Oct. 2, 1956 W. W. MAHER 2,765,167

BLANK STACKING MECHANISM WITH BLANK INTERCEPTING ELEMENTS

Filed May 22, 1953 2 Sheets-Sheet 1

Fig. 1

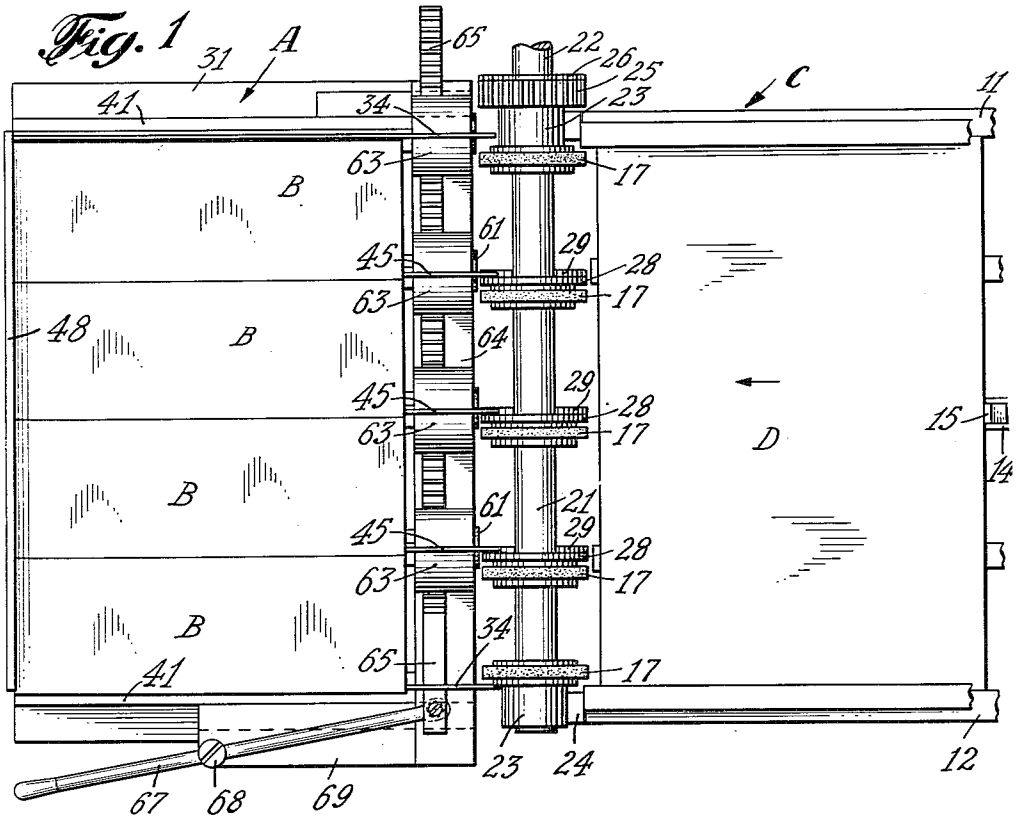
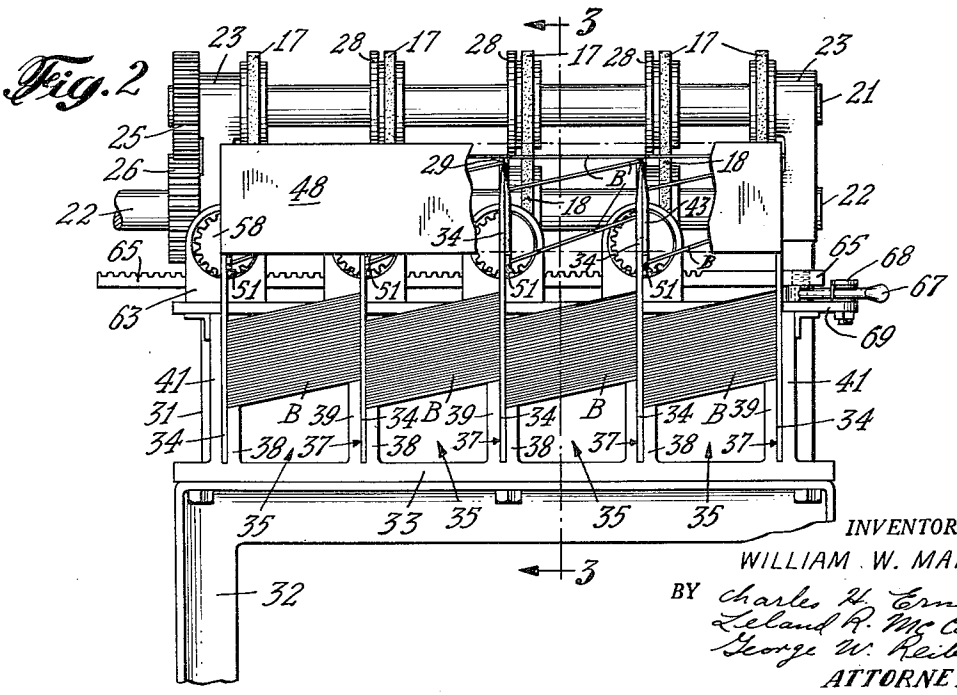


