July 23, 1929. H. P. DOIRON ET AL 1,721,900

STACKING MACHINE

Filed April 20, 1928 3 Sheets-Sheet 1

Fig. 1.

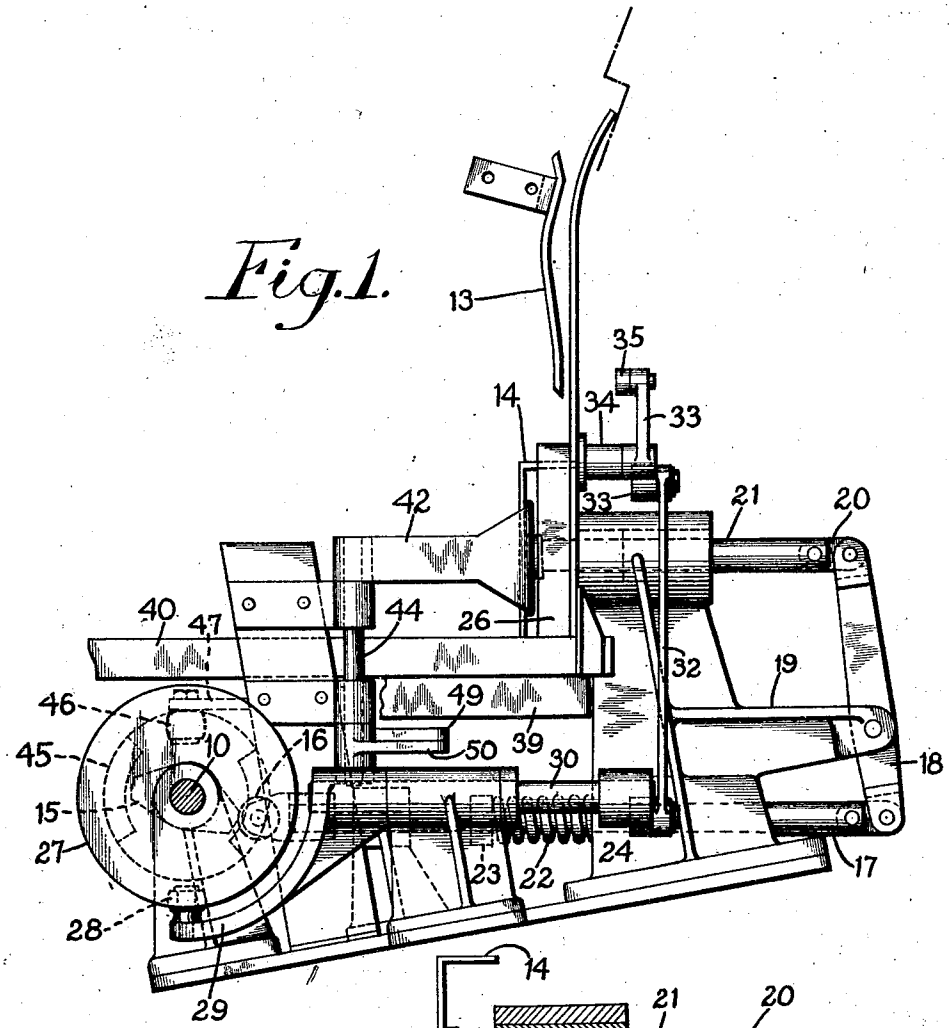
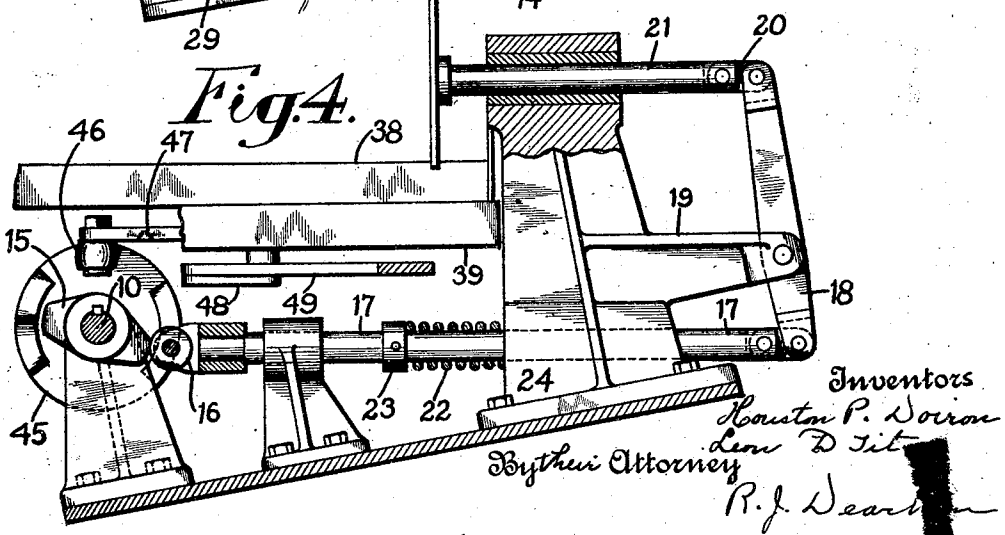


Fig. 4.



