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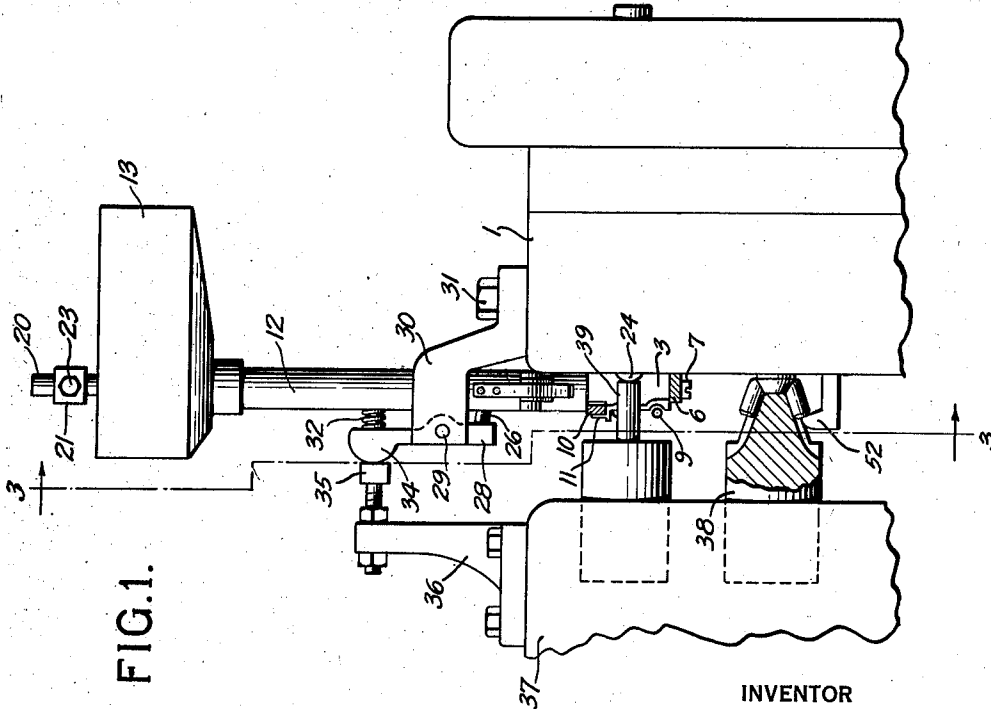
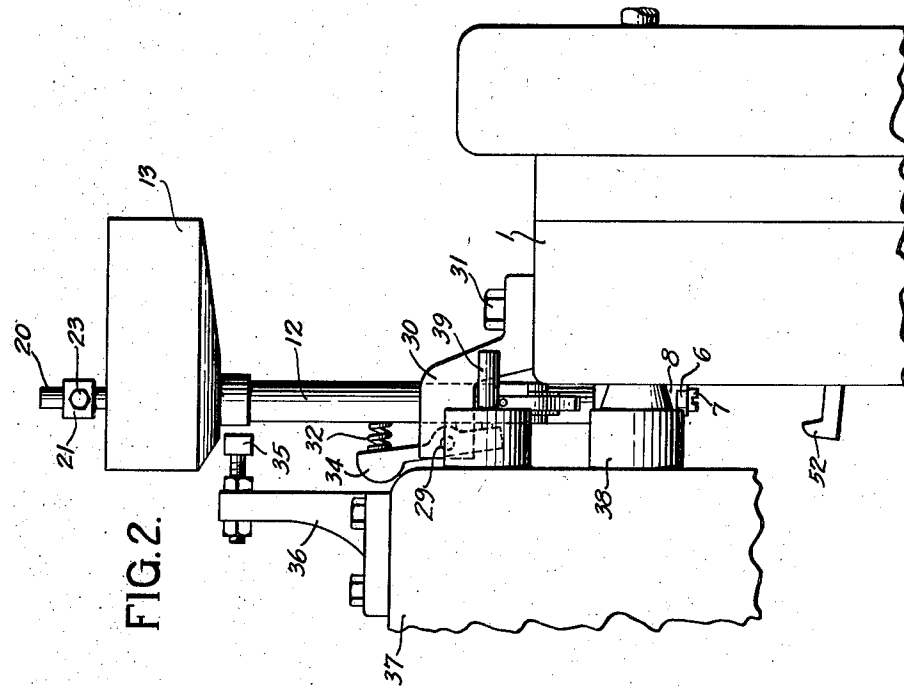
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2,099,232

BLANK FEEDING MEANS

Filed Dec. 30, 1936

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FIG. 3.

