May 24, 1932. A. BINGHAM 1,860,223

DELIVERY APPARATUS FOR STACKING CARDS OR THE LIKE IN COUNTED BATCHES

Filed Nov. 14, 1928 2 Sheets-Sheet 1

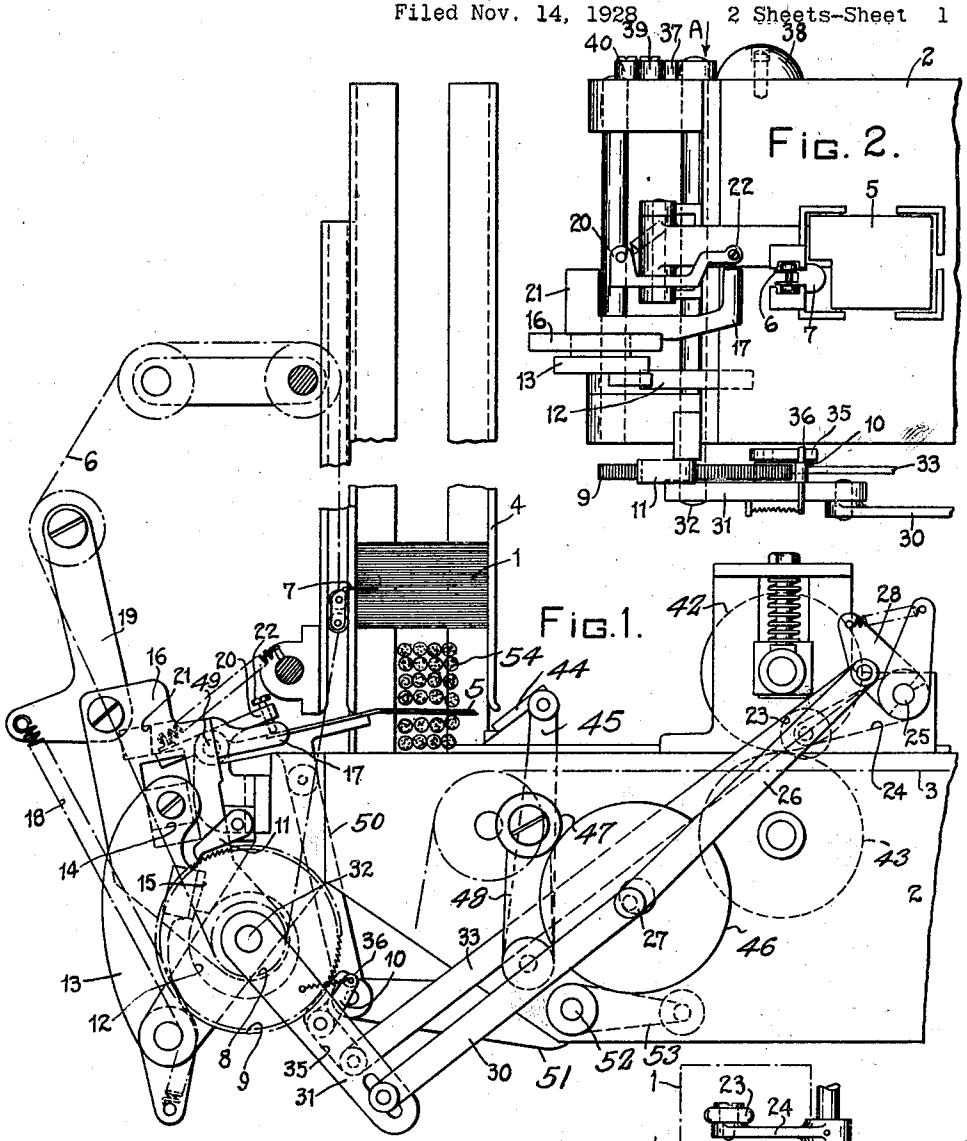


Fig. 1.

Fig. 2.

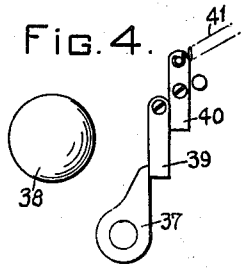


Fig. 4.

