A. L. DUNCAN & C. E. FORRY.

CAN END SEPARATING AND FEEDING MACHINE.

APPLICATION FILED OCT. 24, 1916.

1,253,797. Patented Jan. 15, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

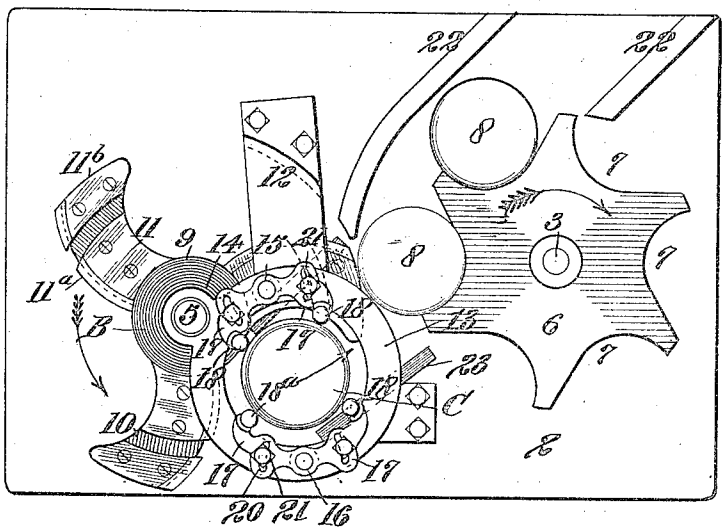


Fig. 4.

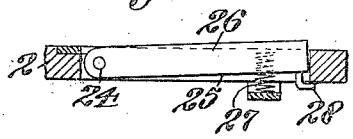


Fig. 5.

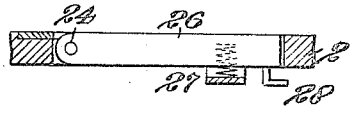
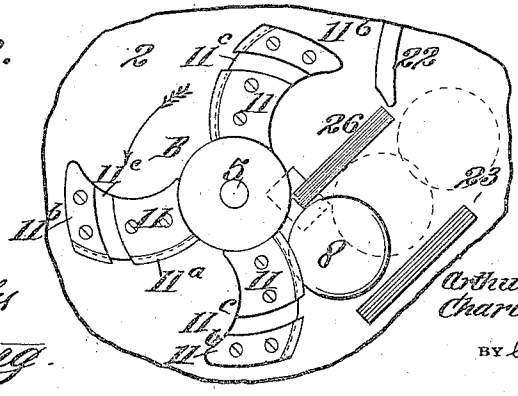


Fig. 2.

Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 6.

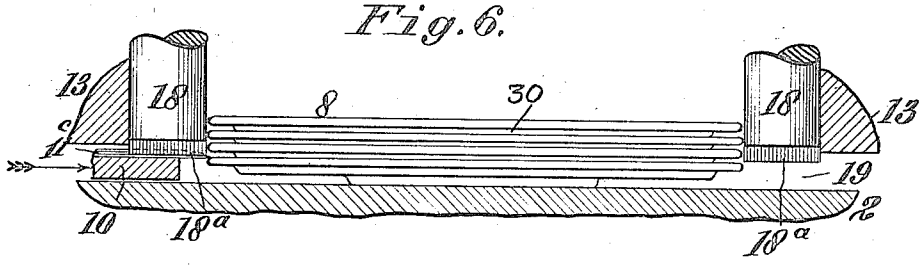


Fig. 7.

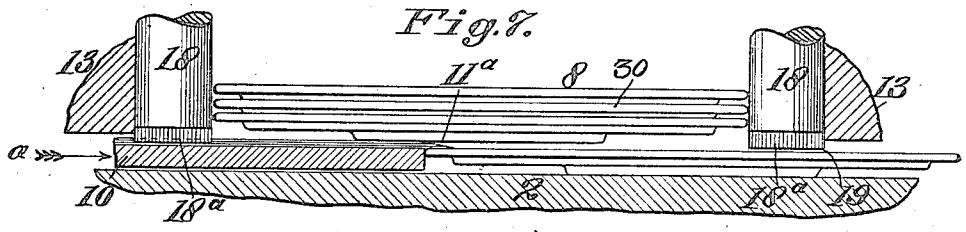


Fig. 10.

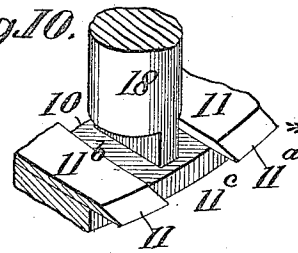


Fig. 8.

