

April 14, 1942.

E. L. SMITH ET AL

2,279,843

WRAPPER FEED FOR WRAPPING MACHINES

Filed Jan. 14, 1941

3 Sheets-Sheet 1

Fig. 1.

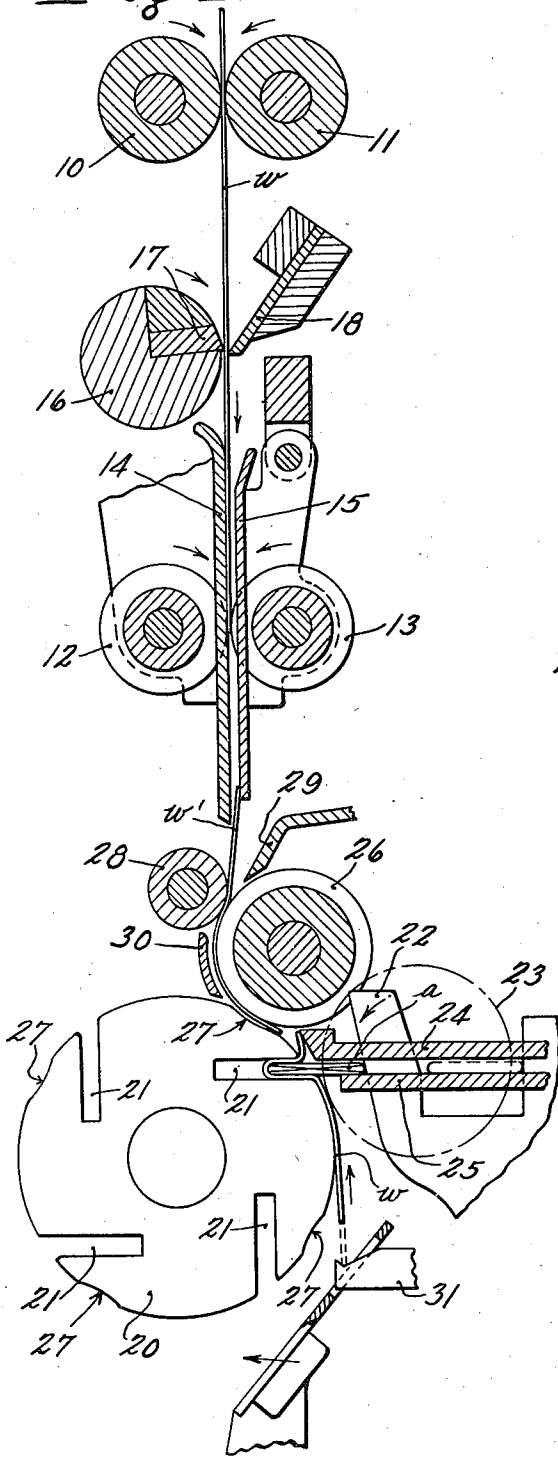
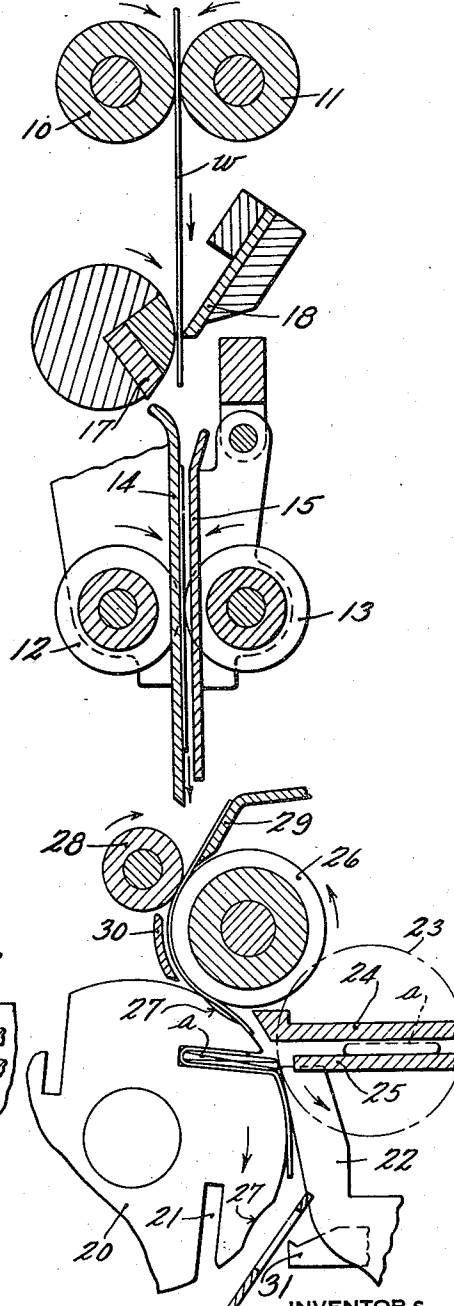


