

Oct. 29, 1940.

R. N. DOBLE

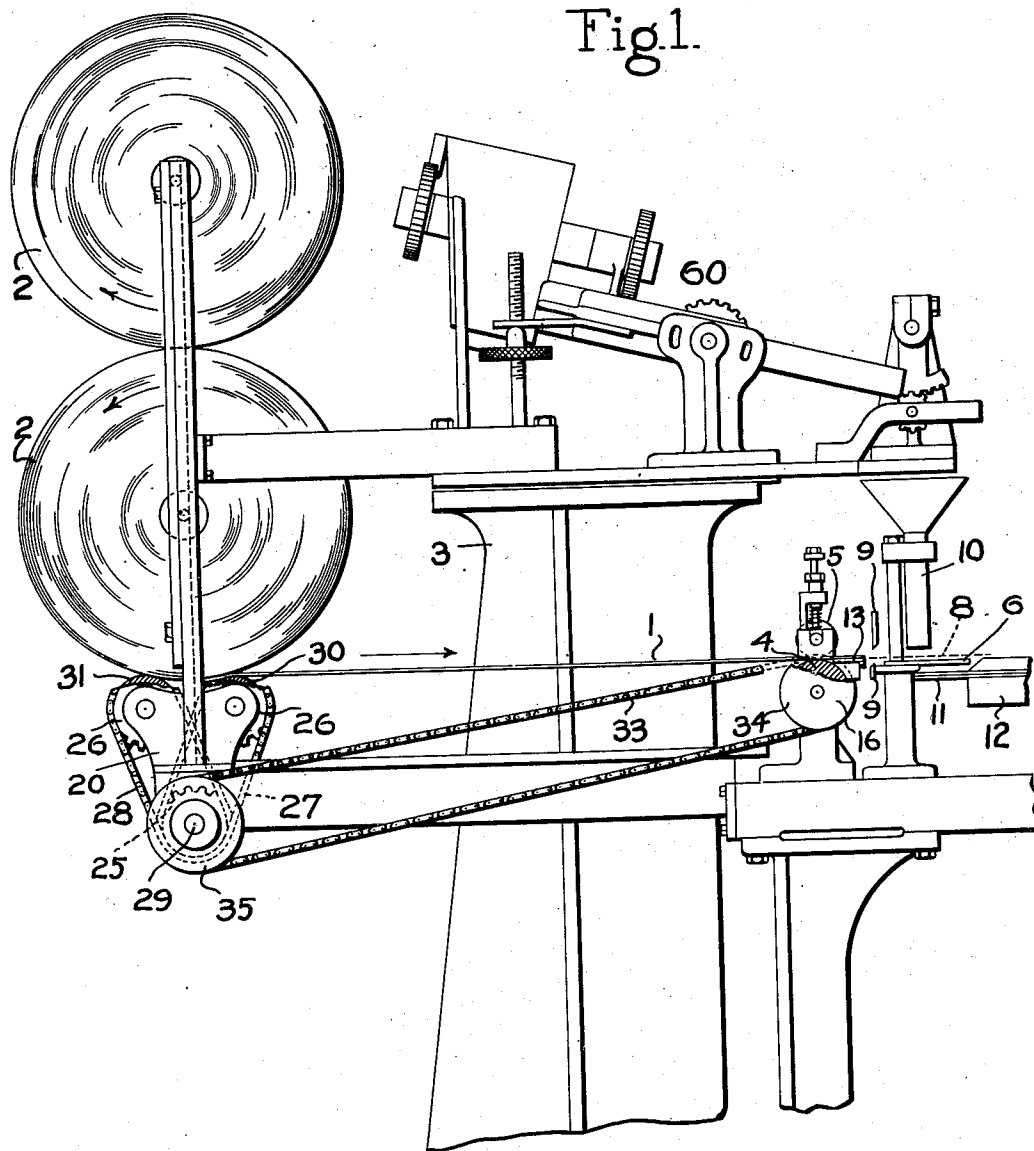
2,219,682

SHEET CUTTER FOR PACKAGING MACHINES

Filed Nov. 6, 1937

2 Sheets-Sheet 1

Fig. 1.



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2 Sheets-Sheet 2

Fig2.