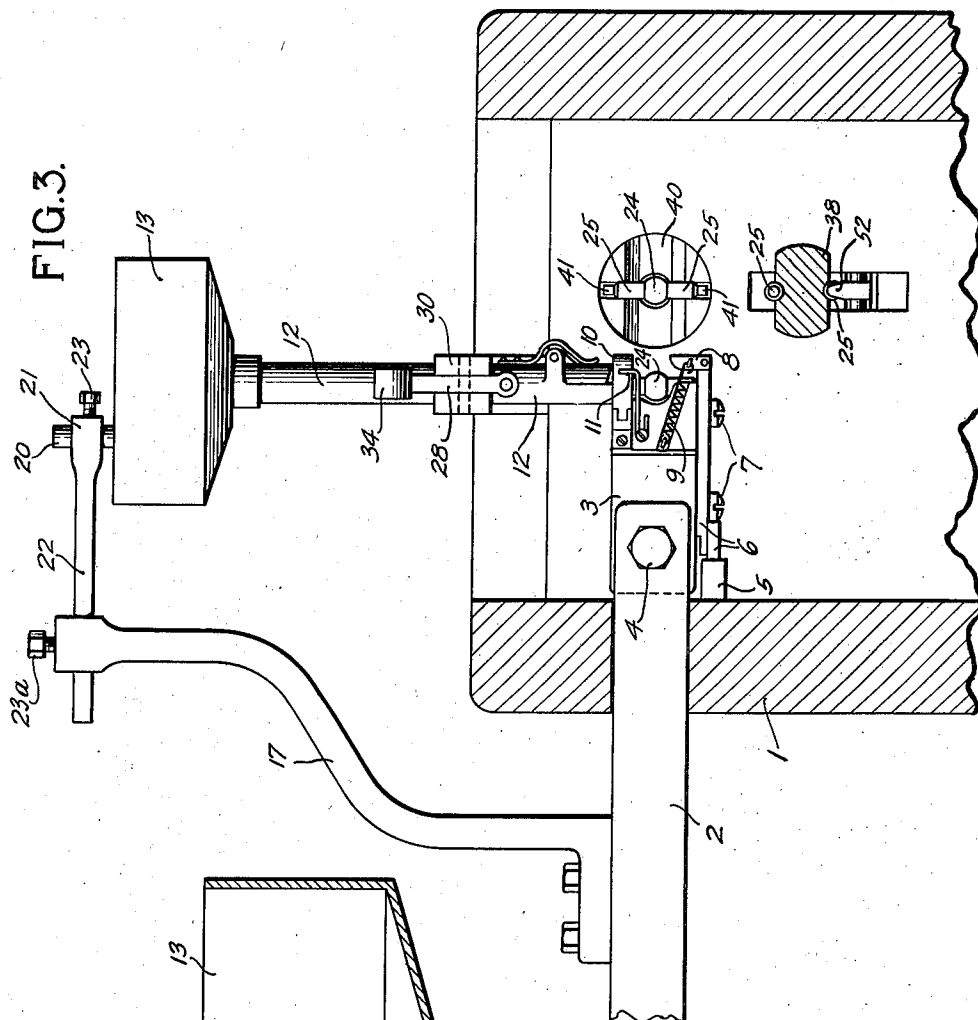
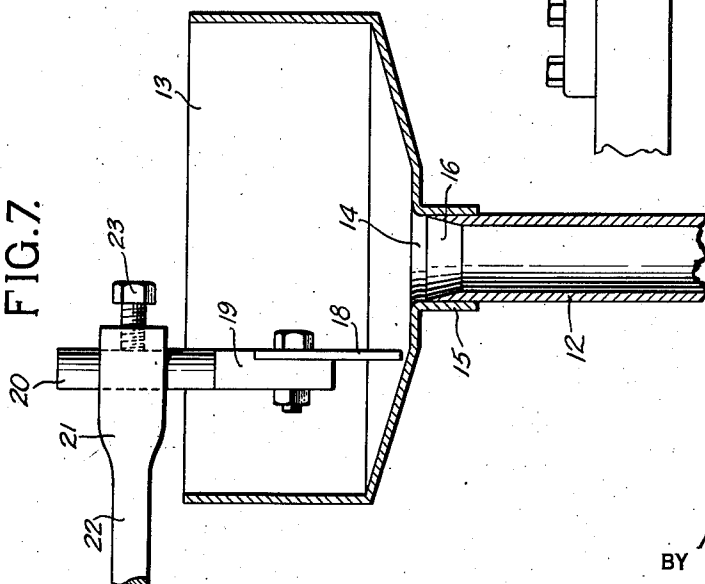


FIG. 7.