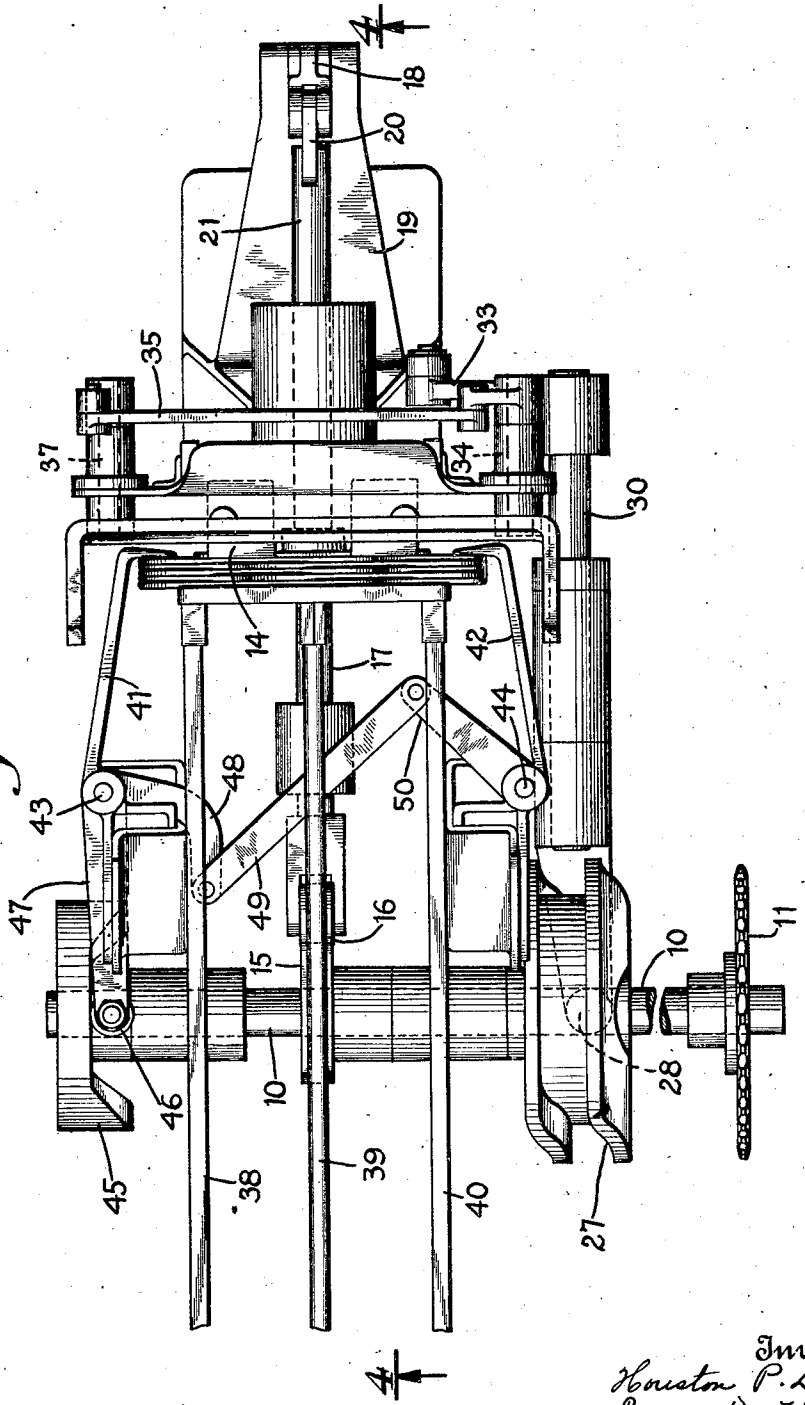
Inventors
Houston P. Doiron
Leon D Titt
By their Attorney
P. J. Dearth

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Fig. 2.