Fig. 2



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Fig. 3

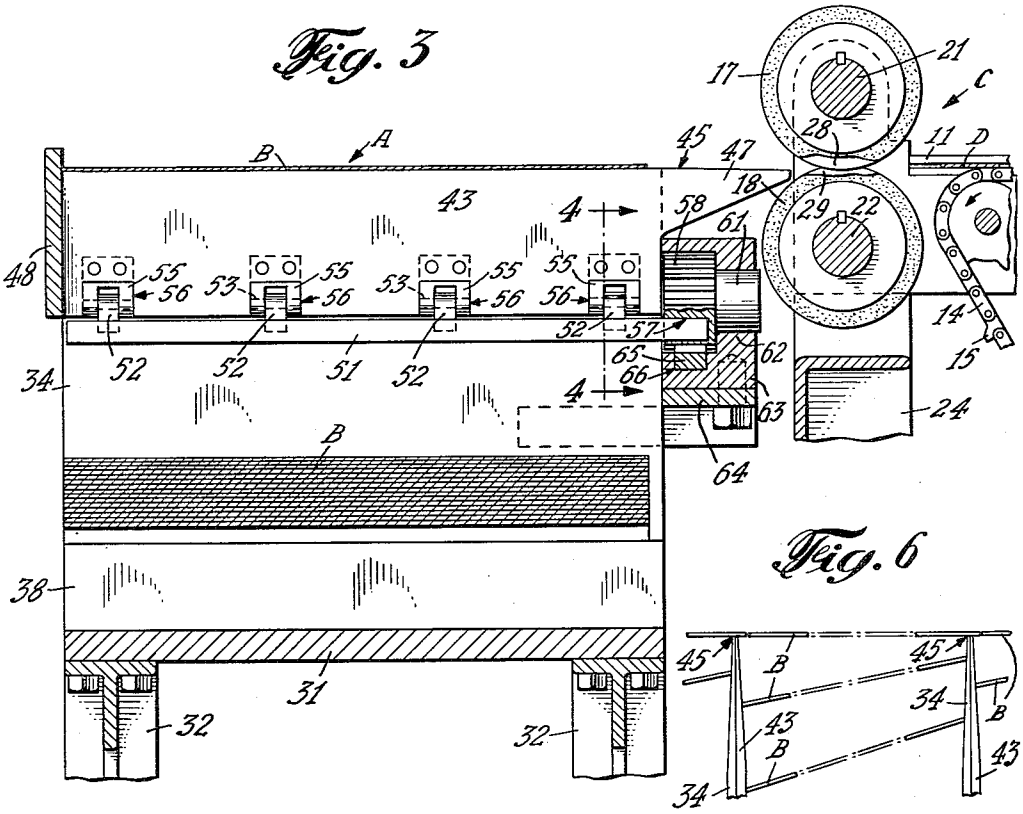


Fig. 6

Fig. 4

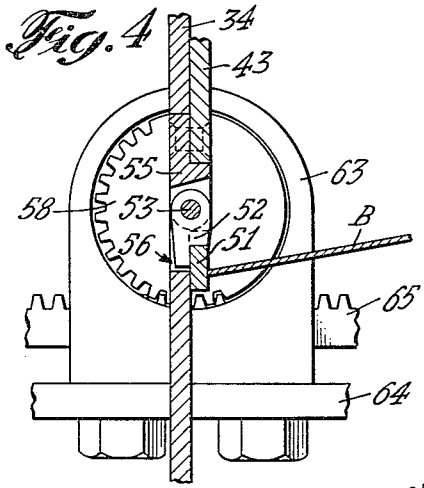


Fig. 5

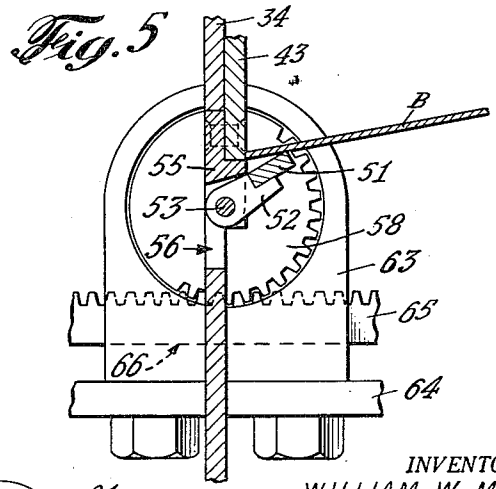
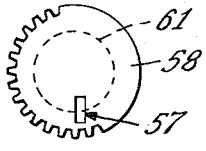


Fig. 7



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BLANK STACKING MECHANISM WITH BLANK INTERCEPTING ELEMENTS

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7 Claims. (Cl. 271—86)

The present invention relates to a mechanism for arranging in vertical stacks, flat sheet material blanks received in a substantially continuous procession from a source of supply such as from a sheet slitting machine or the like and has particular reference to devices for temporarily segregating a batch of stacked blanks to facilitate its removal from the mechanism without stopping the flow of the blanks into the mechanism.

In the manufacture of cans or containers, sheet material such as fibre board or tin plate is cut by a slitting machine into strips or blanks from which can bodies and other can parts are produced. In some cases, transfer of the cut blanks from the slitting machine to subsequent operation machines must be effected manually. In order to facilitate handling of the blanks in an expeditious manner, it is necessary to arrange them in stacked formation.

Where this stacking of the blanks is effected automatically as they are received direct from the slitting machine, the discharge of the blanks from the slitting machine is so rapid and so continuous that it is difficult for an operator to manually remove a batch of the stacked blanks. As a result stoppage of the slitting machine is often resorted to in order to permit the operator to safely remove the stacked blanks. This interferes with production and increases the cost of the finished cans.

The instant invention contemplates overcoming these difficulties by the provision of a stacking mechanism which permits of removing batches of the stacked blanks without interrupting the operation of the slitting machine.

