viewed in the direction of the longitudinal arrows. Fig. 4 is a sectional plan view taken on the line 4—4 and viewed in the direction of the vertical arrows. Fig. 5 is a detail sectional view taken on line 5—5, Fig. 4 of the drawings.

In the drawings, the numeral 1 is used to designate any suitable form of a supporting frame, provided, in the present case, with a bed plate 2, which plate is preferably arranged at an inclination to the horizontal, the said bed plate supporting or sustaining a vertically disposed holder 3 adapted to contain therein a stack of disk blanks 4 formed of fibrous material, the said holder in the present case being formed by a series of spaced rods. The holder 3 as illustrated is provided with an open bottom plate 3′, the disk blanks contained within the holder escaping or discharging successively through the outlet 5 thereof and the registering discharge-way formed through the bed plate 2. The stack of disk blanks 4 within the holder 3 is sustained therein by the plates 6, fitted within the laterally extended guide-ways 7 formed in the face of the bed plate 2 so as to project slightly within the sphere of the discharge-way or outlet 5—Fig. 4 of the drawings, and the projecting inner end portion of said plates serve as a supporting ledge *a* on which rests the lowermost blank of the stack of disk blanks—Fig. 3 of the drawings. The said plates 6 are firmly secured within the guide-ways 7 against movement, and the plates 6 support in turn the laterally movable slides 8. Each slide 8 works freely within a guide-way 8′ in the upper face of the plates 6, and these slides are adapted to be moved within and out of the sphere of the discharge outlet 5; the function of said slides being to compress or slightly buckle the disk blanks at the bottom of the stack, so as to cause the lowermost one of the stack to bear but lightly onto the supporting ledge portion of the plates 6, in order that the same may be readily withdrawn from within the outlet opening 5. It will be noted by reference to Fig. 3 of the drawings, that the inner edge *b* of each slide 8 is beveled inwardly from the bottom edge thereof, so that pressure of the slides on the respective blanks within the sphere thereof, when moved inwardly, will vary slightly from the lowermost one of the stack, which is substantially cut out from the stack proper.

Each slide 8 adjacent the outer end portion thereof is formed with a vertically oblique disposed groove 9, within which work the angularly disposed cams 10, which cams project upwardly from the crank arms 11 and are actuated by the rock-shaft 12 to which the said arms are secured. Owing to the angular disposition of the cams 10, the same as thrown up and down by the movement of the crank arms 11 serve to move the slides 8 into and out of the sphere of the outlet opening 5 for the discharge of the held disk blanks.

The rock-shaft 12 is connected by a de-

pending link 13 to a fulcrumed lever 14 by means of the pitman 15, the said lever 14 being fulcrumed to the frame 1 and carrying at its lower end a roll 16 which works within the groove 17 of an eccentric cam 18. This cam is secured to the drive shaft 19 and by means of the described connections imparts motion to the rock-shaft 12 for the purpose of raising and lowering the arms 11 at predetermined moments. The said lever 14 is also connected by a link 20 to a crank arm 21 projecting from one end of a rock-shaft 22, working in suitable bearing of the bed 2 of the frame 1—Figs. 1, 2 and 4 of the drawings. This rock-shaft 22 is provided with a central bore 23, closed by a screw plug 24, and the central bore 23 of the rock shaft 22 is connected to a suitable suction pump 25 by means of a connection or pipe 25', said connection at its inner end connecting with a ported bushing 26 within which the rock-shaft is mounted for oscillatory motion, and which bushing is connected to the bed plate 2—Figs. 1, 4 and 5 of the drawings. That portion of the shaft 22 extended within the bushing is provided with a port c, which moves into and out of registry with the port c' of the bushing during the oscillatory movement of the rock-shaft 22, and the said shaft substantially centrally thereof is provided with an air port d. This port communicates with a corresponding port in the hub 26 of a hollow suction arm 27, which hub 26 is secured by a key 28 to the rock-shaft 22. At its outer or free end the hollow arm 27 is provided with a slotted head 29, which head, when the suction arm 27 is thrown upwardly its full distance is brought into contact with the exposed under face of the lowermost disk blank 4 of the stack of sustained disk blanks within the holder 3. When the suction arm stands in its full raised position, the ports c and c' are in registry and the air suction is opened, so that with the downward movement or throw of the said arm the adhering lowermost disk blank 4 of the stack of blanks is withdrawn and carried downwardly until in alinement with the chute or runway 30, the said blank being removed from the sucker arm as carried downwardly by the stripper plate 31, the suction at such time having been destroyed by the rock-shaft 22 being so turned as to move the port c thereof out of registry with the port c'. The disk blank falls from the chute 30 into the seat 32, between the opposing face of the coöperating cutting instrumentalities 33—34, the position of which is illustrated by Fig. 1 of the drawings. Inasmuch as the said cutting instrumentalities for severing from the disk blank an annulus or ring liner and the mechanism for actuating the same form no portion of the present invention, detailed description thereof need not be set forth herein.