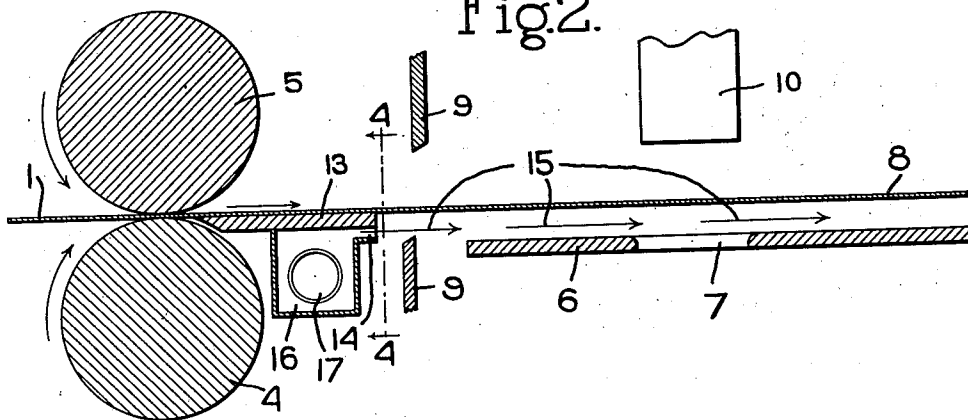


Fig3.

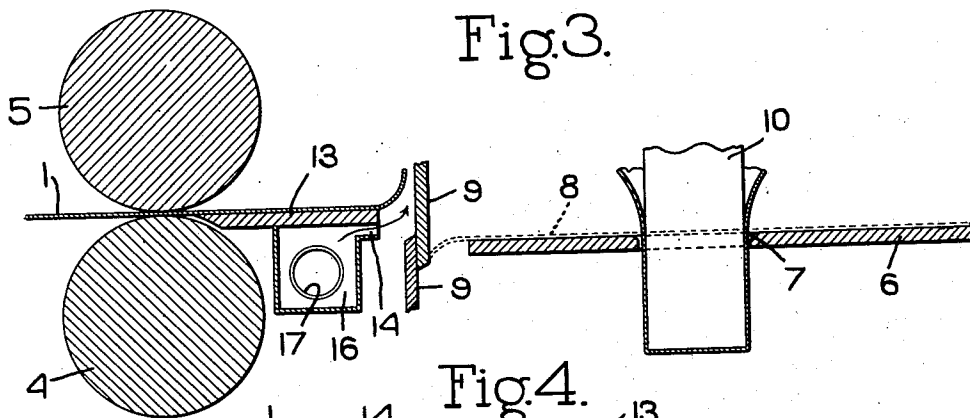


Fig4.

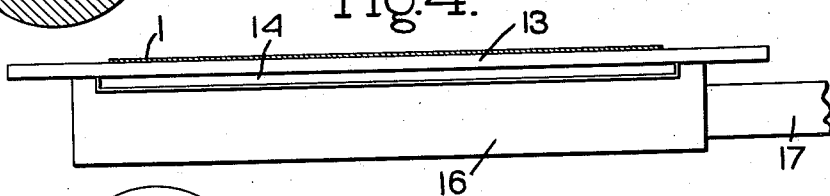
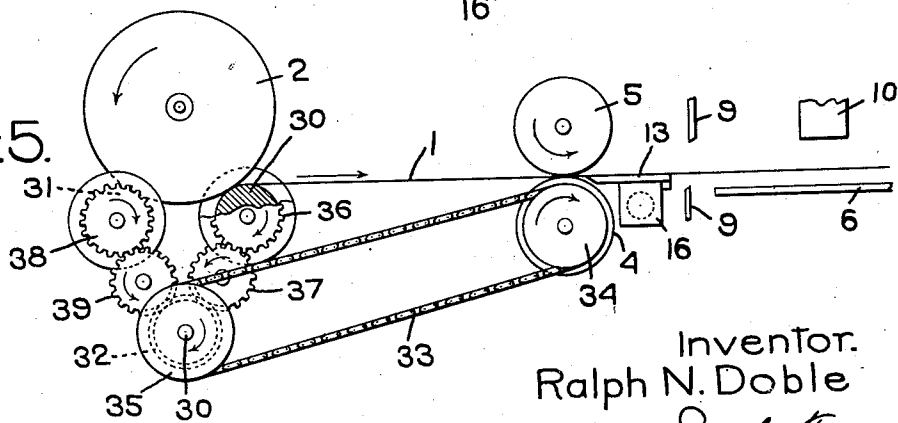


Fig5.



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UNITED STATES PATENT OFFICE

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SHEET CUTTER FOR PACKAGING
MACHINES

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5 Claims. (Cl. 164—49)

This invention relates to packaging machines of the type adapted to make and fill a tea bag, coffee bag or the like and especially to a packaging machine of the general type illustrated in my Patent No. 1,700,672, January 29, 1929 and Patents No. 1,857,662, May 10, 1932, and No. 1,911,805, May 30, 1933.