An object of the invention is the provision of a blank stacking mechanism which receives blanks in a substantially continuous procession and wherein a stack of received blanks may be temporarily segregated from other continuously fed blanks without stopping the feeding of said blanks to facilitate removal of the stacked blanks from the mechanism.

Another object is the provision of such a blank stacking mechanism wherein a plurality of the stacks of blanks may be accommodated in closely adjacent relationship so that the blanks may be received directly from a sheet slitting machine or the like from which the blanks are discharged without the benefit of lateral spacing.

Another object is the provision of such a blank stacking mechanism wherein the stacking of the blanks is effected continuously regardless of the temporary segregation of the blanks as they are received to facilitate removal of a batch of the stacked blanks.

Still another object is the provision of such a blank stacking mechanism wherein the control of the mechanism to facilitate removal of batches of the stacked blanks is effected manually so that the height of the stacks of blanks to be removed may be determined by the operator in accordance with his ability to handle them with ease.

Numerous other objects and advantages of the 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 the discharge end of a sheet slitting machine and an attached blank stacking mechanism embodying the instant invention, with parts broken away;

Fig. 2 is an end elevation of the machine and mechanism as viewed from the left in Fig. 1, parts being broken away;

Fig. 3 is a longitudinal section taken substantially along the line 3—3 in Fig. 2, with parts broken away;

Figs. 4 and 5 are enlarged sectional details as taken substantially along the line 4—4 in Fig. 3, the two views showing the moving parts and a fragmentary portion of a blank in different positions;

Fig. 6 is a schematic view showing how blanks cut from a sheet are received in the stacking mechanism, and

Fig. 7 is a reduced scale detail view of a gear used in the mechanism.