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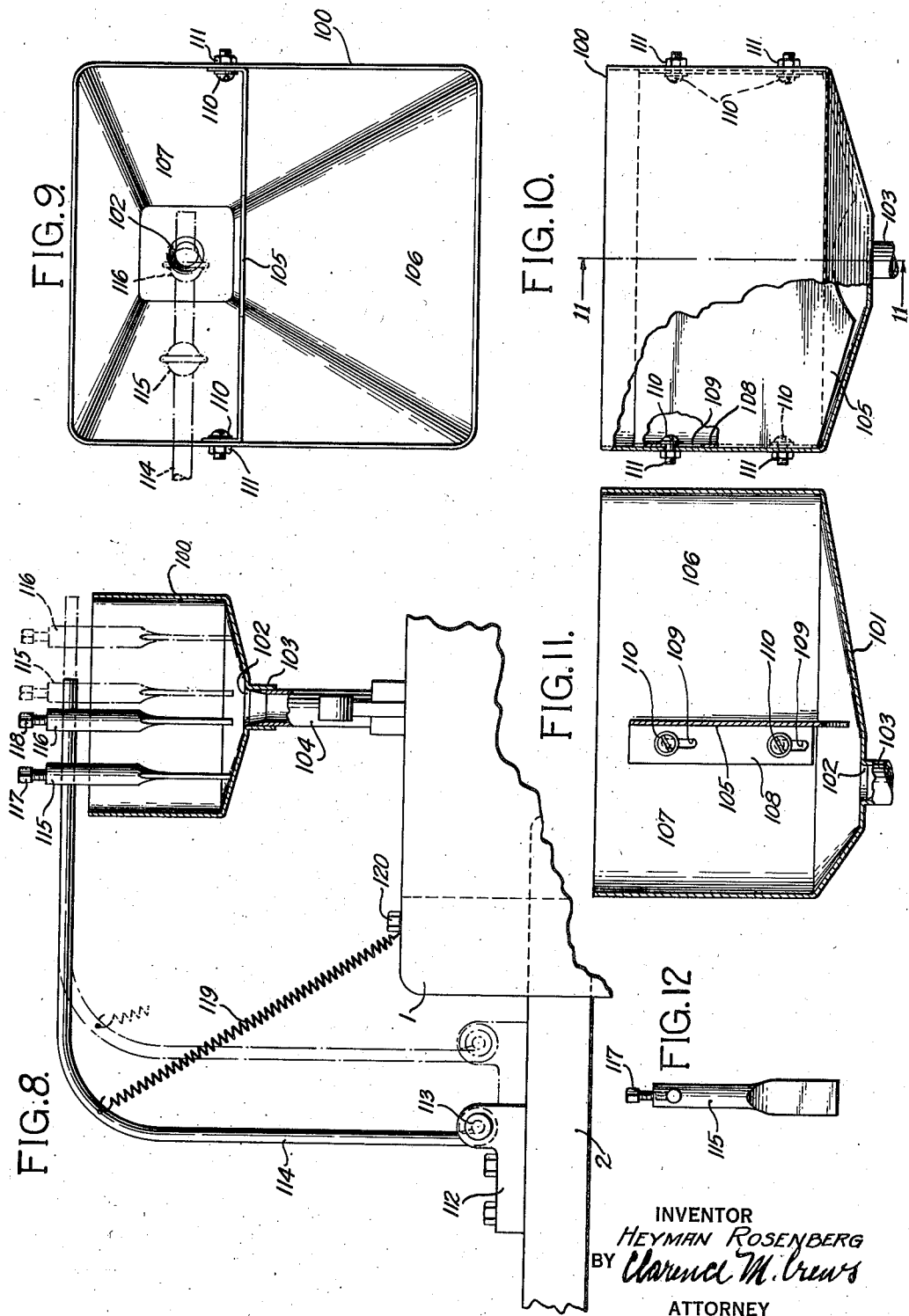
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UNITED STATES PATENT OFFICE

2,099,232

BLANK FEEDING MEANS

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Application December 30, 1936, Serial No. 118,226

14 Claims. (Cl. 10—162)

This invention relates to blank feeding and more particularly to the feeding of wing-nut blanks to the dies of a wing-nut forming machine.

