March 8, 1927. 1,620,058

G. A. BELL ET AL

STACKING DEVICE

Filed March 8, 1926 2 Sheets-Sheet 1

FIG. 1

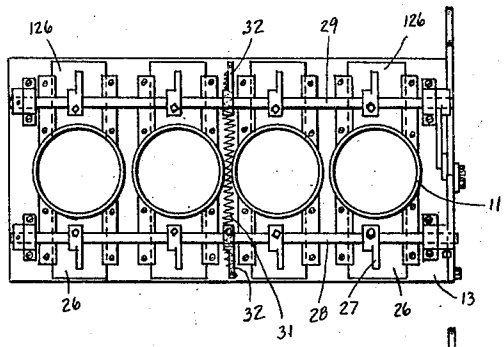


FIG. 2

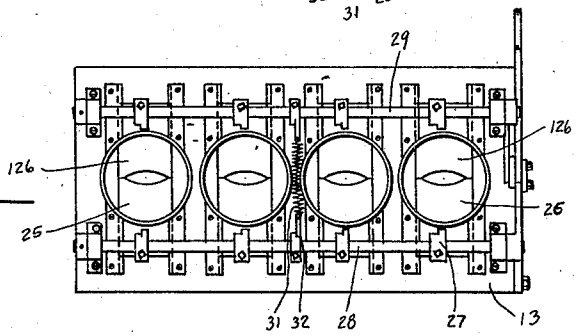
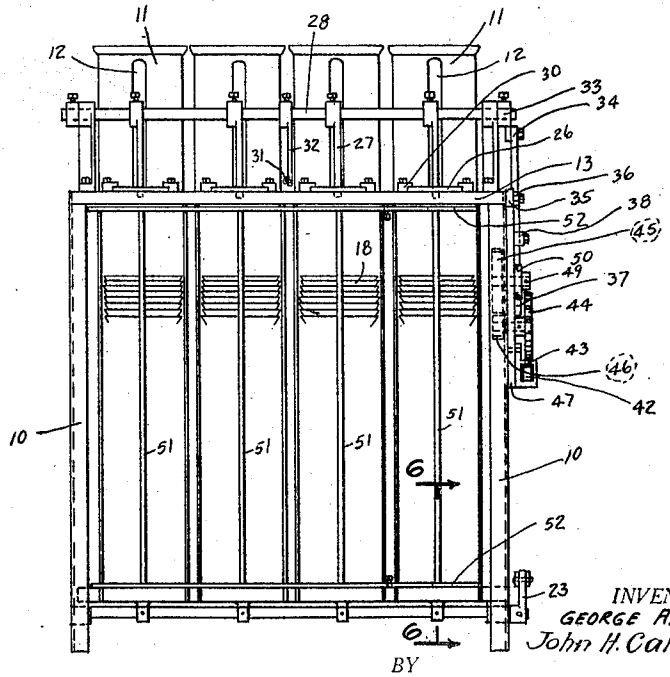


FIG. 3



INVENTOR.
GEORGE A. BELL.
John H. Carson
BY
ATTORNEYS.