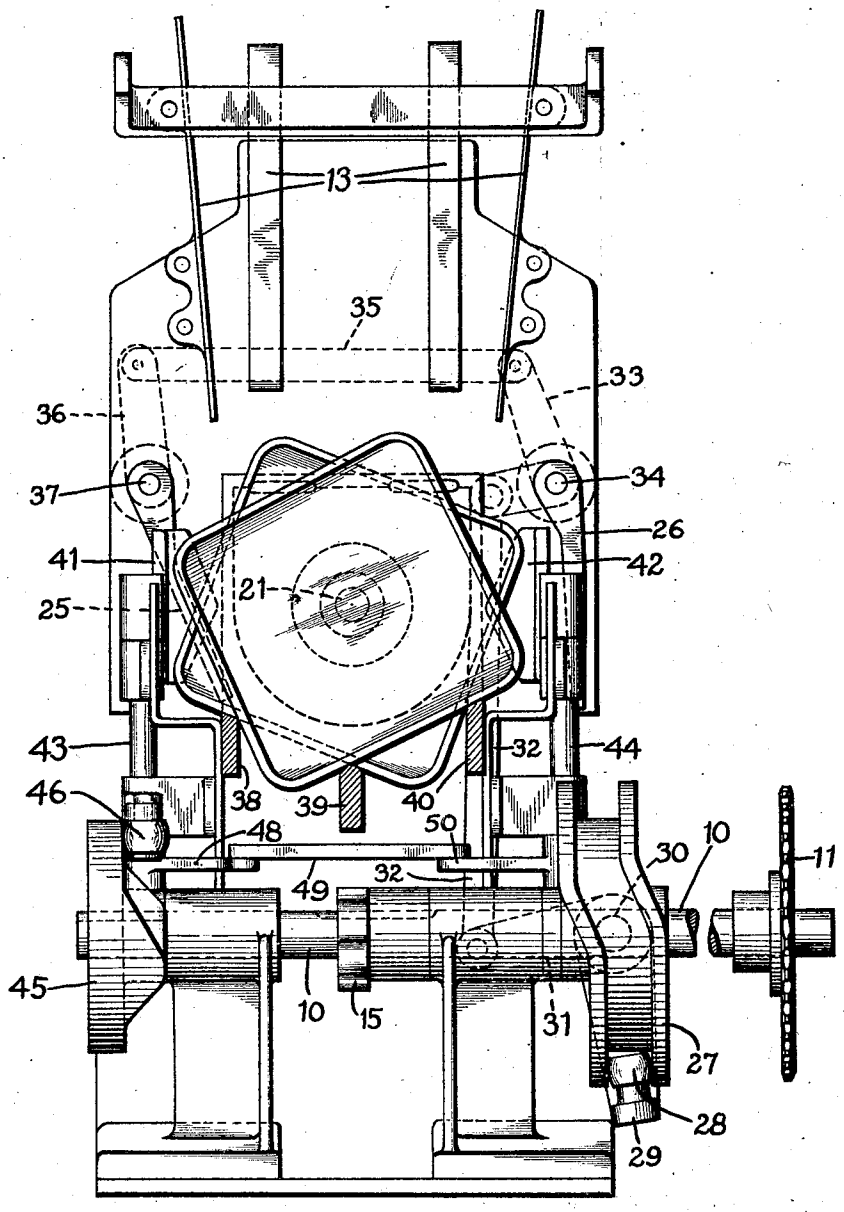
Inventors
Houston P. Doiron
Leon D. Titus
By their Attorney
R. J. Dearborn

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STACKING MACHINE

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Fig. 3.



Inventors
Houston P. Doiron
Leon D. Titus
By their Attorney
R. J. Dearborn

Patented July 23, 1929. 1,721,900

UNITED STATES PATENT OFFICE.

HOUSTON P. DOIRON AND LEON D. TITUS, OF PORT ARTHUR, TEXAS, ASSIGNORS TO THE TEXAS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

STACKING MACHINE.

Application filed April 20, 1928. Serial No. 271,496.

This invention relates to stackers and more particularly to machines for automatically staggering and stacking relatively flat members to prevent their nesting.

The invention is particularly applicable to, and for the purpose of illustration will be described as applied to, machines for stacking top and bottom can ends, which are formed and stamped in a press. Prior to our invention can ends, whether flat or formed with flanges, have had a decided tendency to nest together when stacked, so as to make their subsequent separation for assembly with the body of the can somewhat difficult to accomplish and a time wasting process. By the use of the present invention can ends coming from a press are alternately tipped, first to one side and then to the other, so that as they accumulate in a stack the alternate ends are positioned in such a manner that they can be easily separated for further handling.