The present application is a continuation in part of my co-pending application Serial No. 628,569, filed August 12, 1932, for Apparatus for making wing-nuts, now Patent No. 2,068,076. In the co-pending application referred to, disclosure is made of a hopper, means for agitating blanks in the hopper, a feed tube, a separator detent associated with the feed tube, a transfer device for taking blanks singly as delivered by the feed tube, and carrying them singly into association with the forming dies, and blank-forming mechanism in the form of a double stroke standard header for performing the required operations upon the blanks and discharging the blanks.

The present application is not concerned with the blank transfer device, nor with the forming dies, nor with the general organization of the machine, since those features are claimed in the co-pending application referred to. The present application has to do with the means for delivering blanks singly to the blank transfer device of the machine in properly timed relation to the machine cycle.

The wing-nut blank upon which the apparatus of the present invention is especially designed to operate, is of a form having a bulbous central body portion and straight arms of substantially equal lengths extending in opposite directions from the body portion.

It is an object of the present invention to provide a supply hopper into which the blanks may be miscellaneously deposited, and associated mechanism for agitating the blanks in the hopper and for causing the blanks to be delivered from the hopper in aligned relation.

To these ends, it is a feature of the invention that provision is made of one or more agitating arms for shuffling the blanks in the hopper, and of a delivery tube extending downward from the hopper and having its mouth portion, which communicates with the bottom of the hopper, flared.

It is a further feature of the invention that a separator detent is provided in association with the delivery tube for releasing the blanks singly, and that provision is made of means for actuating the detent at alternate strokes of the two-stroke forming mechanism.

It is a further feature, in accordance with a preferred embodiment of the invention, that provision is made of a partition in the hopper divid-

ing the hopper into receiving and discharging chambers, the partition being so arranged as to provide a limited communication space at its lower side between the receiving and discharging chambers. The discharge tube communicates with the discharging chamber, and the blank-shuffling arm or arms act in the discharging chamber. The partition serves to maintain a limited but adequate supply of blanks in the discharging chamber, so that objectionable resistance to movement of the blank-agitating arm or arms is avoided and the application of objectionable weight to the blanks seeking admission to the discharge tube is avoided.

Other objects and advantages will hereinafter appear.

In the drawings forming part of the specification,

Fig. 1 is a fragmentary view in elevation, partly broken away, illustrating a portion of a wing-nut forming machine embodying features of the present invention;

Fig. 2 is a view similar to Fig. 1 but showing the parts in a different operating position;

Fig. 3 is a fragmentary vertical sectional view, taken upon the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a fragmentary plan view showing the interior of the hopper of Figs. 1 to 3;

Fig. 5 is a fragmentary vertical sectional view, taken on the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a fragmentary detail sectional view showing the feed tube of the associated separator detent;

Fig. 7 is a view similar to Fig. 5, taken from a plane at right angles to the plane of a section of Fig. 5;

Fig. 8 is a fragmentary view in elevation showing a modified form of hopper and blank-agitating means;

Fig. 9 is a fragmentary plan view showing the hopper and a portion of the agitating means of Fig. 8;

Fig. 10 is a view in front elevation, partly broken away, showing the hopper of Figs. 8 and 9, and a fragment of the discharge tube;

Fig. 11 is a view in sectional elevation, taken upon the line 11—11 of Fig. 10, and

Fig. 12 is a detail view showing one of the agitator arms of Fig. 8.

In the illustrative embodiment of Figs. 1 to 7, inclusive, provision is made of the usual framework 1 of a standard header, through which a transversely arranged reciprocating bar 2 ex-

tends. The bar 2 is part of the standard header mechanism, and is connected to the source of power in the usual well-known manner. Fixed to, and carried by, the bar 2 at the inner end portion thereof, is a blank carrier 3, of the form disclosed and claimed in my co-pending application, Serial No. 612,327, filed May 19, 1932 now Patent No. 2,068,075. The carrier 3 is made up of a main plate connected by a bolt 4 with a bar 2.