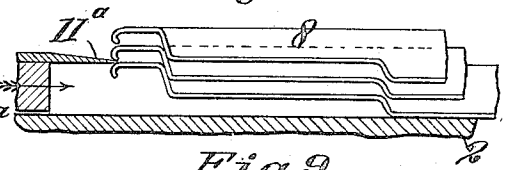


Fig. 11.

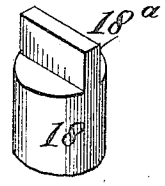


Fig. 9.

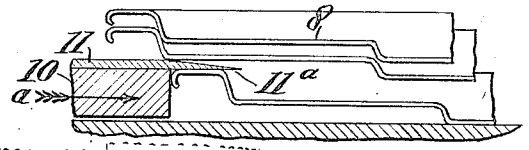
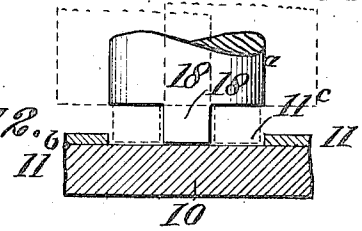


Fig. 12.



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UNITED STATES PATENT OFFICE.

ARTHUR L. DUNCAN AND CHARLES E. FORRY, OF OAKLAND, CALIFORNIA, ASSIGNORS TO H. G. PRINCE & COMPANY, OF OAKLAND, CALIFORNIA, A CORPORATION OF CALIFORNIA.

CAN-END SEPARATING AND FEEDING MACHINE.

1,253,797. Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed October 24, 1916. Serial No. 127,369.

To all whom it may concern:

Be it known that we, ARTHUR L. DUNCAN and CHARLES E. FORRY, both citizens of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Can-End Separating and Feeding Machines, of which the following is a specification.

This invention relates to a can end separating and feeding machine.

One of the objects of the present invention is to provide a simple, substantial, high speed, positive, separating and feeding machine of a rotary type for delivering can ends or blanks, in successive and timed order to a double seamer or other machine.

Another object of the invention is to provide a simple mechanism which permits the machine to be quickly adjusted to accommodate can ends or blanks of varying diameters.

Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings in which:—

Figure 1 is a plan view of the machine.

Fig. 2 is a side elevation of same, partly broken away to show the driving mechanism.

Fig. 3 is a detailed plan view of the rotating separator and feeder.

Fig. 4 is an enlarged detail section of the inner depressible guide showing it in raised position.

Fig. 5 is a similar view showing the guide in depressed position.

Fig. 6 is an enlarged detail section of the lower end of the can end receiver or holder, showing the position of one of the feeding and separating arms just before engagement is made with the lowermost can end.

Fig. 7 is a view similar to Fig. 6 showing one of the separating and feeding arms in engagement with the lowermost can end in a position where said lowermost can end has been partly discharged.

Fig. 8 is a detailed section showing the can ends in section and also showing one of the separating and feeding arms at the point of entrance.

Fig. 9 is a view similar to Fig. 8 showing one of the separating and feeding arms after entrance has been made.

Fig. 10 is a perspective view of the lower end of one of the vertical guides between which the can ends are supported, said view also including a portion of one of the separating and feeding arms.

Fig. 11 is a perspective view of the lower end of one of the vertical guides between which the can ends are supported.

Fig. 12 is a front view of Fig. 10 partly in section showing the amount of adjustability which is permitted as far as the vertical guides are concerned.

Referring to the drawings in detail, A indicates a frame of suitable construction which supports a bed plate 2. Extending through the plate and journaled therein, are three vertically positioned shafts, 3, 4 and 5, which will be respectively known as the star wheel shaft, the intermediate shaft, and the feeder shaft.

Secured on the upper end of the shaft 3, just above the bed plate 2, is a star wheel 6 in which is formed side pockets such as indicated at 7, which pockets are provided for the purpose of receiving the can ends 8 as they are discharged by the feeder generally indicated at B from the stack or holder generally indicated at C. Secured on the upper end of the shaft 5 just above the bed plate 2, is a hub member 9 on which is secured a plurality of feeding arms 10, each of which in turn carries a separating plate 11. Suitably secured upon the bed plate intermediate the star wheel 6 and the feeder B, is a bracket 12, on the outer end of which is formed a ring shaped holder 13. Formed on one side of the holder is an extension 14 which serves as a bearing and guide for the upper end of the feeder shaft 5, and pivotally mounted on the holder as at 15 and 16 are two pair of arms 17, in the outer ends of which are secured vertical guiding rods 18. There are four arms 17, and four guiding rods 18, which are adapted to extend upwardly to any height desired as shown in Fig. 2, while the lower ends pass inside of and through the ring shaped holder 13 to a point adjacent the surface of the bed plate 2.