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G. A. BELL ET AL

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FIG. 4

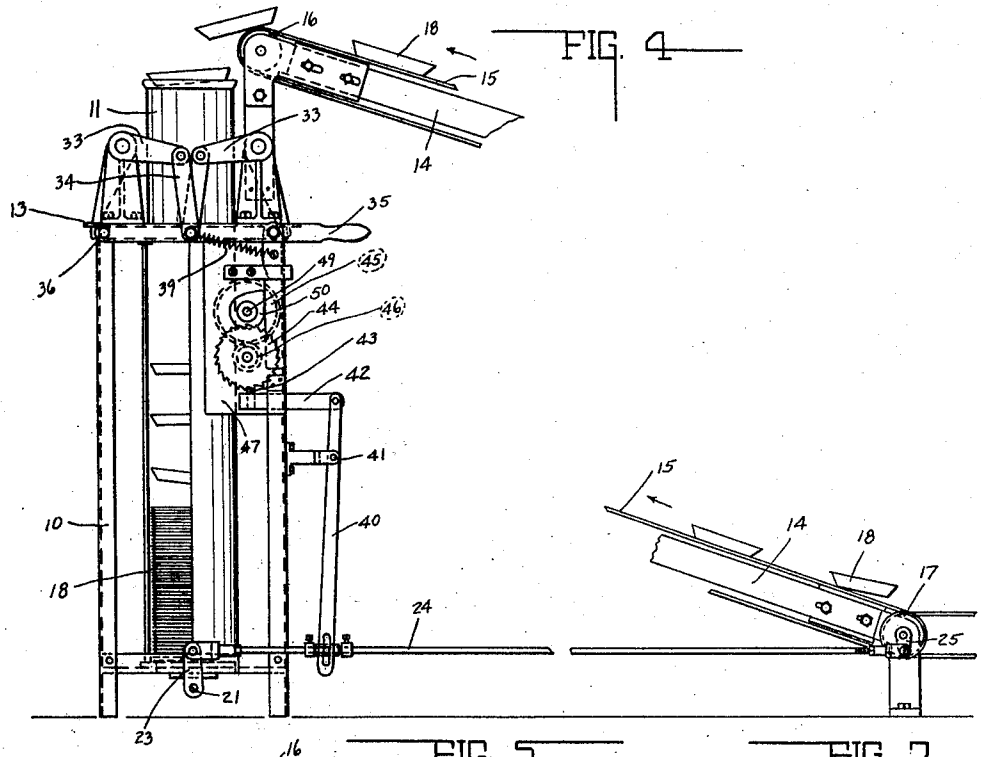


FIG. 5

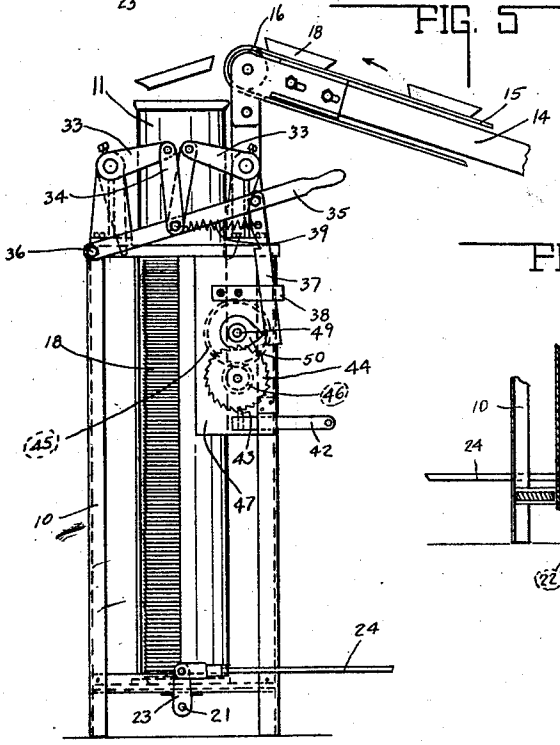


FIG. 6

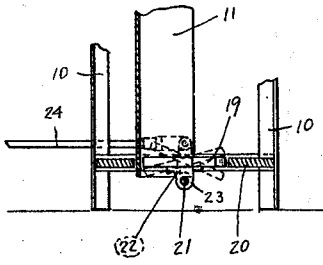
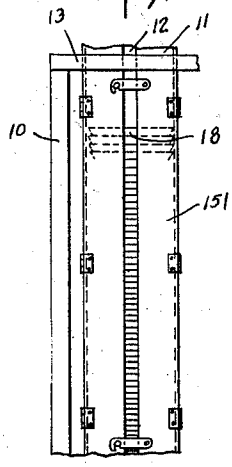


FIG. 7



INVENTOR.
GEORGE A. BELL.
John H. Carson

BY

ATTORNEYS.

Patented Mar. 8, 1927. 1,620,058

UNITED STATES PATENT OFFICE.

GEORGE A. BELL AND JOHN H. CARSON, OF MARION, INDIANA, ASSIGNORS TO INDIANA FIBRE PRODUCTS COMPANY, OF MARION, INDIANA, A CORPORATION.

STACKING DEVICE.

Application filed March 8, 1926. Serial No. 93,351.

This invention pertains to a receiving, stacking and counting device for use in connection with pie plate machines or any other machine of this character which prints or forms articles of relatively thin and light character, such as paper, metal and wooden blanks, printed matter, etc.

The invention as described herein is particularly adapted for use in connection with a pie plate cutting and forming machine of the character set forth and described in my copending application, Serial No. 93,352 filed March 8, 1926, wherein paper pie plates are cut from a paper strip into blank form, thereafter pressed or formed by a suitable die and discharged onto an endless belt. As above stated, the device may receive, stack and count similar articles, as well as pie plates, and it is not desired that the invention be limited thereto.