A stop 5 is fixed to the frame 1, in position to interrupt return movement of a bar 6, slidably carried by the under edge of the main plate of the carrier 3. The bar 6, as seen in detail in my copending application just referred to, is slotted longitudinally and held by bolts 7—7 against detachment from the main plate, while being left free to slide, and the bar 6 is preferably stressed by a spring, not illustrated, in a direction toward the stop 5. A clamping jaw 8 is pivoted to the forward end of the bar 6 and is stressed by a spring 9 rearward or toward a clamping position. The inner or operative clamping face of the jaw 8 is preferably grooved and adapted to snugly engage a nut blank, and the main body of the carrier 3 is correspondingly oppositely notched in its end portion, so that the lower arm of a blank can be clamped between the jaw 8 and the main plate. Portions of the main plate are cut away or notched to accommodate the passage of a placer plunger when the blank is to be moved from the carrier 3 into engagement with the female die, as hereinafter referred to. A finger 10 is pivotally carried by the main plate of the carrier 3, and is stressed by a spring 11 to position for serving as a guide for a nut blank. The finger, however, is capable of moving pivotally when required to do so, to permit movement of the blank.

The purpose of the carrier is to carry the blanks one by one into association with a female die 40, and the purpose of the mechanism to which the present invention relates is to deliver the blanks one by one to the carrier, one blank for each alternate stroke of the header.

The machine comprises a main plunger head 37, which is well known as actuated with two reciprocations, one a main body or horizontal reciprocation to effect the heading or die-stamping operation, and the other a vertical movement between die-stamping operations to bring the required plungers or dies, or feeding fingers, as the case may be, into proper alignment.

The main plunger head 37 carries a placer plunger 39 and a forming die 38. One forward stroke of the main plunger occurs at a time when the carrier is in position to hold a blank 24, 25 in line with the die 40, as seen in Fig. 3, and is effective to thrust the blank from the carrier and between resilient holding fingers 41. This is the depressed stroke of the main plunger 37, as illustrated in Fig. 1. At the next or raised stroke of the main plunger, as illustrated in Fig. 2, the die 38 co-operates with the die 40 to perform the required forming operation upon the blank. As the main plunger 37 now recedes, the die 38 carries with it the blank which has just been formed. At the next depressed stroke of the main plunger, a succeeding blank is thrust by the placer plunger 39 between the holding fingers 41, and at the same time the formed blank on the die 38 is carried past a resiliently supported stripper finger 52, mounted on the stationary frame 1. As the plunger 37 again withdraws, the stripper finger strips the formed blank from the die 38, and so the cycle of operations continues.

What has been thus far described with specific reference to the drawings, is either conventional mechanism or mechanism which is novel with one or the other of my two co-pending applications which have been referred to herein.

The mechanism for delivering the blanks singly to the carrier 3, which embodies the features novel with the present invention, will now be described.

As a preliminary, however, it should be noted that the blank upon which the mechanism is designed to operate comprises a central main body portion 24 (see Fig. 3) and straight arms 25 of equal lengths extending in opposite directions from the bulbous central body portion 24. Such blanks, if supported from their central body portions, would not have a tendency, like headed nails, to hang vertically. It is desirable, therefore, to contrive means for arranging the blanks in end-to-end relation. The central body portions, however, present a difficulty to the securing of such an arrangement. Conventional mechanism, therefore, for arranging and delivering headed fasteners such as nails, or for arranging and delivering slugs or rods of uniform cross section, are inapplicable to the blanks 24, 25.

In accordance with the present invention, the blanks are dumped into a hopper 13, having a discharge opening 14 in its base and a downwardly extending sleeve 15 surrounding the discharge opening. A discharge tube 12 is secured within the sleeve 15. The upper end of the tube 12 is reamed out or otherwise enlarged internally to provide a flared, funnel-like, mouth portion 16 to assist in guiding blanks to an upright position.