The devices illustrated in said patents are designed to produce tea bags, coffee bags or the like of the pouch type and they comprise a supporting plate having a bag-forming opening therein together with means for feeding a piece of bag material onto the plate over the opening, and a combined filling and bag-forming tube constructed to be forced through the opening with the result that the bag material is forced through the opening and folded up around the tube by the edges of the opening. While the combined filling and bag-forming tube is still within the opening a predetermined amount of the tea, coffee or other material with which the bag is to be filled is deposited into the tube and thus into the bag, and the tube is then withdrawn and the neck of the bag is closed together and tied by a suitable fastening device.

In the operation of these machines the bag material, which is drawn from a supply roll, is usually in the form of a strip and this strip of bag material is fed forward to bring a length at the end thereof over the supporting plate, and then said length is severed from the strip just before the bag is formed and filled.

In order that the bag may be properly made it is important that at each bag-forming operation the length of the bag material from which the bag is to be made should be placed squarely on the supporting plate in a smooth unwrinkled condition. In the operation of packaging machines of this type it sometimes happens that the free end of the strip of bag material which is being delivered from the feed rolls will crumple up or wrinkle as it contacts with or is fed to the supporting plate. Such crumpling or wrinkling may be due to various causes such as friction between the bag material and the plate or the presence of static electricity which has been developed in the bag material which causes it to be attracted to the plate and to cling somewhat thereto as it is fed forward.

One purpose of my present invention is to provide novel means for insuring that the bag material will be fed properly from the feed rolls to the supporting plate, and I propose to accomplish this object by providing means for floating the bag material as it is delivered from the feed rolls

into the correct position over the supporting plate by means of a current of air. In this way the bag material is held out of contact with the supporting plate as it is advanced thereover and will be held in a smooth unwrinkled condition by the air current.

Another feature of my invention relates to means for terminating the action of the current of air on the length of bag material after it has been properly positioned over the supporting plate and as soon as such length is severed from the strip. As soon as this occurs the severed length of bag material will gravitate onto the plate in the correct position for the formation of the bag.

Another feature of the present invention relates to improved means for feeding the bag material from the supply roll or rolls to the feed rolls.

In order to give an understanding of the invention I have illustrated in the drawings some selected embodiments thereof which will now be described after which the novel features will be pointed out in the appended claims.

In the drawings:

Fig. 1 is a side view of a portion of a packaging machine embodying my invention;

Fig. 2 is a fragmentary sectional view through the feed rolls and the supporting plate showing the manner in which the bag material is fed into position above the plate;

Fig. 3 is a view similar to Fig. 2 but showing a length of bag material cut from the strip and the operation of forming the bag therefrom;

Fig. 4 is a section on the line 4—4, Fig. 2;

Fig. 5 is a fragmentary and somewhat diagrammatic view illustrating a slightly different feed device for feeding the bag material to the bag-forming instrumentalities;

Since my present invention relates to the feeding of the bag material to the bag-forming instrumentalities, I have not thought it necessary to illustrate a complete machine herein but have shown only such portions of the packaging machine as are necessary to illustrate my present invention. The bag material may be single-ply material or two-ply material and may be in the form of a strip of fabric or paper or a combination of the two. The bag material is delivered from the supply roll or rolls 2, a single-supply roll being employed if the strip is a single-ply strip and two supply rolls 2, as shown in Fig. 1, being employed if the strip is a two-ply strip, one ply being taken from each of the supply rolls.

These supply rolls are suitably supported on the frame 3 of the machine.

The strip of bag material, whether a single-ply strip or a plural-ply strip, passes between feed rolls 4 and 5, one or both of which are positively driven, and is then fed to the usual supporting plate 6 which has the bag-forming opening 7 therein. When a suitable length 8 of the bag material has been fed into position over the supporting plate 6, then such length is cut off from the strip 1 by means of shear devices 9 as described in said above mentioned patents. The combined filling and bag-forming tube is shown at 10, and after the length 8 of bag material has been cut from the strip 1 said tube is depressed downwardly into and through the bag-forming opening 7, thereby causing the edges of the length 8 of bag material to be folded up around the tube as shown in Fig. 3. The required charge of tea, coffee or other ingredient is then deposited into the tube from a suitable measuring or weighing device 60, after which the tube is withdrawn and the edges of the bag are closed together by means of gripping jaws 11 carried by the rotatable turret 12. As the turret rotates the filled bag is carried by the closed gripping jaws 11 out from under the plate 6, and during this rotation the neck of the bag is tied tightly by means of a suitable fastening device in the manner described in the above mentioned patents.