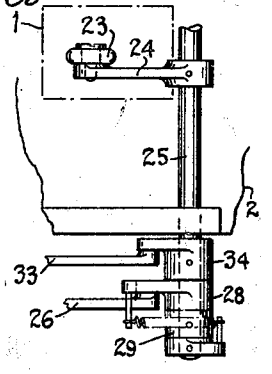


Fig. 3.

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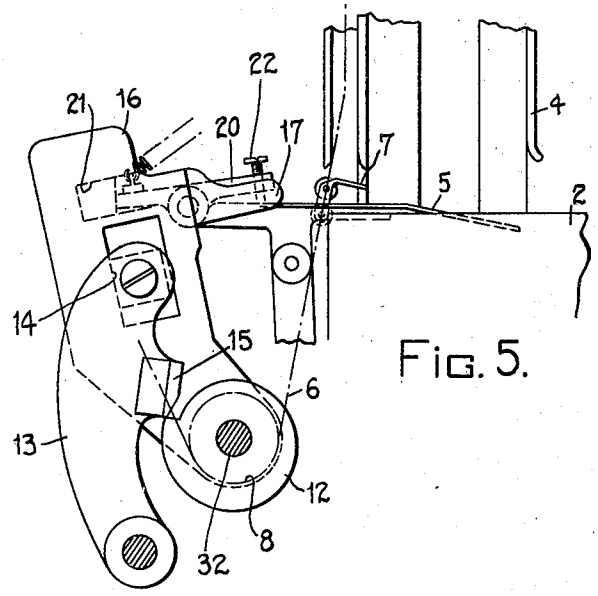


Fig. 5.

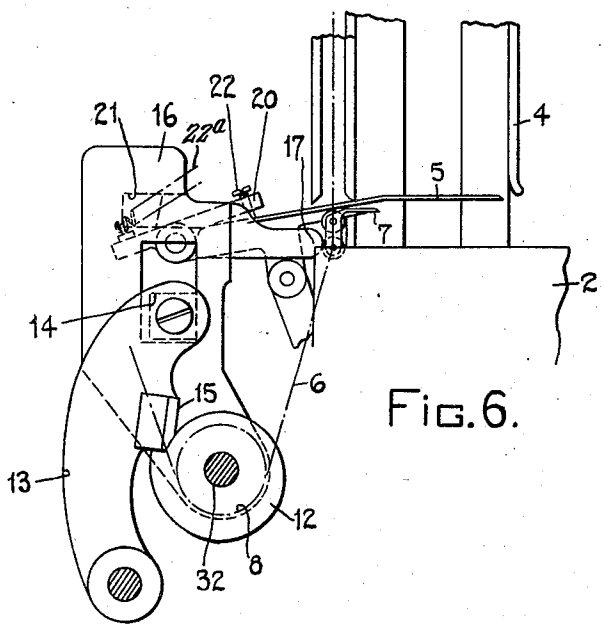


Fig. 6.

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UNITED STATES PATENT OFFICE

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DELIVERY APPARATUS FOR STACKING CARDS OR THE LIKE IN COUNTED BATCHES

Application filed November 14, 1928, Serial No. 319,426, and in Great Britain December 28, 1927.

This invention relates to delivery apparatus for stacking sheets, cards or the like in counted batches, and has for its object the provision of means for separating a stack of sheets, cards and the like into groups of an exact predetermined number so that they may easily be taken from the machine and packed in batches ready for sale or use.

The present invention consists of an apparatus for stacking cards or the like into batches wherein a predetermined number of cards are automatically moved into a stacker and a separating blade is automatically held in an inoperative position until after the final card of a batch has been moved into position, whereafter the separating blade is automatically moved to engage with the underside of the said final card.

Although the invention hereinbefore referred to is for particular use in connection with printing machines, sheet cutting machines and packet making machines, nevertheless, the same may be applied to any machine wherein flat articles are arranged in superimposed relationship.

The invention will be more particularly described with reference to the accompanying drawings which show the apparatus applied to a machine for making the shells for slide and shell cartons such for instance as the machine described in U. S. Application Serial No. 229,475, and in which:—

Fig. 1 is a side elevation of a part of the said machine, showing the stacking mechanism partly in section.