A bracket or other appropriate support 17 is fixed to the reciprocating bar 2, and the bracket 17 carries a flexible brush 18, which may be of leather, fabric or other appropriate material, and is preferably detachably carried by a plate 19, which forms the lower end portion of an arm 20. The arm 20 is passed through an eye 21 forming part of a rod or arm 22. The arm 20 is adjustably fixed to the arm 22 by means of a set screw 23. The arm 22 is adjustably fixed to the bracket 17 by means of a set screw 23a. The set screw 23 enables the brush 18 to be located at a proper elevation with reference to the floor of the hopper, and the set screw 23a enables adjustment of the limits of movement of the brush 18 to be made so as to cause the brush to travel across the discharge opening 14 and cause the blanks lying improperly with respect to the discharge opening 14, so that they cannot fall into it, to be moved out of the way by the brush and allow other blanks to fall after the manner indicated in Fig. 5.

It is a point that the discharge opening 14 is of greater diameter at its mouth than half the length of a nut blank, and of less diameter than the full length of a blank, so that under no circumstances can a blank fall into the opening 14 edgewise. When a preponderating bulk of the blank overhangs the opening 14, the blank will fall by gravity into the opening and will have a turning movement, as indicated in dotted lines in Fig. 5, until the blank is thus brought to an upright position, so that the blanks descend in the tube 12 after the manner shown in Fig. 6. There is no possibility of clogging, and the tube 12 is of ample diameter to allow free feeding of the blanks arranged end to end. The tube is of sufficient diameter to accommodate the bulbous body of a blank, but is not of sufficient diameter to permit the adjacent arms of two successive

blanks to attain an overlapped condition. Roughly, this may be stated, that the tube diameter is less than twice the diameter of a blank arm. The larger end of the funnel-like mouth is not of sufficient diameter to permit two of the bulbous enlargements to be received side by side within it.

In order to retain the blanks in the tube 12 and cause them to be discharged singly as required by the operation of the machine, provision is made of a detent 28, pivoted at 29 upon a bracket 30, which is fixed by a bolt 31 to the main frame 1. The detent carries at its lower end an obstructing or detaining finger 26, which is normally projected through an opening 27 in the side of the tube. The detent is rocked counter-clockwise, as seen in Fig. 6, by means of a compression spring 32, which is interposed between the guide tube and the tail 34 of the detent, the spring being seated in a bore 33 formed in the tail of the detent. The finger 26 is not long enough to extend completely across the bore of the tube 12 nor to extend into the tube far enough to clamp a blank arm against the tube wall. The finger 26 in its forwardly projected position, extends only far enough to prevent the passage downward of the bulbous central body of a blank. Thus, the normal or ideal condition is that illustrated in Fig. 6, although the blanks may be more or less canted in actual practice.

It will be remembered that one blank is required for each two strokes of the main plunger 37. For the purpose of causing a blank to be released at every second stroke of the plunger 37, provision is made upon the plunger 37, itself, of a bracket 36, which carries a detent operating finger 35. The operating finger may be in the form of a threaded bolt secured to the bracket by means of nuts threaded onto the bolt at opposite sides of the bracket. An adjustment of the finger may be secured by re-adjusting the nuts.

The operation of the finger 35 upon the detent will be readily apparent from a comparison of Figs. 1 and 2. In Fig. 1 the main plunger 37 is at the forward limit of its depressed or placing stroke. In this position, it has rocked the detent 28 clockwise against the force of the spring 32, and caused the finger 26 to withdraw from the blank path in the tube. This permits the blanks in the tube to descend until they are arrested by the arrival of the lowermost blank against the top of the body of the carrier 3. The lowermost blank supports the following blanks temporarily until the carrier 3 has returned from its blank delivering position to its blank receiving position as shown in Fig. 3, whereupon the released blank drops into the jaws of the carrier. In the meantime the plunger 37 will have been retracted so that the finger 26 will have been projected by the spring 32 into position to prevent a second blank from descending. It will be noted that the finger 26 will function properly if it is returned at any time after the bulbous body of the first blank has cleared the level of the finger and before the bulbous body of the following blank has reached the level of the finger. The same header may, therefore, be employed for various sizes of blanks without any modification other than the substitution of the proper hopper, feed tube and dies.

At the raised or forming stroke of the plunger 37, no additional blank is wanted, and none is delivered, the finger 35 being carried forward at that stroke to the position shown in Fig. 2, in which position it escapes engagement with the tail 34 of the detent.

In the form of the invention illustrated in Figs. 8 to 12 inclusive, provision is made of a hopper 100, having a sloping bottom 101, which is inclined in all directions toward a discharge opening 102 in the bottom of the hopper.