The object of the invention is to provide a receiving device for the plates as they are discharged from the endless belt, the device stacking them one on top of the other in the same manner that they are to be packed and shipped. At the same time the plates are counted so that the device automatically starts a new pile after receiving a given number of plates. This eliminates the necessity of stacking and counting the plates by hand and affords a convenient method of receiving the plates from the conveyor belt.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings, Figure 1 is a plan view looking down on the device, shown in receiving position. Fig. 2 is the same as Fig. 1, showing a portion of the mechanism after the first stack has been completed for preventing further plates from falling thereon. Fig. 3 is a front elevation of the device. Fig. 4 is an end elevation thereof showing the device in open position. Fig. 5 is the same as Fig. 4, showing the device in closed position after the first stack has been completed. Fig. 6 is a section taken on the line 6—6 of Fig. 3 illustrating the agitating mechanism. Fig. 7 is a modified form showing a front elevation of one of the receptacles with the removable guard hinged thereto.

In the drawings, referring particularly to Fig. 4, there is shown a receiving mechanism comprising an upright frame 10, in which is mounted a plurality of upright cylindrical receptacles 11, the lower portion of said receptacles having their front face open, while the upper portion thereof is completely enclosed with the exception of a vertical slot 12 formed in the front face thereof. In other words, that portion of the receptacle below the horizontal table 13 mounted on said frame has the entire front half cut away or open, while that portion extending above the table 13 is closed with the exception of the slot. There is shown herein an upwardly extending frame 14 about which the endless conveying belt 15 passes supported upon the rollers 16 at the top and the roller 17 at the bottom. The plate cutting and forming machine, not shown herein, is adapted to discharge the pie plates 18 on said conveyor belt at the bottom thereof, said belt being adapted to carry the plates upwardly and discharge them into the open tops of the receptacles 11.

When the plates fall into said receptacle, they are caused to assume a horizontal position by reason of the air resistance within the receptacle, but are permitted to readily drop through the upper portion thereof and onto the pile accumulating at the bottom, since the air may readily escape through either the slot 12 or the open face of the cylinder. In order that the plates will ultimately lie flat, one upon top of the other, and seat snugly within each other, the pile of plates accumulating in the receptacle is agitated, as will hereinafter be described. For the purpose of agitating the plates, each receptacle is provided with a pivotally mounted bottom 19 pivoted to the bottom 20 of the frame through the medium of a rod 21 extending through the downwardly-extending ears 22. The rod 21 is provided with an upwardly extending arm 23 which is pivotally connected to a rod 24, which in turn is connected to a crank arm 25 connected with the roller 17, so that rotary movement of the roller 17 will impart a reciprocatory movement to said rod and cause the bottom plates 19 in each of the receptacles to oscillate about the rod 21, and thereby continuously agitate the plates so as to cause them to settle in the proper position.

For the purpose of limiting the number of plates deposited in the stack, there is pro-

vided a cut-off mechanism adjacent the table 13 near the top of the receptacles. Said cut-off mechanism comprises the sliding gates 26 and 126, which are adapted to slide through suitable slots oppositely disposed in the receptacles so as to meet each other in the center thereof, as shown in Fig. 2. It will be noted that the abutting edges of the gates are curved and they are also beveled so as to avoid permitting the plate to be engaged therebetween. Said gates are caused to slide back and forth through the medium of the arms 27 which are pivoted thereto and fixedly secured to the shafts 28 and 29 extending from one end of the machine to the other on each side of the receptacles. The gates are adapted to slide in the guideways 30 which are secured to the top surface of the table 13, as illustrated in Fig. 3. They are normally brought together under spring tension through the medium of a spring 31 connecting the ends of the arms 32, one arm being rigidly connected to each of the shafts 28 and 29. At the end of each of said shafts there are keyed the inwardly extending arms 33 having the links 34 pivotally connecting their free ends to the hand lever 35. Said hand lever has one end connected to a table at 36 and is provided with a latch bar 37 pivotally connected to the base at the other end thereof and extending downwardly in position to engage a keeper 38. The latch bar is connected by a spring 39 to the lever 35 so that when said lever is manually forced downward to the position shown in Fig. 4, the spring will pull the latch bar into latching engagement with the keeper.