From the foregoing, it is apparent that one of the objects of our invention is to provide a machine for stacking relatively flat members so that they will not nest together.

Another more specific object of our invention is to provide a machine for stacking can ends as they come from a press or the like.

A still further object of our invention is to provide means for staggering the position of the separate can ends in each stack so that they may be easily separated.

These and other objects, features, and advantages of our invention will be set forth in the following detailed description thereof.

In the accompanying drawings we have illustrated a preferred form of our invention in which:

Fig. 1 is a view in side elevation of a stacking apparatus embodying our invention.

Fig. 2 is a plan view of the same apparatus.

Fig. 3 is a view in front elevation of the same apparatus, and

Fig. 4 is a view in vertical section taken on the line 4—4 of Figure 2.

By reference to the drawings it will be seen that the machine is provided with a driving or cam shaft 10 which carries at one end a sprocket wheel 11 through which motive power is applied to the machine from any suitable source. For illustrative purposes we shall assume that the machine is being used in connection with an end stamping machine or press from which the can ends are fed one at a time to a sharply inclined guide chute indicated generally by reference character 13.

Can ends gravitating through chute 13 come to rest with an edge supported on a plate or plunger 14. This plate is mounted for longitudinal and reciprocating movement so that it can be intermittently moved into position to support the individual can ends as they come from the press, and then withdrawn to permit the end to drop, for reasons presently to be set forth in detail.

The longitudinal and reciprocating movement of plate or plunger 14 is produced by means of a cam 15 which is keyed on shaft 10. This cam actuates a roller 16 mounted on the end of a shaft 17 which is pivotally connected to an end of a lever 18. Lever 18 is itself pivotally mounted intermediate its ends on a bracket 19 and its opposite end is pivotally connected to a link 20 which in turn is pivotally connected to a shaft 21, on the opposite end of which plate 14 is rigidly secured.

Cam 15 is so designed that for every complete revolution of shaft 10 the plate 14 will make two complete trips backward and forward. In order to insure that the roller 16 is always in operative contact with cam 15 a coil spring 22 is mounted on shaft 17 between a collar 23 and one of the machine supports 24. The spring is maintained under compression which is increased as shaft 17 is moved to the right, as viewed in Figures 1 and 4.

As stated above, can ends are fed to the machine one at a time through guide chute 13 until one edge rests on the top of plate 14. As the plate moves from under the end the latter is free to drop until it strikes against one or the other of two parallelly disposed pivotally mounted tipper or rocker arms 25 and 26. One of these arms is pivotally mounted at each side of plate 14, and the two arms are alternately rocked into operative position by means of a cam 27 mounted on shaft 10. The cam actuates the arms through a roll 28 mounted on one end of a lever 29 which is connected at its opposite end to a rocker shaft 30. A lever 31 is rigidly connected at one end to shaft 30 and at its opposite end it is pivotally connected to the lower end of a vertically disposed lever link 32. The upper end of link 32 is pivotally connected to one arm of a bell crank lever 33 which is mounted on the same shaft 34 as the rocker arm 26 so that the lever and the arm turn together. The other arm of lever 33 is

pivotally connected to one end of a link 35 which connects with another lever 36 mounted on the same shaft 37 as the other arm 25.

Arms 25 and 26 are so positioned with respect to each other that when one of them is in position to contact with an edge of a falling can end to tip the end to one side, the other arm is entirely clear of the can end and has no effect upon it. By means of cam 27 and the connecting mechanism just described, the arms are alternately moved into operative position so that can ends falling successively are alternately tipped first to one side and then to the other. The ends finally come to rest between two of a group of three supports 38, 39 and 40, collectively forming a rack depending upon the direction in which the particular ends have been tipped by the arms. The can ends rest between the supports with their edges and corners in staggered relation.

It is apparent that each can end as it drops onto the supports must be moved out of the way to provide sufficient clearance for the next end to fall. This is accomplished by the plate 14, which at this step operates as a plunger, on its return stroke. The plate contacts with the rear face of the end that has last dropped and pushes it and those in front of it slightly forward on the rack formed by the supports 38, 39 and 40.

At this stage two opposed hooked members or end holders 41 and 42 swing together so that the hooked end portions slip behind the end of the stack of can ends to hold them in position after the pressure momentarily exerted by plate 14 is released. Hooked member 41 is secured on a vertically disposed rotatable shaft 43 on one side of the machine and the other hooked member 42 is similarly mounted on a rotatable shaft 4 on the opposite side of the machine.