As a preferred or exemplary embodiment of the invention the drawings illustrate a stacking mechanism A (Fig. 1) adapted to stack slit sheet metal can body blanks B received from a sheet slitting machine C of the character disclosed in United States Patent 2,355,079 issued August 8, 1944 to L. L. Jones on Sheet Slitting Machine, although the invention is equally adapted to other machines.

In such a slitting machine, large unslit sheets D of tin plate or the like material, are advanced in a horizontal position between a pair of spaced and parallel guide rails 11, 12 (Figs. 1 and 3) by a continuously moving endless chain conveyor 14 having spaced feed dogs 15 for engaging behind and propelling the sheets D. The conveyor 14 advances the sheets D into the grip of cooperating pairs of continuously rotating upper and lower resilient feed rollers 17, 18 mounted on a pair of spaced and parallel cutter shafts 21, 22 which extend transversely of the machine. At their ends the shafts are journaled in bearings 23 formed in a frame 24 which constitutes the main frame of the machine. Meshing gears 25, 26 carried on the shafts rotate the shafts in unison. The lower shaft 22 is the driving shaft and may be driven in any suitable manner, preferably as shown in the above mentioned Jones patent.

There are a plurality of sets of the feed rollers 17, 18 spaced along the shafts 21, 22 and each set, intermediate the end sets is formed as a part of a cutter unit comprising upper and lower rotary cutters or slitter rolls 28, 29. These sets of slitter rolls rotate with the cutter shafts 21, 22 and are spaced apart to produce the width of can body blank desired.

Hence as a sheet D is advanced by the conveyor 14 into the grip of the feed rollers 17, 18, the latter feed the sheet between the slitter rolls 28, 29 and thus cause the sheet to be slit longitudinally to produce the can body blanks B. Three sets of slitter rolls 28, 29 are shown in the drawings and these rolls produce four blanks B. The slitter rolls usually rotate faster than the lineal travel of the conveyor 14 and thus take the sheet away from the conveyor dogs 15 and discharge the blanks B at high speed. Since the slitter rolls merely sever or cut the sheet, there is no space between the blanks when they are discharged from the slitter. The slit blanks B are discharged directly into the stacker mechanism A in a substantially continuous procession as the sheets D advanced by the conveyor 14 follow closely one behind the other.

The stacker mechanism A comprises a magazine frame 31 which is disposed in front of the slitting machine C adjacent the slitting rolls 28, 29 and is supported on a pair of legs 32. The magazine frame 31 is formed with a base 33 which carries a plurality of vertically disposed longitudinally extending magazine side walls or division plates 34 (Fig. 2) which between them define a plurality

of magazines 35 disposed in side-by-side relation for the reception of the blanks B from the slitting machine. There is one magazine for each blank B slit from a sheet D. By way of example, the drawings show the sheets D being slit into four blanks B and therefore there are four magazines 35 to receive the four blanks B.

At their lower edges, the division plates 34 are supported in vertical slots 37 (Fig. 2) formed in spaced and parallel longitudinal webs which extend up from the base 33 and which set off in the bottom of each magazine 35 a low support rail 38 and a slightly higher high support rail 39 for supporting the received blanks B in a transversely inclined position as shown in Fig. 2. The two outer division plates 34 outside of the magazines are supported additionally by side walls 41 of the magazine frame.

At their upper edges, the division plates 34 are provided with blank guide plates 43 which are secured in any suitable manner to one side of the division plates 34, the right side as shown in Fig. 2 to correspond with the low rails 38 at the bottom of the magazines. These guide plates 43 extend down along the division plates 34 for only a short distance and terminate well above the desired height of a stack of blanks B to be accumulated in the magazines 35.

The upper outer faces of the division plates 34 and the guide plates 43 are tapered as best shown in Fig. 6 to guide the edges of the blanks and guard against wedging of the blanks between the plates and thereby facilitate entrance of the blanks B into the magazine. These tapered faces provide a relatively narrow or sharp top edge 45 (Fig. 6) at the upper edges of the plates 34, 43.

