Jan. 29, 1924. 1,482,197

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CARTON CLOSING MACHINE WITH AUTOMATIC STOP MECHANISM

Filed July 16, 1921 2 Sheets-Sheet 1

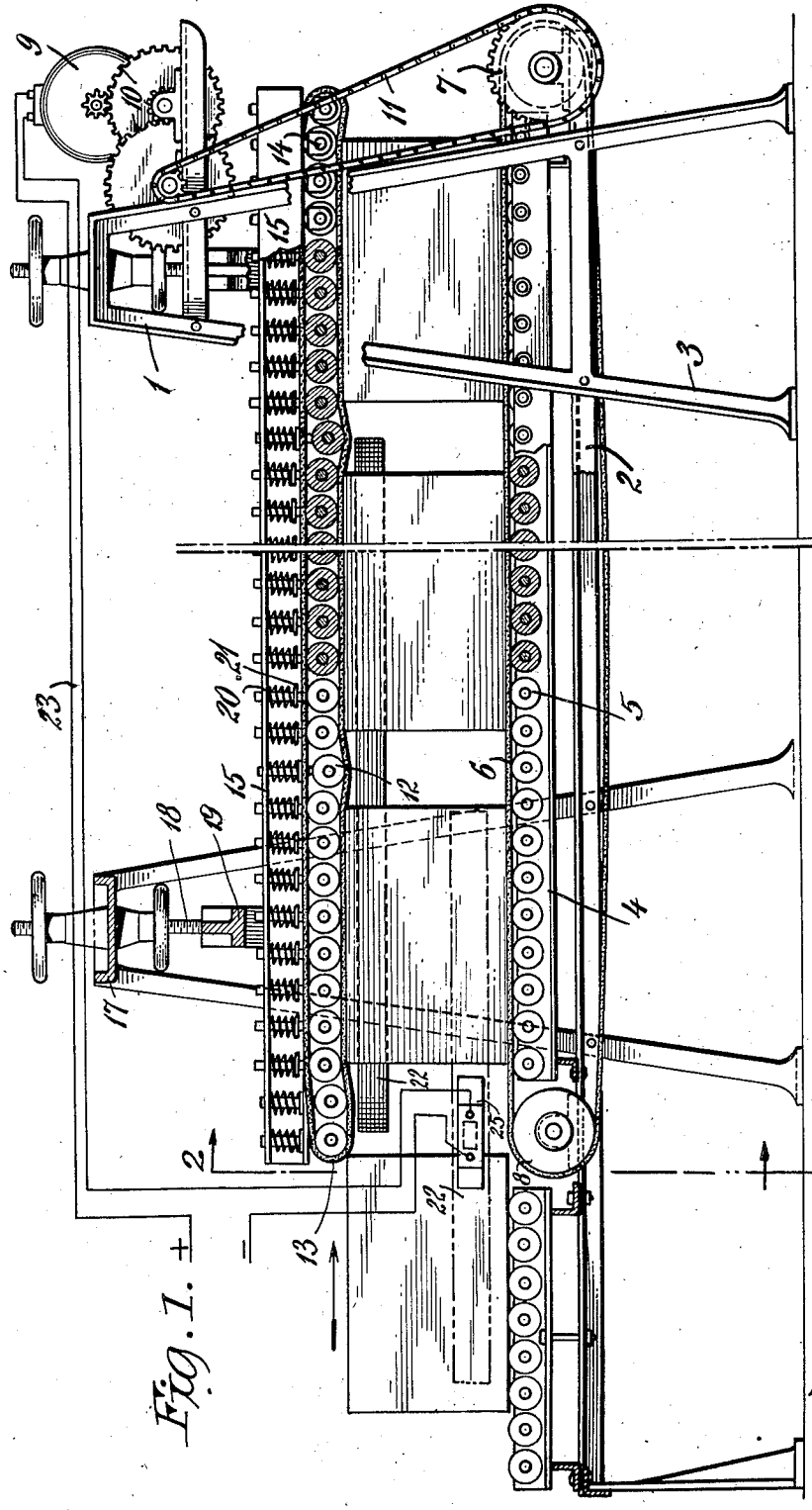


Fig. 1.

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Fig. 2.