The two shafts 43 and 44 rotate in opposite directions and their movement is effected by means of a cam 45 which is mounted on shaft 10. The cam actuates a follower 46 mounted on a lever 47 which is secured at one end on shaft 43 so that the shaft is rotated in response to the movement of cam 45. The two shafts 43 and 44 are connected so as to operate simultaneously but in opposite directions by means of pivotally connected links 48, 49 and 50.

In operation can ends are fed successively through chute 13 and each end in turn is brought to rest on the upper edge of plate 14. The plate, which is actuated by cam 15, then moves from under the end (to the right as viewed in Figure 4) thereby allowing the end to drop until it comes in contact with one or the other of arms 25 and 26, depending upon which arm is at the moment in operative position. This contact with one of the arms tips the end to one side and it comes to rest in the rack which consists of the horizontal supports 38, 39 and 40. Arms 25 and 26 are actuated by cam 27 and are alternately moved into operative position so that succeeding can ends are alternately tipped or staggered.

As each can end comes to rest in its tipped position in the rack, plate 14 advances in order to receive the next succeeding end from the chute. While so advancing (moving to the left as viewed in Figure 4) the plate acts as a plunger and, contacting with the face of the end which has last come to rest, pushes that end and those in front of it a sufficient distance to insure clearance for the next end to drop.

When the plate has reached the extreme limit of its forward movement it has pushed the staggered ends out of the way and is in position to receive the next end to come from the chute.

At this stage in the cycle of operation arms 41 and 42 are swung into operative position by reason of the action of cam 45 so that the hooked end portions of the arms move in behind the end of the stack of ends so as to hold them in position when the pressure exerted on them by plate 14 is relieved by reason of the further movement of the plate.

It will be seen that the movements of the plate, arms and hooked members are synchronized and timed to operate in proper order by the three cams which are all mounted on a single shaft.

When a sufficient number of can ends have been stacked, a portable rack is slipped in under the ends so that the assembly of staggered ends may be removed for transfer to other hands.

Apparatus of preferred form and construction has been illustrated and described for the purpose of showing a way in which this invention may be practiced, but the inventive thought upon which this application is based is broader than this illustrative embodiment. It is therefore understood that the scope of the invention is not to be limited by the present disclosure, reference being had to the appended claims for that purpose.

What we claim is:

1. In a machine of the class described, opposed means adapted to alternately move into position to engage successively dropping flat members to change the relative positions of alternate ones, and cam controlled means for actuating the engaging means.

2. In a machine of the class described, spaced parallelly disposed means adapted to alternately move into position to engage successively dropping flat members to change the relative positions of alternate ones, and means for controlling the movement of the engaging means.

3. In a machine of the class described, means for momentarily supporting a relatively flat member, means for withdrawing the supporting means to permit the flat member to drop, means adapted to engage alter-

nate dropping flat members to cause them to tip to one side or the other, and means for arresting the movement of the flat members and for maintaining them in their tipped positions.

4. The combination with means for feeding can ends to a stacker in succession and at regular intervals, of means for tipping alternate ends in opposite directions to produce a staggered stack, means for moving the stacked ends to provide clearance for succeeding ends, and means for holding the stacked ends in staggered position.

5. In a machine for stacking can ends, a guide through which the ends are fed to the machine, opposed means adapted to stagger the positions of alternate ends after they leave the chute, and means for controlling the movement of the ends from the chute to the staggering means.

6. In a machine for stacking can ends, a guide through which the ends are fed to the machine, means for staggering the positions of alternate ends after they leave the chute, means for controlling the movement of the ends from the chute to the staggering means and for moving staggered ends to provide clearance for succeeding ends, and means for retaining the stacked ends in position.

7. In a machine for stacking can ends, a guide through which ends are fed to the machine, oppositely disposed rocker arms severally adapted to engage alternate ends to tip them in opposite directions, means for maintaining the oppositely tipped ends in the staggered positions, and means for intermittently moving the staggered ends to provide clearance for the ones to follow.

8. In a machine for stacking can ends, an inclined chute through which the ends are fed to the machine, means for momentarily arresting the movement of each end as it comes from the chute, cam controlled means for withdrawing the arresting means to permit the end to drop, oppositely disposed and cam controlled rocker arms severally adapted to engage alternate can ends as they drop to tip them in opposite directions, a rack for maintaining the ends in the staggered positions, cam controlled means for intermittently engagaing the rear end of the stack of ends to prevent the stack from separating, and a power driven cam shaft for actuating the several cam controlled means.

In witness whereof we have hereunto set our hands and seals this 9th day of April, 1928.

HOUSTON P. DOIRON.
LEON D. TITUS.