In order that each bag may be properly formed it is necessary that the length 8 of bag material should be delivered to the supporting plate 6 in a flat unwrinkled condition and in a position in which it is properly aligned with the bag-forming opening 7. Although the feed rolls 4 and 5 serve to deliver at each bag-forming operation the requisite length 8 of bag material to form a bag, yet unless the free end of this length 8 is properly controlled there is a possibility that said length may crumple up more or less as it is delivered from the feed rolls to the supporting plate 6, in which case said length of bag material will not be delivered onto the supporting plate 6 in the necessary flat condition nor in the proper position relative to the bag-forming opening 7 to have the bag formed correctly. The crumpling up or buckling of the bag material may be occasioned by the presence of static electricity in said material which causes it to be attracted to and to adhere to the plate 6, or it may be due to roughness or foreign matter on the plate which produces sufficient friction between the bag material and the plate to prevent said material from being fed into the proper position, or it may be caused from other causes.

To provide for the proper delivery of the free end of the bag material to the plate 6 I propose to employ means for floating the free end of the bag material into place over the plate 6 on a current of air, said air current being so directed against the under side of the portion 8 of the bag material as to keep it flat and smooth and to feed it forward as it is delivered from the feed rolls 4, 5 so that the bag-forming length 8 will be brought over the plate 6 in a flat, unwrinkled condition.

As shown in the drawings there is provided a delivery apron 13 on the delivery side of the feed rolls 4, 5, over which apron the bag material is fed, and situated directly beneath the delivery end of this apron is an air delivery nozzle 14 through which a sheet-like jet of air is delivered that flows along over the plate 6 and underneath the portion 8 of bag material. The velocity

and pressure of the air thus delivered through the nozzle is such as to provide an air current, indicated by the arrows 15 in Fig. 2, which is sufficient to support the length 8 of bag material and float it along over the plate 6. Various ways of providing the nozzle may be employed. I have herein shown an air chamber 16 situated directly beneath the apron 13 and having in one side a slot which forms the nozzle 14. The chamber is provided with an inlet 17 through which 10 air under the required pressure and in the required volume may be delivered to the chamber and thus to and through the nozzle 14.

The presence of this air current 15 flowing over the plate 6 in the direction of feed serves 15 to support the free end 8 of the bag material as it is delivered from the feed rolls and hold it out of contact with the plate 6 as shown in Fig. 2 and to carry it in a flat, unwrinkled condition into the correct position over the plate 6. When 20 the required length of bag material has been fed over the plate 6 the feed rollers stop, as usual in devices of this type, and the shear blades 9 close together to sever the length 8 from the strip 1. The closing together of the shear blades 25 9, as shown in Fig. 3, forms a dam or barrier for the air current delivered from the nozzle 14 and deflects this air current either up or down so that as soon as the blades are closed the severed length 8 of bag material is freed from 30 the action of the current 15 and said bag material then settles down onto the plate 6 in a flat, unwrinkled condition, as shown by dotted lines in Fig. 3. The bag material is thus delivered to the plate 6 in a free, unwrinkled condition and 35 in a correct position to be acted on by the combined filling and bag-forming tube 10.

After the bag has been formed and filled as above described the shear blades are separated from each other and the feed rolls 4 and 5 then 40 operate to feed another length of bag material over the apron 13 and to the plate 6, and as soon as the shear blades are separated, as shown in Fig. 4, the air current delivered from the nozzle 14 serves to support the free end of bag 45 material as it passes off from the apron 13 and to float said bag material over and across the plate 6 as shown in Fig. 2.

There is thus provided means which become operative when the feed rolls are rotating to float 50 the free end of the bag material into place over the plate 6, and which become inoperative when the feeding movement stops and the shears are operated to cut the length 8 from the strip of bag material. The presence of the air current 55 above described holds the bag material separated from the plate 6 so that the feed of the bag material into position above the plate is not interfered with by any frictional contact between the bag material and the plate or by the 60 presence of static electricity in the bag material.