In order that the plates may be properly counted, the roller 17 is of such dimensions as to make one revolution every time a set of plates is deposited by the machine on the belt 15. Therefore, there will be one plate delivered to each pile for each revolution of said roller, or one cycle of movement of the connecting rod 24. By reason of a pin and slot engagement, the rod 24 is connected with a lever 40 which is fulcrumed to the machine at 41, the upper end of said lever being pivotally connected with a sliding bar 42, having on its free end a pawl 43. The ratchet wheel 44 is mounted on the side of the frame having a plurality of ratchet teeth adapted to be engaged by the pawl 43. Upon each cycle of movement of the rod 24, or upon the discharge of one set of plates, the pawl 43 will rotate the ratchet wheel 44 to the extent of one ratchet tooth. Therefore, assuming that there were twenty ratchet teeth, and the belt had the full number of plates thereon, there would be twenty plates deposited in the pile upon one revolution of the wheel. If it is desired that there be one hundred plates deposited in the pile, there is a reduction in gearing of five to one between the ratchet wheel 44 and the gear wheel 45 through the medium of a pinion 46 or the like. Accordingly there would be one hundred plates deposited upon one revolution of the gear 45. The ratchet wheel is supported by a plate 47 mounted on the frame at the end of the device, and is positioned on the exterior side thereof, as shown in Figs. 4 and 5. The shaft upon which it is mounted extends through the plate and is provided on the opposite side thereof with a pinion 46, shown in dotted lines, said pinion being adapted to mesh with the teeth on the gear 45 which is also on the opposite side of the plate. The gear 45 is mounted on a shaft 49 extending through the plate and provided with a cam 50 which is in position to engage the latch bar 37 and force it out of latching engagement with the keeper 38, as shown in Fig. 5. Accordingly, upon every revolution of the cam 50, five revolutions of the wheel 44 and one hundred revolutions of the roller 17, the latch bar is released, which permits the lever 35 to be raised by the tension of the spring 31, which closes the gates 26, as shown in Figs. 2 and 5. The receptacles would then contain one hundred plates each.

As they continue to be discharged, they would rest upon the gates 26 and be held in that position while the operator is removing the stack from the lower portion of the receptacle, the counting of the plates going on as before. After the operator has removed the stacked plates, the hand lever 35 is forced downward so as to overcome the tension of the spring 31, separate the gates 26 and 126 and cause the latch bar 37 to engage with the keeper, the cam again having passed out of engaging position therewith. The plates that have accumulated during this time at the top of the receptacle will then be permitted to drop onto the bottom and the fall thereof, as well as the counting, will continue as before.

In order to guide the plates and keep them in proper line while dropping and being agitated in the receptacles, there is provided a guard comprising the upright rods 51 normally positioned directly in the center of the open portion of the receptacles. Said rods are mounted on a sliding frame 52, which is slidable between the bottom of the frame and the table 13 so that when it is desired to remove the plates, the operator slides the gate to one side until the bars 51 register with the edges of the receptacles and are accordingly out of the way. After the plates have been removed, and the handle lever 35 is again actuated to permit the plates to drop into the receptacle, and guard is caused to slide back into the position shown in Fig. 3.

It will be observed that the receptacles can be of any desired shape, size or depth for receiving articles of various shapes and charac-

ter and varying numbers thereof. Furthermore, the gear ratios and other timing mechanism can be altered or adjusted according to the desired number of articles to be included in a single stack.

As shown in Fig. 7, if desired, the structure may be modified by employing a removable guard 151 in the form of a door or plate substantially covering the open front of the receptacle. Said guard in this instance substantially closes the open front of the receptacle so as to leave a relatively small opening or vertical slot for the escape of air as the plates descend, thus allowing their descent in the lower portion as well as the upper portion. Such a guard may be slidably mounted in the same manner as that shown in Fig. 3, or it may be hinged to the receptacle so as to swing into open position for removal of the plates, as illustrated in Fig. 7.

The invention claimed is:

1. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof so as to settle towards the bottom, and an agitating member mounted at the bottom of said receptacle for agitating the articles while stacking so as to cause them to nest or adjust their position therein.

2. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof so as to settle toward the bottom, a pivotally mounted agitating member at the bottom of said receptacle positioned to agitate the articles and cause them to nest or adjust their position therein, and an actuating member connected therewith and operated by said discharging means for reciprocating said agitating member.

3. A stacking device of the character described, including an upright receptacle, an endless belt associated therewith for conveying articles to be stacked to the top of said receptacle and discharging them therein, an agitating member mounted at the bottom of said receptacle on which the stacked articles are adapted to rest, and means operated by the movement of said conveyor belt for actuating said member and causing it to agitate the articles during their stacking, whereby they will be caused to nest and adjust their position with respect to each other.