Fig. 2 is a plan of Fig. 1, omitting the feeler or detector mechanism.

Fig. 3 is a plan view of the feeler mechanism.

Fig. 4 is a view looking in the direction of the arrow "A", Fig. 2, showing the gong striking mechanism.

Fig. 5 is a diagrammatic view showing the first movement of the plunger in a direction towards the conveyor chain, and

Fig. 6 is a diagrammatic view showing the said plunger at the end of the stroke.

Referring to the drawings: the shells 1 formed on the machine described in U. S. application Serial No. 229,475 are carried along the bed 2 of the machine by a conveyor 3 from forming mechanism (not shown) through a pair of rollers 42 and 43, which flatten the shells, and are then thrust into the bottom of a stacker 4 by a pusher 44 carried on a lever 45 and operated by a cam 46 through the roller 47 and lever 48. Each shell is in turn thrust upwardly into the stacker 4 by a plate 5 pivoted at 49 to the machine frame and lifted upwardly each time a shell passes on to it by a link 50 connected to a lever 51 pivoted at 52 and oscillated by another lever 53 which works in contact with a cam in the interior of the machine.

The base of the stacker 4 is furnished with small brushes 54, the friction of which supports the shells as they rise up the stacker. Above the brushes, the shells are supported by the blades 7 and friction of the sides of the magazine.

A chain conveyor 6 provided with a number of spaced separating blades 7 is mounted as shown in Fig. 1 so as to be movable upwardly at the same rate as the shells are delivered to the stacker 4.

The apparatus is designed to separate the shells into groups of exactly 100, and the blades 7 are spaced on the chain 6 at such a distance apart that the tips of two consecutive blades are separated by a distance approximately equal to the thickness of 100 shells. The chain conveyor 6 is driven by a sprocket wheel 8 fixed to a shaft 32 which carries a ratchet wheel 9 operated by a pawl 10 in a manner hereinafter described and controlled by a locking pawl 11.

The separation into counted batches is effected by periodically pressing the chain 6 inwards at the base of the stacker and causing one of the blades 7 to pass in beneath the last shell of a batch 100; the flexibility of the chain 6 permits the separator blades to pass inwards at the exact time, irrespective of any slight variations in the pitch of the chain. The inward movement of the blade 7 is effected by the apparatus and in the manner about to be described.

On the shaft 32 which carries the ratchet wheel 9 is mounted a snail cam 12 which controls the position of a pivoted lever 13 which

is arranged to carry a sliding block 14 at the upper end thereof.

When the snail cam 12 is rotated to such a position that the working face 15 of the lever 13 drops down the profile of the said cam, see Figs. 5 and 6, the movement of the pivoted lever 13 permits a plunger lever 16 to move inwards so that the end 17 thereof thrusts the chain conveyor 6 inwards to cause one of the separator blades 7 to extend beneath the last shell of a batch.

The plunger lever 16 is drawn inwardly by means of a spring 18 which acts through a pivoted jockey lever 19, but the movement of lever 16 is further controlled as hereinafter described.

Referring to Fig. 1, it will be observed that the jockey 19 is pivoted to the plunger lever 16 and is in the form of a bell crank lever. One end of the lever carries the jockey sprocket and the other end is connected through the spring 18 to a fixed point on the frame of the machine. The tension of the spring 18 pulls the lever 16 inwards about its pivot around the axis of the shaft 32; the jockey sprocket acting as a fulcrum. When the nose 17 presses on the inner rim of the chain the jockey sprocket also moves in somewhat as the tension of the inner chain increases under the pressure of the nose 17.

In order to ensure that the separator blades are pushed in beneath the stack of shells after an exact predetermined number have passed into the stacker, the movement of the plunger lever 16 is controlled by a tripping mechanism as illustrated in Figs. 1, 2, 5 and 6. The tripping mechanism comprises a pivoted trip piece 20 and a lug 21 mounted on the plunger lever 16. The pivoted trip piece 20 is rocked about its pivot by the lifting plate 5 through the medium of an adjusting screw 22 and returned by a spring 22*a*.