Fig. 2.



INVENTORS
ELMER LOVELL SMITH AND
BY CARL E. MELHORN
Chapin & Neal ATTORNEYS

April 14, 1942.

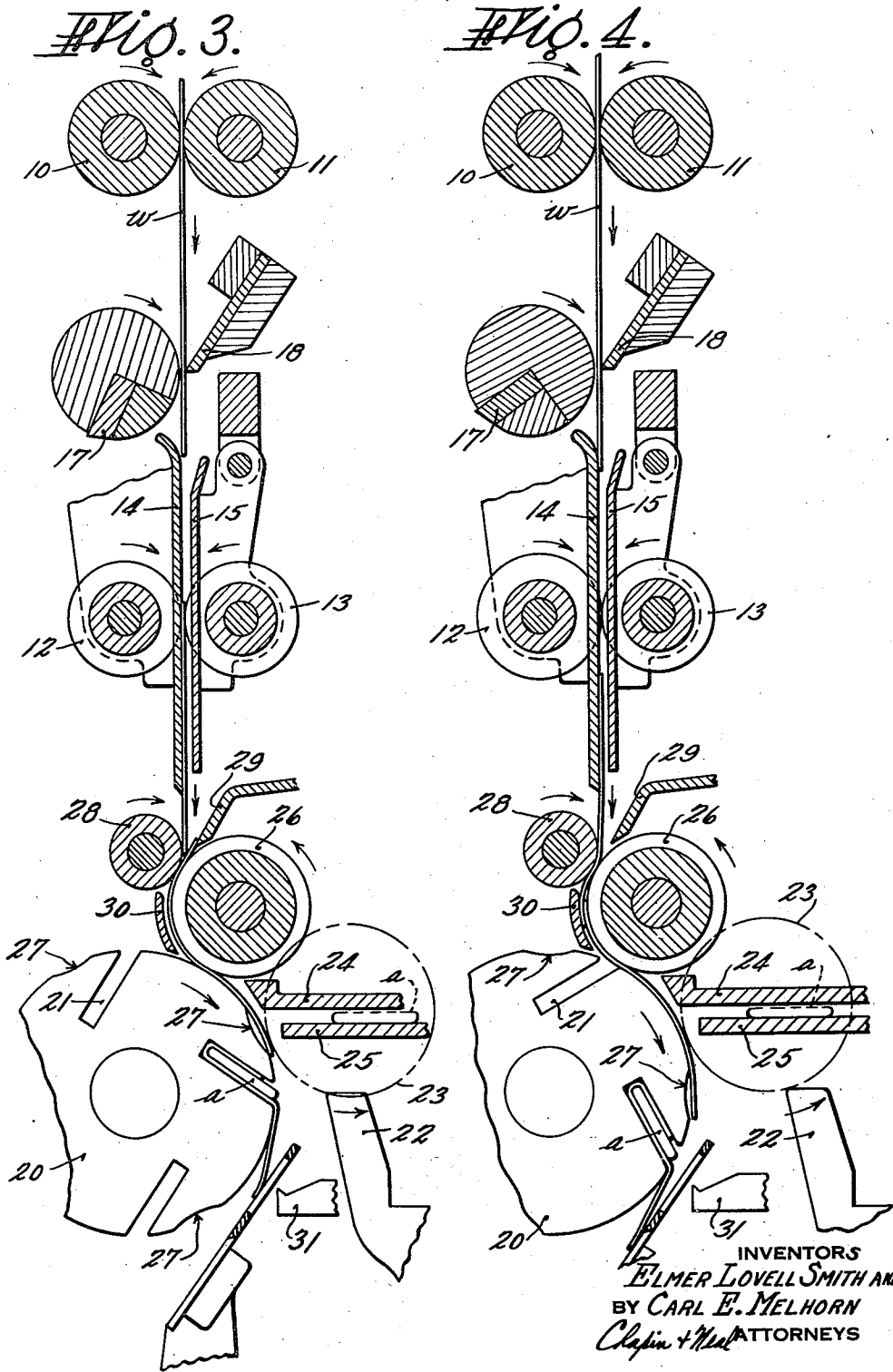