As in the form already described, a sleeve 103 extends downward from the opening and surrounds the upper end of a feed tube 104. The upper end of the feed tube 104 is provided with a flaring mouth, as in the form of Figs. 1 to 7, for the purpose which has already been made clear. The discharge opening 102 is desirably formed well to one side of the hopper, and provision is made of a partition plate 105 for dividing the hopper into receiving and discharging chambers 106 and 107. The partition plate is adjustable toward and from the bottom of the hopper to provide a limited clearance so that blanks can pass from the receiving chamber to the discharge chamber, but not so freely that there will ever be a substantial accumulation of blanks in the discharge chamber. Such adjustment is desirably provided by making the partition plate 105 with end flanges 108, having upper and lower vertical slots 109 formed in them. The partition plate is adjustably clamped in place by means of bolts 110, passed outward through the slots and through holes in the walls of the hopper, and by clamping nuts 111 threaded onto the outwardly projecting bolt ends.

The main parts of the machine are the same as in the form of the invention previously described, the hopper and feed tube being supported from the stationary frame 1, and the reciprocating slide 2 being present as before.

The reciprocating slide carries a plate 112, in which a bearing pin 113 is mounted. A rocking arm 114 is journaled on the bearing pin 113 and extends upward and over the hopper 100. The arm 114 has two blank-agitating blades or arms 115 and 116, adjustably attached to it by means of set screws 117 and 118, respectively. A tension spring 119, connected at one end to the arm 114 and at its opposite end to the main frame 1 by means of a bolt 120, tends to rock the arm 114 in a clockwise direction. Clockwise rocking of the arm is limited, however, by engagement of one or the other of the agitating blades 115, 116, with the bottom of the hopper. In the full-line position illustrated in Fig. 8, clockwise rocking of the arm 114 is limited by engagement of the blade 115 with the bottom of the hopper, and in the dotted line position of Fig. 8, clockwise movement of the arm 114 is prevented by engagement of the blade 116 with the bottom of the hopper.

With this arrangement, the blades travel alternately in engagement with the bottom of the hopper, and each serves to control the movement of the other and to limit the approach of the other to the discharge opening. The blades are desirably so adjusted that each one is caused to travel across the discharge opening but to have its stroke in one direction limited substantially to the plane of a boundary of the discharge opening. The arrangement enables the blades to pass nearer to the mouth of the discharge opening than they could if they were simply reciprocated in a horizontal plane, since the sloping bottom of the hopper would limit the level at which such reciprocation could occur. The feature is especially useful for operating upon small blanks.

The fact that the arm 114 is yieldingly urged clockwise by the spring 119, enables the arm to

yield in a counter-clockwise direction in response to any positive obstruction which may be encountered. It is not necessary, therefore, for the blades 115 and 116 to be provided with yielding brushes, although leather sheaths or jackets are desirably provided for the purpose of reducing noise.

The partition plate 105 may be centrally mounted in the hopper to make the receiving and discharge chambers of substantially equal size, but preferably it is provided well to one side, so as to make the receiving chamber substantially larger than the discharge chamber. The partition is of especial utility for operating upon small blanks.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not, therefore, desire to limit myself to the specific constructions illustrated, but intend to cover my invention broadly in whatever form its principle may be utilized.

I claim:

1. In die stamping apparatus for wing-nuts, the combination of a container for wing-nut blanks of a tube leading directly downward from the bottom of the container for conducting the blanks downward in end to end, aligned relation, said tube having a funnel-like mouth of substantially circular cross-section, the lower end of said mouth being of less diameter than the upper end thereof, but of greater diameter than one-half the diameter of said upper end, and means for agitating wing-nut blanks within the container.
2. The combination as claimed in claim 1 wherein the height of the funnel-like mouth of the feed tube is less than the diameter of the upper end of said mouth.
3. In feeding apparatus for nut blanks for nut stamping mechanism, the combination, with a blank feeding tube, of a detent extending into the tube in position to engage a blank and positively obstruct the descent of blanks within the tube for temporarily preventing feeding thereof, a blank carrier movable across the lower end of the tube between blank receiving and blank delivering positions and effective to prevent escape of a blank from the tube when not in blank receiving position, means for operating the blank carrier, and means for positively operating said detent to a non-obstructing position in timed relation to the movements of the carrier when the carrier is not in receiving position.
4. The combination as claimed in claim 3 which further includes a plunger die for driving the blank from the carrier, and a reciprocating plunger carrying said die, and in which the detent operating means is carried by the plunger.
5. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper, a feed tube leading downward from the hopper, means for causing the blanks to pass from the hopper into the tube in end to end relation, a detent having a finger extending into the tube far enough to obstruct the central body portion of a blank, but not far enough to clamp a blank arm against the tube wall, and means for periodically actuating the detent to withdraw the finger from blank obstructing position.
6. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination,