The sharp edges 45 are disposed at a level slightly below the horizontal path of travel of a sheet D passing between the slitting rolls 28, 29 and are located slightly out of lateral alignment with the line of severance of the slitter roll, i. e. toward the left or high side of the adjacent stack of blanks as viewed in Fig. 2. Thus one marginal edge portion of each blank, i. e. the right as viewed in Fig. 2, is supported by the sharp edge 45 as the blanks are received from the slitting rolls 28, 29 and are deposited in inclined position on the support rails 38, 39. For this purpose each of the guide plates 43 is formed with a longitudinal or coplanar extension 47 (Fig. 3) which extends toward and closely adjacent the slitting rolls 28, 29.

Hence as the blanks B are slit from the sheets D, they advance onto and are partially supported on the the sharp edges 45 of the plates 34, 43 and upon complete severance, travel under their own inertia along the edges 45 until they contact a stop plate 48 (Figs. 1, 2 and 3) secured to and extending transversely of the forward vertical edges of the division plates 34. This stop plate 48 arrests further advancement of the blanks and locates each blank over a magazine 35 with one edge of the blanks unsupported and the other resting on a sharp edge 45 as shown in Fig. 6.

With the blanks in this position, the unsupported edge falls downwardly along the tapered face of the adjacent guide plate 43 and thus pivots the blank on its opposed supported edge, causing the blank to assume an inclined position with its higher edge leaning against the adjacent division plate 34 as shown in Figs. 2 and 6. This inclined position creates sufficient space between the blanks to permit each blank to enter its magazine and fall onto the low and high support rails 38, 39 at the bottom of the magazine without wedging against the division plates. As successive sheets D, passing through the slitting machine C in rapid succession, are cut into blanks B, the blanks enter the magazines 35 as explained above in a substantially continuous longitudinal procession and thereafter accumulate on the low and high rails 38, 39 at the bottoms of the magazines to produce laterally inclined stacks as shown in Fig. 2 for subsequent use.

In order to facilitate removal of the stacks of accumulated blanks B without interrupting the procession of blanks entering the magazines, provision is made to intercept temporarily the entering blanks and thereby segregate them from the stacks. For this purpose a movable support

or stop element or shelf 51 (Figs. 3, 4 and 5) is disposed adjacent each magazine 35 and is movable into the path of travel of the inclined blanks entering the magazine to intercept and temporarily support them at a level above an accumulated stack.

The shelves 51 preferably are located adjacent the magazine division plates 34 at the lower edges of the guide plates 43. Each shelf 51 is secured to a plurality of movable hinge members 52 (Figs. 3, 4 and 5) mounted on pintles 53 carried in stationary bearing brackets 55 located in openings 56 in the division plates 34. The bearing brackets 55 are secured to the guide plates 43.

Movement of the shelves 51 into and out of operating position is effected by pivoting or oscillating the shelves on their hinge pintles 53. The shelves 51 in all of the magazines 35 preferably are oscillated simultaneously and in unison. For this purpose the inner ends of the shelves 51 extend into eccentrically disposed radial slots 57 formed in actuating gears 58. There is one gear 58 for each shelf 51. The gears are formed with bearing hubs 61 (Fig. 3) which are journaled in bearings 62 formed in housings 63 bolted to a support bracket 64 extending along the back of and secured to the magazine frame 31.

The gears 58 mesh with a rack bar 65 which is slidably disposed in grooves 66 (Figs. 3 and 5) formed in the housings 63. One end of the rack bar 65 is pivotally attached to an actuating lever or handle 67 (Figs. 1 and 2) which intermediate its length is carried on a pivot pin 68 secured in an extension 69 of the bracket 64.

Hence by manually shifting the actuating lever 67, the rack bar 65 may be shifted in its grooves 66 and thus partially rotate the gears 58 to rock the shelves 51 into a desired position. The normal position of the shelves 51 is shown in Fig. 4. In this position the shelves depend alongside the division plates 34 of the magazines 35 and provide a continuation of the guide plates 43 to permit blanks B entering the magazines to fall unrestricted for accumulation in stacked formation on the support rails 38, 39.