Assuming the holder to have been filled with a stack of disk blanks supported therein by the bottom plates 6, the operation of the feed mechanism for the successive removal of the said blanks may be briefly described as follows:—During the movement of the rock-shaft 22 to throw upwardly the suction arm 27 and place the ports c and c' in registry, the rock-shaft 12 is actuated through the described inter-connected parts to raise the crank arms 11 and force the cams 10 upwardly within the grooves 9 of the slides 8. This movement of the said cams forces inwardly the slides 8, the inner ends thereof engaging with and exerting pressure against the edges of the disk blanks situated within the discharge outlet 5 causes a buckling thereof to such an extent as to concave the lowermost blank of the stack until it is held substantially by frictional engagement only with the inner end of the plates 6, the weight of the stack of blanks, excepting the lowermost one thereof, being at such time sustained by the end portion of the slides projected within the sphere of the outlet opening 5. By this time the head of the sucker arm 27 will bear firmly against the under face of the lowermost partly released disk blank of the stack of disk blanks within the holder, with the air suction fully opened, so that when through the rotary movement of the eccentric cam 18 and the action of its described associated parts, the sucker arm is forced downward for return to normal position, the said blank adheres firmly to the head thereof, and is withdrawn from the stack of disks and brought into position directly over the chute 30. As the arm 27 approaches the limit of its down stroke, the rock-shaft 22 is moved to shift the port c out of registry with the port c', thus destroying or breaking the air suction, so that as the blank is brought against the stripper plate 31, the same is removed from the head 29 of the sucker arm and falling into the chute 30 is delivered into the seat 32 between the opposing faces of the co-acting cutting instrumentalities 33 and 34. It will be understood that during this return stroke of the sucker arm, the rock-shaft 12 is given a reverse movement or part rotation to that previously described and actuates the crank arms 11 to downwardly throw the angularly disposed cams 10, so as to force outwardly the slide 8 and gradually release the disk blank held thereby. The actions of the respective parts are so timed relative to each other, that they come into action at the proper times for the carrying out of the described steps, the said parts being automatically placed into operation. By the described means the blank disks are positively and successively removed from within the holder by pneumatic means, and de-

livered thereby into the chute or runway for conveying the same to a suitable place of deposit.

While I have described and illustrated the improved feed mechanism as embodied in a practical apparatus for the delivery of disk blanks to means for the cutting of ring liners therefrom and thereby disclosing the preferred embodiment of the invention, still, it is not my wish to be understood as limiting or confining the invention to the detailed arrangement of the working parts as so illustrated and described, being well aware that changes and modifications in the associated working parts may be made without creating a departure from the nature and scope of the present invention, and by the expression "disk" blanks as herein employed, I wish to be understood as meaning any shape of blank which may be employed in connection with the holder therefor.

Having thus described the invention, what is claimed as new and desired to be protected by Letters Patent is:—

1. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of disk blanks, horizontally reciprocating means for separating the lowermost disk blank of the series of disk blanks contained within the holder, air suction means for removing the lowermost separated disk blank of the stack of disk blanks and conveying the same into position for discharge, means for breaking the air suction on the disk blank being brought into position for discharge, and associated instrumentalities for actuating the said respective means.

2. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of disk blanks, horizontally reciprocating devices for successively separating blanks from the bottom of the stack, mechanism for actuating the same, and air controlled means associated with said devices for removing the separated lowermost blank and conveying the same into position for discharge and devices for making and breaking the air suction in accordance with the movement thereof.

3. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of disk blanks, slide devices for buckling the blanks within the bottom portion of the holder, a sucker arm for removing the lowermost blank of the stack of blanks, a part tubular rock shaft for actuating said arm, air connections with said shaft, and mechanism for imparting movement to the mentioned slides and operating the rock-shaft for opening and closing the air connection with the sucker arm.

4. A feed mechanism for disk blanks, the same comprising a suitable holder adapted to contain a stack of blanks, devices associated with the holder for buckling a plurality of the blanks at the bottom thereof, suction means for successively removing the blanks from the bottom of the holder, air connections associated therewith, and mechanism for actuating the suction means for opening and closing the air connections.

5. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of disk blanks, devices for separating the lowermost disk blank from the stack of disk blanks and controlling the discharge outlet for the holder, and air controlled devices coöperating therewith for removing from said outlet the lowermost separated blank of the stack of blanks and conveying the same into position for discharge.

6. A feed mechanism for disk blanks, the same comprising a suitable frame, a holder adapted to contain a stack of blanks supported thereon, horizontally reciprocating slide means co-acting with the bottom portion of the holder for controlling the removal of blanks therefrom and separating the lowermost blank from the series of blanks, devices for actuating said means, a sucker arm for successively removing the separated blank from the series of blanks contained within the holder and conveying the same into position for discharge, a rock-shaft carrying said arm, air connections between said arm through the rock-shaft with the suction means, and mechanism for operating said shaft to throw the sucker arm for making and breaking the said air connections.

7. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of blanks, reciprocating devices for separating the lowermost blank from the series of blanks within the holder, suction means associated with the said devices for removing the lowermost separated blank from the stack within the holder, and mechanism for actuating said means for removing the separated blank to discharging position.

8. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of blanks, reciprocating devices for separating the lowermost blank from the series of blanks contained within the holder, suction means associated with the said devices for removing the lowermost blank from the stack within the holder and placing the same into position for discharge, mechanism for actuating said means, and a stripper device for releasing the removed blank from the suction means.

9. A feed mechanism for disk blanks, the same comprising a holder adapted to contain a stack of disk blanks, reciprocating devices for buckling the blanks within the bottom portion of the holder and separating

the lowermost blank of the series of blanks, a sucker arm for removing the lowermost separated blank of the series of blanks, a part tubular rock-shaft for actuating said arm, air connections within said shaft, and mechanism for operating the rock-shaft for opening and closing the air connection with the sucker arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES A. GRAY.

Witnesses:
I. D. THORNBURGH,
D. B. RICHARDS.