4. A stacking device of the character described, including an upright receptacle, a conveyor belt for conveying and discharging articles into the top of said receptacle, an agitating plate pivotally mounted at the bottom of said receptacle for supporting the articles being stacked, a crank arm connected with said plate, a rotary member rotated by the movement of said conveyor belt, and a rod connecting said member and crank arm for reciprocating said plate about its pivotal mounting so as to agitate said articles and cause them to nest or adjust their position with respect to each other.

5. A stacking device of the character described, including an opening at one side thereof for permitting the removal of the articles being stacked, and a guard removably mounted in front of said opening for causing the articles to be retained in stacking position in said receptacle until the stacking thereof has been completed.

6. A stacking device of the character described, including an upright receptacle, said receptacle having an opening in one side thereof extending throughout its lower portion and a relatively narrow vertical slot in the upper portion, means for discharging articles to be stacked into the top thereof so as to pass through the upper portion and settle in the lower portion in stacked relation, and a removable guard associated therewith in front of the open portion for permitting removal of the stacked articles and preventing their escape from said receptacle during the stacking operation.

7. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, said receptacle having an air opening in one face thereof for permitting the escape of air while the articles are settling to the bottom, and means for preventing the escape of said articles during their stacking movement, and permitting the removal thereof after having been stacked.

8. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, a gate positioned adjacent the top of said receptacle for closing the same after a given number of articles have been stacked therein, and means for opening and closing said gate.

9. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, and a gate positioned intermediate the ends of said receptacle for closing the same after a given number of articles have been received in the lower portion thereof and arresting and supporting the additional articles discharged therein within the upper portion thereof.

10. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, a gate positioned intermediate the ends of said receptacle for closing the same after a given number of articles have been received in the lower portion thereof and arresting and supporting the additional articles discharged therein within the upper portion thereof, and counting

mechanism controlled by the number of articles discharged therein for closing said gate.

11. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, a gate positioned intermediate the ends of said receptacle for closing the same after a given number of articles have been received in the lower portion thereof and arresting and supporting the additional articles discharged therein within the upper portion thereof, and a counting mechanism controlled through the medium of said discharging means for closing said gate after a given number of articles have been discharged to the lower portion of said receptacle.

12. A stacking device of the character described, including an upright receptacle, an endless conveyor belt for discharging articles to be stacked into the top thereof, a gate positioned intermediate the ends thereof for arresting and supporting the articles discharged therein after a given number of articles have been stacked below said gate in the lower portion of said receptacle, a ratchet wheel mounted on said device, means operated by the movement of said conveyor belt for actuating said ratchet wheel upon the discharge of each article, and means operated by the movement of said ratchet wheel for causing said gate to be closed upon a given number of said articles having been stacked in the lower portion of said receptacle.

13. A stacking device of the character described, including an upright receptacle, an endless conveyor belt for discharging articles to be stacked into the top thereof, a gate portion intermediate the ends thereof for arresting and supporting the articles discharged therein after a given number of articles have been stacked below said gate in the lower portion of said receptacle, means for closing said gate, a ratchet wheel mounted on said device, means operated by the movement of said conveyor belt for actuating said ratchet wheel upon discharge of each article, means operated by the movement of said ratchet wheel for permitting said gate closing means to function for closing said gate, and means for opening said gate after the removal of the articles stacked therebelow, whereby the articles supported by said gate will be permitted to drop into stacking position.

14. A stacking device of the character described, including an upright receptacle, means for discharging articles to be stacked into the top thereof, means positioned at the bottom thereof for agitating said articles so as to cause them to nestle and position themselves with respect to each other, and means for arresting additional articles discharged therein after a given number of articles have been stacked.

15. A stacking device of the character described, including an upright receptacle having an opening in one face thereof through which the articles stacked therein may be removed, means for guarding said opening so as to permit air to be discharged therefrom during the falling movement of the articles and prevent said articles from escaping, an endless belt for discharging articles to be stacked into the top thereof, an agitating member at the bottom of said receptacle for agitating the articles and causing them to nestle and position themselves with respect to each other, a gate intermediate the ends of said receptacle adapted to be closed upon a given number of articles having been stacked therein and arresting and supporting the additional articles discharged into the top thereof, means associated with said conveyor belt for actuating said agitating member, and means associated with said belt for causing said gate to close upon a given number of articles having been discharged into said receptacle.

In witness whereof, we have hereunto affixed our signatures.

GEORGE A. BELL.
JOHN H. CARSON.