When the plunger 16 is clear of the conveyor 6 as shown in Fig. 1, the trip piece 20 rises and falls freely with the plate 5. When the hundredth shell of a group is being fed into the stacker the lever 13 moves inwardly on the drop of the snail cam 12 and permits the plunger lever 16 to move inwardly a small extent under the action of the spring 18; the tension of the chain being automatically adjusted by the jockey lever 19. The initial movement of the plunger 16 is arrested by the lug 21 coming into contact with the end of the trip piece 20, due to the fact that the lifting plate 5 is then in the lowermost position, although the hundredth shell moving onto plate 5, has already caused the ratchet wheel 9 to be operated and turned the snail cam 21 so that lever 13 can move inwardly. As the plate 5 rises, carrying the hundredth shell, the plate engages with the adjusting screw 22 and moves the end of the trip piece 20 out of engagement with the lug 21, thus releasing the plunger 16 which snaps inwardly under the influence of the spring 18 and thrusts one of the blades 7 into the stacker beneath the hundredth shell as shown in Fig. 6. The blade 7 then passes up the stacker with the shells as indicated in Fig. 1.

In order to ensure that the ratchet counting mechanism only operates when a shell is fed into the stacker, there is provided a detecting device or feeler comprising a roller 23 mounted on a lever 24 which is fixed to a spindle 25 adapted to oscillate in bearings on the bed 2 of the machine. The roller 23 is raised upon the approach of each pusher piece of the conveyor 3 by the movement of the spindle 25 which is operated by a link 26, one end of the link being connected to an eccentric 27 as shown in Fig. 1, the other end being pivoted to a lever 28 which is loosely mounted on the spindle 25 and provided with a clutch face. The clutch face on the lever 28 is adapted to engage with a corresponding face on a collar 29 (Fig. 3) which is fixed to the spindle 25. Each clutch face consists of a single dog which is proportioned to allow of some lost motion between the respective clutch members.

As a shell approaches the detecting device the clutch lever 28 operated by the eccentric rod 26 is in such a position as to permit the roller 23 to drop by gravity until the movement thereof is arrested by the shell and the roller 23 then runs over the upper surface of the shell until raised by the movement of the link 26, which movement has taken up the lost motion mentioned above just before the rear edge of the shell passes the detecting position.

A link 30 also connected to the eccentric 27 has the opposite end thereof pivoted to a lever 31 loosely mounted on the spindle 32 of the ratchet wheel and carrying the ratchet driving pawl 10.

Every time a shell passes the detecting position the motion of eccentric 27 rocks lever 31, through link 30 and the pawl 10 moves the ratchet wheel one tooth, but if a shell is missing, the roller 23 drops downwardly beneath the bed level and causes the link 33 to be moved through the medium of a lever 34 which is fixed to the spindle 25. The other end of the lever 33 is pivoted to a bell crank lever 35 which, when operated, strikes a pin 36 on the pawl 10 and moves the same out of contact with the ratchet wheel 9.

The spindle 25 and lever 34 are capable of moving when the roller 23 drops owing to the fact that the link 26 operates the said spindle through the dog clutch previously described.

If desired, a cam 37 fixed to the spindle 32 may be provided for operating a bell 38. The cam 37 presses on a pivoted lever 39 which in turn presses on another lever 40 against the action of a spring 41.

As the corner of the cam 37 slips past the lever 39, the latter is thrust outwards by the spring and strikes the bell and warns the operator that a further batch of shells is ready for removal.

It will be appreciated from the foregoing description that instead of the cards being detected prior to the same being moved into the stacker, the presence of the same could be detected after they had been moved into the stacker, for example the roller 23, or a corresponding device, could be arranged to engage with a slot formed in the plate 5 so that if a card were present on the plate 5, the driving pawl 10 would be held in engagement with the ratchet 9, whereas if a card were missing, the roller, or corresponding device, would fall into the slot formed in the plate, disengage the pawl from the ratchet 9 and thereby ensure that a counting operation had not been effected.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus of the class described, the combination with a stacker, of means for feeding blanks upwardly, one at a time, into said stacker, and mechanism operable after a predetermined number of blanks have been fed for separating the blanks so fed from subsequently fed blanks, said mechanism including means adapted to be interposed between the blanks in the stacker and moving continuously with the blanks.