When the operator believes the accumulation of blanks in the magazines 35 has reached a point where the stacked blanks should be removed, he swings the actuating lever 67 inwardly toward the magazine frame 31 from the position shown in Fig. 1 and this rotates the gears 58 in a counterclockwise direction as viewed in Figs. 4 and 5 and thus swings the shelves 51 upwardly into the position shown in Fig. 5. In this position of the shelves 51 they extend into the magazines 35 in the path of vertical travel of the blanks as they travel from the slitting rolls 28, 29 to the tops of the stacks of blanks in the magazines.

Since the falling blanks are in an inclined position as shown in Fig. 6, with the higher edge moving along the tapered face of the magazine division plate 34 and the lower edge similarly moving along the inner face of the guide plate 43, the lower edge of the entering blanks engage against the shelves 51 projecting into the magazines and thus intercept and arrest further falling of the blanks. The intercepted blanks are thus supported along their lower edges by the shelves 51 and along their upper edges by the division plate 34. As the blanks continue to enter the magazine they are thus held back and segregated from the stacked blanks.

While the incoming blanks are thus held back, the operator removes the stacked blanks manually and when all of the magazines are clear of stacked blanks, he again shifts the actuating lever 67, this time outwardly as viewed in Fig. 1, to return the shelves 51 to their normal inoperative positions as shown in Fig. 4. This releases the accumulated intercepted blanks and permits them to fall without restraint to the bottoms of the magazines to begin new stacks of blanks supported on the low and high support rails 38, 39.

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 stacking blanks, the combination of a magazine for accumulating said blanks in stacked formation, means for feeding said blanks into said magazine in a substantially continuous procession, said magazine including a pair of opposed upright side walls offset laterally in the same direction from the side edges of the blank as fed by said feeding means so that each blank fed thereby is initially supported at one edge thereof by one side wall only to permit the opposite blank edge to tilt and deposit the blank by gravity into said magazine, rotatable blank support means disposed adjacent said magazine side wall opposite to said blank supporting wall beneath the path of travel of the incoming blanks, and means for rotating said support means into the path of travel of the blanks being deposited into said magazine for intercepting and temporarily supporting the blanks at a level above an accumulated stack of blanks therein, whereby to facilitate removal of said blank stack without interruption of the feeding of blanks into said magazine.

2. In a mechanism for stacking blanks, the combination of a plurality of magazines for accumulating said blanks in stacked formation, means for feeding said blanks into said magazines in substantially continuous processions, each of said magazines including opposed upright side walls offset laterally in the same direction from the side edges of the blank as fed by said feeding means so that each blank fed thereby is initially supported at one edge thereof by one side wall only to permit the opposite blank edge to tilt downwardly and deposit the blank by gravity into said magazine, rotatable blank support means disposed adjacent each of said magazine side walls opposite to said blank supporting walls beneath the path of travel of the incoming blanks, and means for rotating said support means into the paths of travel of the blanks being deposited into said magazines for intercepting and temporarily segregating the entering blanks from and at a level above the stacks of blanks accumulated in said magazines, whereby to facilitate removal of said blank stacks from said magazines without interruption of the feeding of blanks thereinto.

3. In a mechanism for stacking blanks, the combination of a plurality of spaced and parallel upstanding division plates defining a plurality of adjacent magazines for accumulating said blanks in stacked formation, means for feeding said blanks into said magazines in substantially continuous processions, said division plates being offset laterally in the same direction from the side edges of the blanks as fed by said feeding means so that each blank fed thereby is initially supported at one side thereof by one division plate only to permit the opposite blank side to tilt downwardly and deposit the blank by gravity into a said magazine, rotatable blank support means disposed adjacent each of said division plates opposite to said blank supporting division plates beneath the paths of travel of the incoming blanks, and means for rotating said support means into the paths of travel of the blanks being deposited in said magazines for intercepting and temporarily segregating the entering blanks from the stacks of blanks previously accumulated in said magazines, whereby to facilitate removal of said blank stacks from said magazines without interruption of the feeding of blanks thereinto.