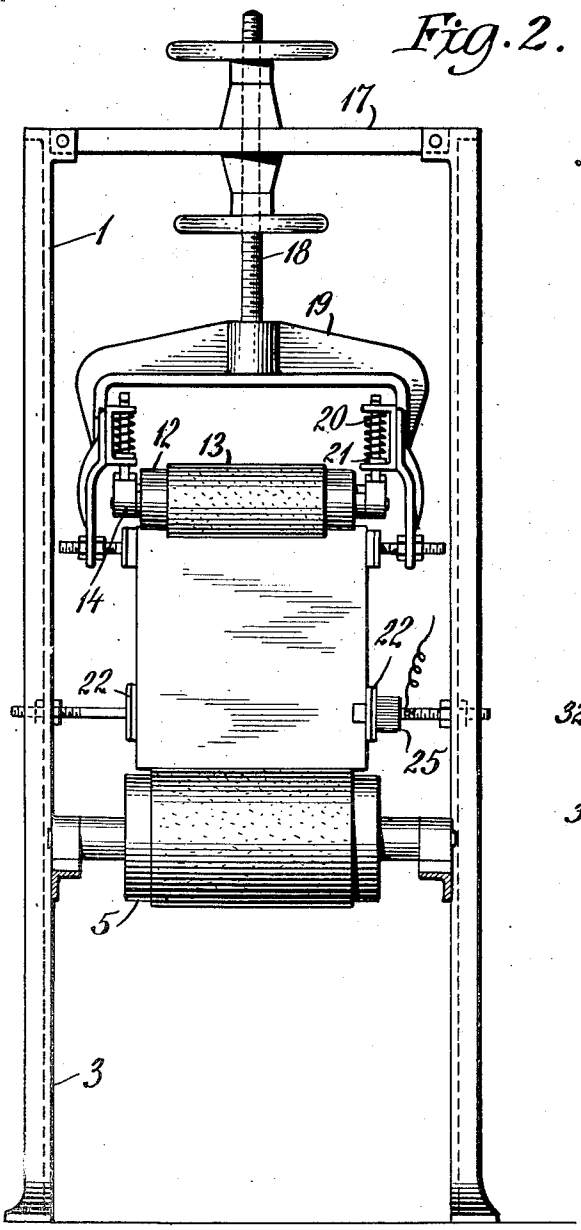


Fig. 4.

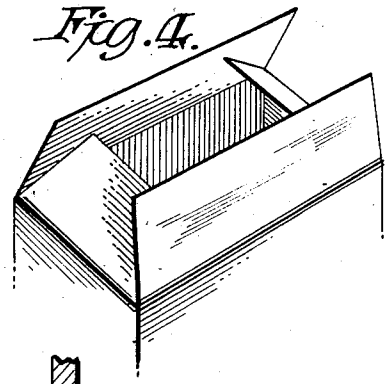
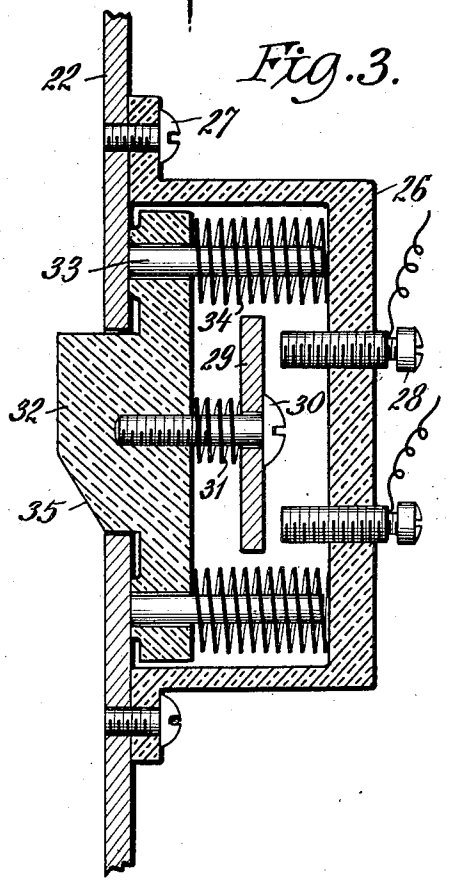


Fig. 3.



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UNITED STATES PATENT OFFICE.

WALLACE D. KIMBALL, OF NEW YORK, N. Y., ASSIGNOR TO STANDARD SEALING EQUIPMENT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CARTON-CLOSING MACHINE WITH AUTOMATIC STOP MECHANISM.

Application filed July 16, 1921. Serial No. 485,189.

To all whom it may concern:

Be it known that I, WALLACE D. KIMBALL, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Carton-Closing Machines with Automatic Stop Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a machine for sealing filled cartons and refers particularly to improvements in that type of carton sealing machine disclosed in the co-pending application of Wallace D. Kimball and Arthur E. Rideout, Serial No. 396,362.