2. In a machine for stacking blanks, the combination with means for feeding blanks separately, of means for collecting the blanks so fed to form a pile, and means constituting a part of the machine adapted to be inserted between successive groups of a predetermined number of blanks to separate the same, said means moving continuously with said blanks.

3. In apparatus for stacking blanks, the combination with a stacker, of means for feeding blanks upwardly into said stacker, and means driven in synchronism with said feeding means so as to move upwardly with said blanks for separating the blanks into groups of a predetermined number.

4. In apparatus for stacking blanks, the combination with a stacker, of means for feeding blanks upwardly into said stacker, and means driven in synchronism with said feeding means so as to move upwardly with said blanks for separating the blanks into groups of a predetermined number, mechanism for driving said last named means, and means for automatically rendering said mechanism inoperative when no blank is fed.

5. In a machine for stacking blanks, the combination with means for feeding blanks separately, of means for collecting the blanks so fed to form a pile, means adapted to be inserted between successive groups of a predetermined number of blanks to separate the same, mechanism for effecting insertion of said last named means, means controlled by the feeding of a blank by said first named means for initiating release of said mechanism, and means actuated by the blank collecting means for completing such release.

6. In a machine for stacking blanks, the combination with means for feeding blanks separately, of means for collecting the blanks so fed to form a pile, means for detecting the failure of said first named means to feed a blank, and mechanism for separating the piled blanks into groups of a predetermined number, said mechanism being controlled by the joint action of the means for collecting the blanks and said last-named means.

7. In a machine for stacking blanks, the combination with means for feeding and collecting the blanks, of mechanism for separating the collected blanks into groups of a predetermined number, and means for detecting the absence of a blank, said mechanism being controlled by the joint action of said first-named means and said last-named means.

8. In apparatus of the class described, the combination with a stacker, of means for feeding blanks upwardly, one at a time, into said stacker, and mechanism operable after a predetermined number of blanks have been fed for separating the blanks so fed from subsequently fed blanks, and means controlled by said mechanism for indicating the operation of the latter.

9. In apparatus of the class described, the combination with a conveyor for feeding blanks, of a member reciprocable transversely of the path of movement of said blanks and adapted to yieldingly engage each blank, a counting mechanism controlled by said member, and means operable by the absence of a blank for engagement by said member for rendering said counting mechanism inactive.

10. In apparatus of the class described, the combination with means for feeding blanks, one at a time, of a member reciprocable across the path of movement of said blanks, yielding means for reciprocating said member in timed relation with the feeding of the blanks, a counting mechanism operable in conjunction with said yielding means, and means whereby the passage of said member past the path of movement of said blanks by reason of the absence of any blank renders said counting mechanism inactive.

11. In apparatus for stacking blanks, the combination with a stacker, of means for moving blanks upwardly within said stacker, and means positively driven to move with said blanks and adapted to project between certain of said blanks to separate the latter into groups of a predetermined number.

12. In apparatus for stacking blanks, the combination with a stacker of means for in-

termittently advancing a pile of blanks within the stacker, an endless band, means for advancing said band in timed relation with the movement of said blanks, and means carried by said band and adapted to project between certain of said blanks to separate the latter into groups of a predetermined number.

13. In apparatus of the class described, the combination with a stacker, of means for feeding blanks to said stacker to form a pile, a continuous flexible band driven in timed relation to said feeding means and provided with means spaced at intervals thereon and adapted to engage between the blanks to separate the latter into groups of a predetermined number, and means operable to deflect said band to cause said last named means to move to blank engaging position.

14. In apparatus of the class described, the combination with means for stacking blanks, of means moving with said stacked blanks for separating said blanks into groups, a cam driven in timed relation to said first-named means, and mechanism operatively associated with said cam for effecting cooperation of said device with said blanks for the purpose described.

In testimony whereof I hereunto affix my signature.

ARTHUR BINGHAM.