4. In a mechanism for stacking blanks, the combination of a plurality of magazines for accumulating said blanks in stacked formation, means for feeding said blanks into said magazines in substantially continuous processions, each of said magazines being defined by opposed upright side walls offset laterally in the same direction from the side edges of the blanks as fed by said feeding means so that each blank fed thereby is initially supported

at one edge thereof by one magazine side wall only to permit the opposite blank edge to fall and thus deposit the blank by gravity into said magazine, a support shelf pivotally mounted adjacent each of said magazine side walls opposite to said blank supporting walls beneath the path of travel of the incoming blanks, and means for swinging said support shelves on their pivotal mountings into the paths of travel of the blanks being deposited in said magazines for intercepting and temporarily segregating the entering blanks from the stacks of blanks accumulated in said magazines, whereby to facilitate unobstructed removal of said stacks of blanks without interruption of the continuous feeding of the blanks into said magazines.

5. In a mechanism for stacking blanks, the combination of a plurality of magazines for accumulating said blanks in stacked formation, means for feeding said blanks into said magazines in substantially continuous processions, each of said magazines having opposed upright side walls offset laterally in the same direction from the side edges of the blanks as fed by said feeding means so that each blank fed thereby is initially supported at one edge thereof by one side wall only to permit the opposite blank edge to drop and deposit the blank by gravity into said magazine, a support shelf pivotally mounted adjacent each of said magazine side walls opposite to said blank supporting side walls beneath the path of travel of the incoming blanks, and means connected with said shelves for swinging said shelves on their pivotal mountings into the paths of travel of the blanks being deposited in said magazines for intercepting and temporarily segregating the entering blanks from the stacks of blanks accumulated in said magazines, whereby to facilitate unobstructed removal of said stacks of blanks therefrom without interrupting the feeding of blanks thereinto.

6. In a mechanism for stacking blanks, the combination of a magazine for accumulating said blanks in stacked formation, said magazine being defined by a pair of parallel division plates constituting opposed upstanding side walls of said magazine, said division plates being spaced apart a distance less than the width of said blanks for receiving said blanks in an inclined position with the higher edge of a said blank leaning against one of said division plates, means for feeding said blanks into said magazine in a substantially continuous procession, said magazine side walls being offset laterally in the same direction from the side edges of the blanks as fed by said feeding means so that each blank fed thereby is initially supported at one edge thereof by one side wall only to permit the opposite blank edge to tilt downwardly and thus deposit the blank by gravity into said magazine, a blank support shelf rotatably mounted in the other of said magazine side walls beneath and at the opposite side of the path of travel of the incoming blanks, and means for rotating said support shelf into the path of travel of the lower edge of the inclined blanks being deposited in said magazine for intercepting and temporarily segregating the entering blanks from a stack of blanks previously accumulated in said magazine, whereby to facilitate unobstructed removal of said stack of blanks therefrom without interruption of the continuous feeding of blanks thereinto.

7. In a mechanism for stacking blanks, the combination of a magazine for accumulating said blanks in stacked formation, means for feeding blanks into said magazine in a continuous procession, said magazine being defined by a pair of parallel division plates constituting opposed side walls spaced apart a distance less than the width of said blanks for receiving said blanks in an inclined position with the higher edge of said blank leaning against one of said division plates, the inner face at the entrance edge of said one division plate being tapered to facilitate entrance of a blank into said magazine, a guide plate secured to the inner face of the other of said division plates for guiding the lower edges of a said inclined entering blank, the inner face of said guide plate at its entrance edge being tapered to insure against wedging of said blank be-

tween said plates, said magazine side walls being offset laterally in the same direction from the side edges of the blanks as fed by said feeding means so that each blank fed thereby is initially supported at one edge thereof by one side wall only to permit the opposite blank edge to fall and thus deposit the blank by gravity into said magazine, rotatable support means disposed adjacent said magazine side wall opposite to said blank supporting wall beneath the path of travel of the incoming blanks, and means for rotating said support means into the path of travel of the blanks being deposited in said magazine for intercepting and temporarily supporting the entering blanks at a level above an accumulated stack of blanks in said magazine, whereby to facilitate unobstructed removal of said stack of accumulated blanks without interruption of the continued feeding of blanks into said magazine.

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