The use of fibre board, or similar material, in the construction of cartons and containers to be used as shipping cases is widely practiced at the present time. If properly sealed such cartons and packing cases give excellent service when subjected to the rough usage encountered in shipping. If the sealing is defective, however, the closed flaps are likely to break open and thereby not only cause the loss of the contents, but the destruction of the container as well.

To secure a substantial joint it is necessary that the flaps be coated with adhesive and subjected to a uniform pressure over their gummed portions until setting of the adhesive takes place. Silicate of soda is almost invariably employed as the cementing medium and is excellent for this purpose if properly used. However, "silicate" has properties somewhat similar to a cement, and the silicated flaps must be held firmly in position for a sufficient length of time to permit of an initial set. Unlike an ordinary adhesive which gradually hardens and is not seriously affected by a slight relative movement of the flaps during the hardening process, the newly applied coating of silicate is ruptured by any slight movement which may occur and its adhesive qualities completely destroyed.

It is important then to not only apply pressure to the flaps after being silicated but to maintain a uniform pressure over each particular portion of the flap, and thereby rigidly hold them without relative movement.

In plants having a small output the most satisfactory method of sealing cartons is by means of individual presses in which one or two cartons at a time may set until sealed. In larger plants, however, it is desirable that some power-driven sealing apparatus be employed in which the cartons are moved along during the sealing process toward the place at which they are to be loaded for shipment, and such an apparatus is described in the above mentioned co-pending application. In that machine, however, the carton carrier is continuously moving, and although the pressure-applying elements which engage the flaps move with the carton the vibration of the machine sometimes causes imperfect sealing.

Accordingly, in the present invention we provide a power-driven apparatus for sealing filled cartons in which pressure is applied to the gummed flaps while the carton is stationary for a period sufficiently long to permit of an initial setting of the silicate, and subsequently convey the carton along the apparatus as successive cartons are introduced.

A further object of the invention is to provide a device of this type in which each carton is moved away from the receiving end of the apparatus out of the way of succeeding cartons, by an automatically operating mechanism which sets the machine in operation as the carton is placed in the machine.

Another object of the invention is to provide an automatic apparatus of the above type in which the power from the driving motor is utilized with maximum efficiency, there being no operation of the driving mechanism when the machine is empty.

It is a further object of the present invention to provide an apparatus of this type in which the full length of the pressure element is utilized at all times, thereby permitting a shorter machine and one of correspondingly low cost to be employed for a given output desired.

It is a still further object of the invention to provide in an apparatus of the above type an automatic mechanism for regulating the driving mechanism which is of extremely simple construction and adds practically nothing to the cost of the apparatus.

I have illustrated a preferred embodiment of my invention in the accompanying drawings, in which—

Fig. 1 is an elevational view, partly in

section, of a machine for sealing filled cartons in accordance with my invention;

Fig. 2 is an elevational view taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view of a part of the regulating mechanism; and

Fig. 4 is a perspective view illustrating the type of carton which my improved apparatus is designed to seal.

Referring to Figs. 1 and 2 of the drawings and particularly to Fig. 1, 1 indicates the frame of the machine shown here as consisting of a horizontal table 2 supported on the legs 3 arranged at desired intervals along its length. Supported on the table 2 is a pair of channels 4 upon which is mounted a series of rollers 5 serving as a support for the cartons in their passage through the machine. The rollers are transversely mounted in the channels with their peripheries close together, and around them is placed an endless belt 6 preferably of heavy webbing and having an appreciable thickness. The belt is supported at one end upon the driving pulley 7 and at the opposite end upon an idle roller 8, and is driven from a suitable source of power, such as an electric motor 9 mounted upon the upper portion of the frame 1 and driving the pulley 7 by means of reducing gears 10, and a sprocket chain 11.

The upper portion of the frame extends above the rollers 5 for a distance considerably greater than the height of the cartons to be closed and forms a support for an upper pressing mechanism comprising essentially a series of rollers 12 carrying a pressing belt 13. The rollers 12 are supported at their ends by hangers 14 whose stems project upwardly from the axis of the rollers through holes in the opposite flanges of the channel bars 15, which extend longitudinally of the machine at the inner side of the members 3 of the frame 1.