I have also provided herein means for feeding the bag material from the supply roll 2 to the feed rolls 4, 5 under a controlled tension. The supply roll 2 rests on and is supported by one or 65 more supporting rolls, two rolls 30 and 31 being herein shown. These rolls are suitably journaled in a portion 20 of the frame and are positively driven in the same direction as and in timed relation with the feed rolls. Since the 70 supply roll rests on the supporting rolls 30 and 31 the rotative movement of the supporting rolls will give rotation to the supply roll in a direction to deliver the bag material therefrom. If the bag material is of fabric and it is desired to subject 75

the portion of the bag material between the supply roll and the feed roll to a very slight tension sufficient to keep it taut, then the driving connection between the feed rolls and the supporting rolls will be such that while the supporting rolls and the feed rolls may have approximately the same surface speed, yet the surface speed of the supporting rolls will be slightly less than that of the feed rolls. On the other hand if it is desired to have the length of bag material between the supply roll and the feed rolls under a controlled tension which is practically zero, then the supporting rolls will be driven at the same surface speed as the feed rolls. In the construction shown in Fig. 1 the driven feed roll 4 has a sprocket 34 rigid therewith which is connected by a sprocket chain 33 with a sprocket wheel 35 fast on a suitable shaft 29, and this shaft 29 is connected to the supporting rolls 30 and 31 through the medium of two sprocket chains 27, 28 which pass around sprocket wheels 25 and 26 fast with the shaft 29 and the supporting rolls 30, 31 respectively.

In place of the sprocket chains and sprocket wheels 25, 26, 27 I may employ a geared connection between the shaft 29 and the two supply rolls 30 and 31 as shown in Fig. 5. In this embodiment the shaft 29 has a gear 32 which is connected to a gear 36 rigid with the supporting roll 30 through the medium of an intermediate gear 37 and which is also connected to a gear 38 that is rigid with the supporting roll 31 through the medium of another intermediate gear 39. This construction provides means for positively rotating the supporting rolls 30, 31 in timed relation with the feed rolls so that the bag material 1 will be delivered from the supply roll to the feed rolls under a controlled tension which may range from zero to any desired amount.

While I have illustrated herein two supporting rolls on which the supply roll rests, yet the invention would not be departed from if a single supporting roll only were used.

I claim:

1. Feeding mechanism for feeding web material to a supporting plate comprising intermittently operating feed rolls acting on a strip of web material and during each operation feeding a length thereof to said plate, means to deliver a current of air against the under side of said web material as it is delivered from the feed rolls whereby said length of web material will be floated into position over the plate, and a pair of shears to cut said length of web material from the strip, said shears being positioned so that when closed they interrupt the flow of air over said plate.

2. A feeding mechanism for feeding web material to a supporting plate, said feeding mechanism comprising intermittently operating feed rolls acting on a strip of web material and during

each operation feeding a length thereof to said plate, means to deliver a current of air against the underside of said web material as it is delivered from the feed rolls, said current of air flowing over said plate, whereby said length of web material will be floated into position over the plate, and means to sever the length of web material from the strip and simultaneously interpose a barrier to the flow of air over said plate, thus allowing said severed length to settle onto the plate.

3. A feeding mechanism for feeding lengths of web material to a supporting plate, said feeding mechanism comprising intermittently operating feeding rolls acting on a strip of web material and during each operation feeding a length thereof to said plate, an air delivery nozzle situated to direct a current of air against the underside of the web material and over said plate as the web material is delivered from the feed rolls and means to sever said length of web material from the strip and simultaneously interpose a barrier between the nozzle and the plate which cuts off the flow of air over said plate, whereby the severed length will settle into position on the plate.

4. A feeding mechanism for feeding web material to a supporting plate, said feeding mechanism comprising intermittently operating feed rolls acting on a strip of web material and during each operation feeding a length thereof to said plate, a delivery apron over which the web material passes in its travel from the feed rolls to the plate, a nozzle beneath the delivery apron arranged to deliver a sheet-like current of air against the web material and over the plate, thereby floating the web material into position above the plate, and means to sever said length of web material from the strip and simultaneously interpose a barrier between the nozzle and the plate which cuts off the flow over said plate, whereby the severed length will settle into position on the plate.

5. In a packaging machine, the combination with a feed roll for feeding bag material in strip form to a bag-forming mechanism, a supporting roll on which rests a supply roll of bag material, said supply roll being rotated by the supporting roll, a second supply roll resting on the first-named supply roll, the strip of bag material from the second supply roll passing part way around the first-named supply roll and the strips from both supply rolls being delivered from the first-named supply roll at the same point, and means for rotating the feed roll and the supporting roll at substantially the same surface speed whereby the bag material will be delivered from both supply rolls to the feed rolls under a controlled tension.

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