a hopper, a feed tube leading downward from the hopper, means for causing the blanks to pass from the hopper into the tube in end to end relation, a detent having a finger extending into the tube, and means for periodically actuating the detent to withdraw the finger from blank obstructing position, the machine being a double stroke header and including a main plunger whose operating strokes occur in spaced parallel paths, and the detent actuating means consisting of a member mounted on the main plunger in position to engage and actuate the detent on one operating stroke of the plunger but to escape engagement with the detent on the other operating stroke of the plunger.

7. A machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms comprising, in combination, a hopper, means for agitating blanks in the hopper, and a feed tube extending from the bottom of the hopper for delivering blanks from the hopper in aligned relation, said feed tube comprising a portion of a uniform diameter large enough to pass the bulbous body of a blank freely but not large enough to permit the blank arms of successive blanks to attain an overlapped condition, and said tube having a flared mouth portion adjacent the hopper, the larger or entrance end of said mouth portion having a diameter less than the length of a blank but greater than half the length of a blank.

8. A machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms comprising, in combination, a hopper, means for agitating blanks in the hopper, and a feed tube extending from the bottom of the hopper for delivering blanks from the hopper in aligned relation, said feed tube having a flaring mouth and a portion of uniform diameter forming a continuation of the mouth, the portion of uniform diameter having a diameter greater than that of the central bulbous body of a blank, but not large enough to permit the blank arms of successive blanks to assume an overlapped relation.

9. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper, a feed tube having a flared mouth communicating with the bottom of the hopper, means for agitating the blanks in the hopper comprising a pair of agitating arms, and means for moving the agitating arms alternately across the flared mouth of the feed tube from opposite directions.

10. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper having a discharge opening in its bottom and having its bottom sloped from opposite directions toward the discharge opening, a pair of agitating arms, an upwardly yielding carrier for moving the agitating arms alternately across the discharge opening from opposite directions, and means yieldingly urging the carrier in a direction to carry the agitating arms toward the hopper bottom, the arrangement being such that the carrier is supported from the hopper bottom first by one of the agitating arms and then by the other.

11. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper having a discharge opening in its bottom and having its bottom sloped from opposite directions toward the discharge opening, a pair of agitating arms, and a carrier cooperating with

the agitating arms to cause the arms alternately to move down across a portion of the hopper bottom and then upward across the discharge opening.

12. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper having a discharge opening in its bottom and having its bottom sloped from opposite directions toward the discharge opening, a pair of agitating arms, an upwardly yielding carrier for moving the agitating arms alternately across the discharge opening from opposite directions, and means yieldingly urging the carrier in a direction to carry the agitating arms toward the hopper bottom, the arrangement being such that the carrier is supported from the hopper bottom first by one of the agitating arms and then by the other, and means for adjusting the positions of the agitating arms relative to the carrier.

13. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper, a feed tube having a flared mouth com-

municating with the bottom of the hopper, means operating across the flared mouth of the feed tube for agitating the blanks in the hopper, and a partition dividing the hopper into receiving and discharging chambers, said partition clearing the bottom of the hopper sufficiently to permit restricted passage of blanks from the receiving to the discharging chamber of the hopper.

14. In a machine for forming wing-nut blanks from blanks having bulbous central body portions and oppositely extending arms, in combination, a hopper, a feed tube having a flared mouth communicating with the bottom of the hopper, means operating across the flared mouth of the feed tube for agitating the blanks in the hopper, a partition dividing the hopper into receiving and discharging chambers, said partition clearing the bottom of the hopper sufficiently to permit restricted passage of blanks from the receiving to the discharging chamber of the hopper, and means for adjustably mounting the partition relative to the hopper bottom.

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