The channels are suspended from the upper cross bars 17 of the main frame by means of screw threaded rods 18 threaded through fixed collars on the frame structure 1 and supporting at their lower ends brackets 19 whose opposite ends are connected to the channels 15. The joint between the screw shanks 18 and the brackets 19 are floating joints and allow the arch to tilt somewhat to provide for slight irregularities in the surface of the carton.

Each of the hangers 14 is provided with separate pressure springs 20, the springs preferably lying between the webs of the channels and working against the collars 21 which are attached to the stems of the hangers. The machine may be adjusted to receive various sized cartons by moving the brackets 19 in a vertical direction by means of the screw threaded rods 18. For any given size carton the upper pressing belt 13 is adjusted to such height that the carton when introduced will raise the rollers slightly against the pressure of their springs.

The upper belt 13 is not driven and is consequently allowed an appreciable amount of slack so as to conform to the top of the carton under the action of the rollers 12. Both the upper and lower belts are narrower than the carton being sealed and of an appreciable thickness, so that pressure will be applied along the gummed edges of the flaps without crushing down the edges of the carton. This arrangement obtains a positive and secure sealing of the flaps from end to end.

The frame 1 is preferably provided at its receiving end with a roller table, as shown in Fig. 1, and at its discharge end with a table (not shown) or a chute for receiving the sealed cartons. Longitudinal guide strips 22 are preferably provided near the receiving end of the machine to properly place the cartons with relation to the pressing belts.

The motor 9 receives its power from the leads 23 through an automatic control switch 25 supported substantially beneath the first belt supporting roller at the initial end of the machine and preferably mounted in the lower guide strip 22, as shown in Fig. 1.

Referring to Fig. 3 in which the details of the switch are shown, the switch parts are enclosed within the housing 26, which is secured to the guide strip 22 by means of screws 27. In the outer wall of the housing 26 are mounted contact posts 28 extending through the wall of the housing and projecting equal distances into the interior. These posts are located in one side of the motor circuit which leads from its power source, the interval between these posts being the only non-conducting space disconnecting the motor from its power source. Thus, when the posts 28 are connected by an electrical conductor, the motor circuit will be closed and the driving mechanism will be set in motion.

Mounted within the housing is a contact bar or disk 29 which fits loosely around the shaft of a screw 30, and is pressed against the head of the screw by means of a spring 31. The screw 30 is secured to the body member 32 of the contact switch which in turn is slidably mounted upon rods 33 and is held in position by means of coil springs 34 surrounding the rods 33. The member 32 is so shaped as to project through a hole in the guide strip 22 and has its side closest the receiving end of the machine beveled off at 35 so as to be pressed outwardly by the introduction of a carton. Normally springs 34 maintain the member 32 projected through the hole in the guide strip 22, the screw 30 being of such length that contact

piece 29 is held away from the binding post 28. The projecting portion of the member 32 is of greater height than the gap between the contact piece and the binding posts 28. The springs 34 serve to hold the member 32 securely against the side of the carton and prevent chattering or other vibration. After the member 32 has been pressed partly outward the contact piece 29 interconnects the binding posts 28, thus connecting the motor 9 with its power source. Further movement of the piece 32 compresses the spring so that it serves as a resilient backing for the contact piece 29 and maintains a firm contact regardless of irregularities in the size of the carton, the loose fit about the shank of screw 30 allowing the contact piece to tilt a small amount and thus offset any inequalities of the length of the projections of posts 28 into the switch housing.

From the above description the operation of the apparatus will be readily understood. The cartons come from the packer with the flaps folded in but unsealed, and with the goods in the cartons. If the goods are individual articles such as cans, or cakes of soap, for instance, the flaps at both ends are unsealed. If packed with finely divided material the bottom flaps will have been folded and sealed upon a so-called "bottom-sealer" before being filled. A carton as received from the packer is placed upon the roller table at the receiving end of the machine and the overlaping faces of the unsealed flaps coated with silicate and pressed together. The carton is then introduced by the operator into the presser mechanism. As the forward end of the carton goes beneath the first pressing roller it also contacts with member 32 of the switch 25. When this switch is closed power is supplied to the motor 9 and the driving mechanism is actuated, carrying the carton to be sealed into the machine. The contact continues until the carton has passed the projecting portion 32 of the contacting switch, at which time the member 32 springs quickly back into position and effects a clean break in the motor circuit. The power supplied to the driving mechanism is immediately shut off, and the carton will move beyond the switch 25 only such a distance as it is carried by the momentum of the machine, which distance is small and serves merely to provide a clearance space between successive cartons in their passage through the machine.