A spacing such as indicated at 19, see Figs. 2, 6, and 7, being formed between the lower end of each guiding rod and the bed plate, to permit the feeding arms 10 to clear same

in their revolution with the shaft 5 as will hereinafter be described. Each pair of arms 17 is adapted to be swung about the pivotal supports 15 and 16 upon the ring shaped holder 13 to permit the vertical guiding rods 18 to be moved in or out, or in other words to permit their position to be adjusted to receive can ends of varying diameters. Each pair of arms 17 is therefore slotted as at 20, to permit set screws 21 to extend therethrough which may be tightened or locked when an adjustment has been secured.

Formed on the bed plate integral therewith or otherwise secured on one side of the star wheel, is a pair of fixed guiding flanges 22, provided for the purpose of receiving the can ends discharged by the star wheel. Mounted on the face of the bed plate, or otherwise formed thereon at a point below the ring shaped holder 13, is a guiding plate 23, and pivotally mounted as at 24 in a slot 25 formed in the face of the bed plate at a point opposite the guide 23, is a depressible guiding plate 26 which is normally projected to the raised position shown in Fig. 4, by means of a spring 27. The projected or raised position of said guide being limited by a stop member 28.

By referring to Fig. 1 it will be seen that the feeder is provided with three arms while the star wheel is provided with six pockets such as indicated at 7. This necessitates a two to one drive to permit a relative movement between the feeder and star wheel. This movement is secured by a two to one gear train such as indicated at 24^a which connects the star wheel shaft 3 with the intermediate shaft 4, and a sprocket chain drive 25^a which connects the intermediate shaft 4 with the feeder shaft 5. The star wheel shaft being driven as here shown from any suitable source by a sprocket chain 26^a or any other suitable means.

The feeding arms 10 employed may be cast integral with the hub member 9 secured on the shaft 5 or may be otherwise formed, but their thickness must be uniform from the hub and out, said thickness being equal to the depth of a can end, see Figs. 6, 7, 8 and 9. Similarly the spacing 19 formed between the lower ends of the vertical guides 18 and the top of the bed plate 2, must not be more than just sufficient to permit a can end to pass under when engaged by a feeding arm. The separating plates 11 secured upon each feeding arm 10, are preferably made as thin as possible and their forward edges are beveled to a thin knife like edge such as indicated at 11^a to permit them to readily enter between the can ends (as shown in Figs. 6 and 7) when machine is operating.

The operation of the feeder as a whole will be as follows:—

With a stack of can ends such as shown at 30, see Figs. 1 and 2, placed between the vertical guides 18 and with the machine operating, it can readily be seen that a timed relation or movement is obtained between the star wheel and the feeder, and that each arm of the feeder will pass under the can end stack or holder C once during each revolution. A feeding arm when passing under the ring shaped holder 13, will first cause the knife like edge 11^a to enter between the lowermost can end and the lowermost of the several superposed can ends contained in the stack between the vertical guides 18. The stack as a whole with the exception of the lowermost can end, is therefore elevated a slight distance, or to be exact, a distance equal to the thickness of the entering separating plate. The forward edge of the feeding arm 10 will then engage one side of the lowermost can end and force it out from under the stack in the direction of arrow *a*, see Figs. 1, 7, and 9. The movement of the lowermost can end while the feeding arm is in engagement, is in this instance restricted and positively pre-determined by the position of the stationary guide 23 and the depressible guide 26, and as the star wheel is revolved in positive timed unison with relation to the feeder, it can readily be seen that a pocket 7 will be in position to receive the can end when it is liberated or expelled from the feeder arm which removed it from the stack or holder C. The can end thus delivered to a pocket in the star wheel, is further advanced and guided by the revolution of the star wheel and the stationary guides 22, and may here be delivered to a conveyer belt or to any other suitable mechanism not forming any part of the present machine.

The depressible guide 26 is depressed each time a feeding arm passes over, and as each feeding arm is curved as shown in Figs. 1 and 2, it can readily be seen that the engagement between a feeding arm and a depressible guide is so gradual that the guide does not become completely depressed with relation to the face of the bed plate 2, until the can end which is being discharged by said feeding arm, is delivered to the star wheel 6. It is therefore obviously impossible for any can end to follow around with the feeding arms, as the several guides provided will not permit it, a positive discharge and feed is therefore obtained each time a feeding and separating arm passes below the holder.

The provision of the spring 27 positively raises the depressible guide each time a feeding arm has passed over. It is therefore automatically projected into position to guide the next can end discharged by the feeder into the star wheel 6.

By referring to Figs. 1, 3, and 10, it will be seen that each separating plate 11 is divided into an outer and inner section such as indicated at 11 and 11^b. A groove 11^c is

in this manner formed on the upper surface of each feeding arm or separating plate, which is considerably wider than the contracted lower ends 18ª formed on two of the vertical guides 18. This is an essential feature of the present invention as it permits the vertical guides to be swung in or out as shown in Fig. 12 upon their supporting arms 17 to receive and guide can ends of varying diameters. The curved forward face of each separating plate and feeding arm is also another important feature of the present invention as it permits a gradual engagement between an arm and a can end when contact is made. It furthermore imparts a turning or spinning movement to each can end as it is being discharged, thereby reducing friction as much as possible, and furthermore positively preventing any wedging or binding action, as each can end when partly turning or spinning has a tendency to roll freely out between the guiding plates during its passage from the holder C to the discharging point formed between the stationary guides 22.

Another important feature of the present invention is the simple compact structure provided, and particularly the mechanism which permits a rotating movement of all of the operating parts involved. This not only permits the feeder to operate under a comparatively high speed, but it also protects the machine as a whole from any unnecessary wear and tear, as all reciprocating and rocking movements are entirely eliminated.

The materials and finish of the several parts of the device may otherwise be such as the experience and judgment of the manufacturer may dictate.

We wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that we do not wish to limit ourselves to the specific design or construction here shown.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. In a can end separating and feeding machine, a holder, a rotor, a star wheel spaced from the holder, and guiding means between the holder and star wheel and coöperating with the rotor for guiding the blanks and causing same to enter and be operatively held in the pockets of the star wheel for advancement by the latter, one of said guides being depressible and arranged so that the rotor may by engagement therewith depress and move over same.

2. In a can end separating and feeding machine, a holder, a rotor operating below the holder, a star wheel adjacent the rotor, and guide means associated with the star wheel and rotor, said guide means coöperating with the star wheel to form a path tangential thereto and terminating adjacent the rotor whereby the rotor will first feed a blank to the star wheel and thereafter cooperate with the star wheel and guide to cause the blank to positively move in the path defined conjointly by the star wheel and guide means.

3. In a can end separating and feeding machine, a holder, a rotor operating beneath the holder and having an arm, a star wheel adjacent the holder, a pair of guides to form a guideway extending tangential to the star wheel; one of which guides terminates adjacent the path described by the outer end of the rotor arm upon movement of the latter, whereby a can end will first be fed by said rotor arm to the star wheel and thereafter the end of the rotor arm will coöperate with said end of the guide and star wheel in guiding the can end.

4. In a can end separating and feeding machine, a bed plate, a holder including spaced vertical guiding rods, the lower ends of which are arranged above and spaced from said bed plate, and a rotor having an arm moving in the space between said rods and the bed plate to move the can ends out of the holder, said arm having a cut-away part on its upper face receiving therein the lower ends of said rods.

5. In a can end separating and feeding machine, a bed plate, a holder including spaced vertical guiding rods, the lower ends of which are arranged above and spaced from said bed plate, and a rotor having an arm moving in the space between said rods and the bed plate to move the can ends out of the holder, said arm having a cut-away part on its upper face receiving therein the lower ends of said rods, said rods being adjustable toward and away from one another to accommodate can ends of varying sizes and said cut-away part of the rotor arm being of such size so as to receive the lower ends of the rods in all adjustments thereof.

6. In a can end separating and feeding machine, a holder, a star wheel adjacent thereto, a rotor operating below the holder, guides between the rotor and star wheel and over one of which guides the rotor operates, and means whereby to enable said guide to move out of the path of the rotor upon rotation of the latter.

7. In a can end separating and feeding machine, a holder, a star wheel adjacent thereto, a rotor, guides between the rotor and star wheel, said star wheel having a sweep across and adjacent to the outer end of said guides, a guide having an end terminating adjacent one of the first named guides and extending to one side of the star wheel and in spaced relation thereto so as to coöperate with the latter to form a path to guide the can ends, and a guide associated

with the first named guide and the star wheel to form a continuation of the path defined by the first named guide and the star wheel.

8. In a can end separating and feeding machine, a holder, a rotor operating beneath the holder, a star wheel spaced from the holder, guides adjacent the star wheel for coöperation therewith, a guide leading from the holder to a point adjacent the star wheel, and a guide leading from the holder to a point adjacent the star wheel, and a guide leading from the holder to a point adjacent one of the first named guides.

In testimony whereof we have hereunto set our hands.

ARTHUR L. DUNCAN.
CHARLES E. FORRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."