The carton then rests in this position under the action of the pressing elements until a succeeding carton is introduced. Thus a uniform steady pressure is applied to the flaps during the time in which the silicate is attaining its initial set, without even the small danger of relative movement of the flaps being sealed as might exist in case the cartons were passed continuously on through the machine. Furthermore, during this period the driving motor is shut off and no power is wasted in actuating the driving mechanism unnecessarily.

The next carton is then introduced and the motor again operates the driving mechanism until this carton has been completely introduced into the pressure element, after which it again stops and remains stationary until the introduction of a succeeding carton. In this manner the entire length of the machine is utilized, the cartons being closely spaced all along the length of the pressing mechanism. Each carton has a longer period of contact with the presser belt than would be the case if a continuously moving driving mechanism were employed, and consequently a shorter machine may be employed for a given output to be handled.

This machine may be used for sealing the top and bottom flaps of filled cartons or for sealing the top flaps only.

It is to be understood that the contact switch used need not be of the exact construction here shown but may be of any standard type which will accomplish the same purpose, the springs, however, being preferably used to avoid sparking at the points of contact. It is also obvious that power controlling devices other than electric switches may be employed if desired and that various other changes may be made without departing from the scope of the invention.

I claim:

1. In a machine for sealing filled cartons, a presser member for applying pressure to the flaps of the carton, means for advancing the carton into the machine under the action of said presser member, and automatic means for discontinuing the advancing force applied to said carton immediately after its complete introduction to the action of said presser member.

2. In a machine for sealing filled cartons, comprising presser elements, means for advancing a carton into the machine with its flaps silicated, and automatic means for discontinuing the advancing force applied to the carton immediately after its introduction into the said presser elements for a length of time sufficient to insure an initial setting of the silicate.

3. In a machine for sealing filled cartons, means for applying pressure to the flaps to be sealed, and means for automatically spacing the cartons in close succession along the length of said pressure applying means.

4. In a machine for sealing filled cartons means for applying pressure to the flaps being sealed, the contact between said pressure applying means and said flaps being stationary and means for automatically spac-

ing the cartons in close succession along the length of said pressure applying means.

5. In a machine for sealing filled cartons, means for advancing a carton into the machine with its flaps silicated, automatic means for controlling the movement of said means to start its movement upon the introduction of each carton into the machine and to stop the movement after an advance at least equal to the length of the carton.

6. In a machine for sealing filled cartons, means for applying pressure to the flaps to be sealed, said means comprising a pressure member of width less than that of the carton and a yielding backing for said member comprising a plurality of transverse rollers resiliently mounted to permit of a slight vertical movement, and means for automatically spacing the cartons in close succession along the length of said pressure applying means.

7. In a machine for sealing filled cartons, the combination of means for applying pressure along the middle of the carton flaps, means for conveying the carton through the machine, and a motor actuating said conveying means, said motor being controlled by the movement of the cartons through the machine.

8. In a machine for sealing filled cartons, means for conveying the carton through the machine, an electric motor actuating said conveying means, and automatic means for connecting the motor to its power supply during the introduction of a carton and disconnecting it immediately after introduction of the carton.

9. In a machine for sealing filled cartons, the combination of presser belts of width less than that of the carton for applying pressure along the middle of the upper and lower carton flaps, the lower presser belt serving to convey the carton through the machine, and a motor actuating said conveying belt, said motor being controlled by the movement of the cartons through the machine.

10. In a machine for sealing filled cartons, means for applying pressure to the carton flaps, means for conveying the cartons through the machine, an electric motor actuating said conveying means, and a contact switch in circuit with said motor adapted to be actuated by successive cartons as they are introduced into the machine to intermittently connect said motor to its power source.

11. In a machine for sealing filled cartons, means for applying pressure to the carton flaps, means for conveying cartons through the machine, an electric motor actuating said conveying means, and a contact switch in circuit with said motor adapted to be depressed by a carton as it is introduced into the machine and thereby connect said motor to its power source and adapted to return to the open position after said carton has passed, thereby disconnecting the motor from its power source.

12. In a machine for sealing filled cartons, means for applying pressure to the carton flaps, means for conveying cartons through the machine, an electric motor actuating said conveying means, and a contact switch in circuit with said motor, said switch comprising contact terminals, a contact plate for bridging said terminals, a spring for holding said plate resiliently in contact with said terminals, a body member carrying said contact plate and adapted to be actuated by a carton as it is introduced into the machine, and springs for normally holding said member resiliently in an open position.

In testimony whereof I affix my signature.

WALLACE D. KIMBALL.