E. L. SMITH ET AL

2,279,843

WRAPPER FEED FOR WRAPPING MACHINES

Filed Jan. 14, 1941

3 Sheets-Sheet 2



April 14, 1942.

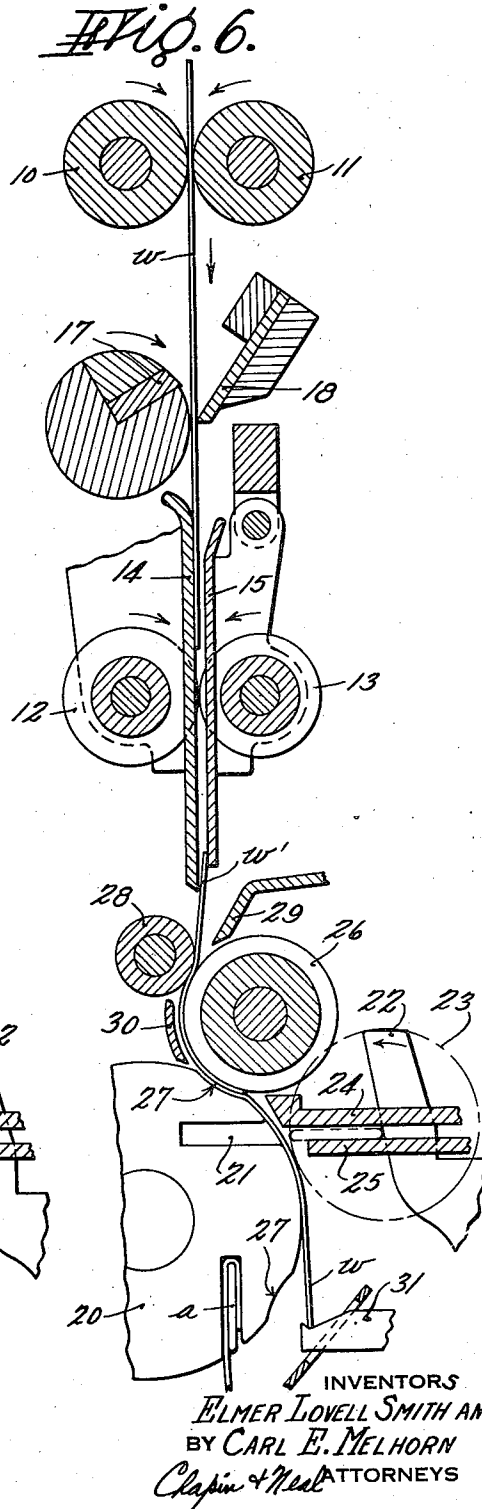
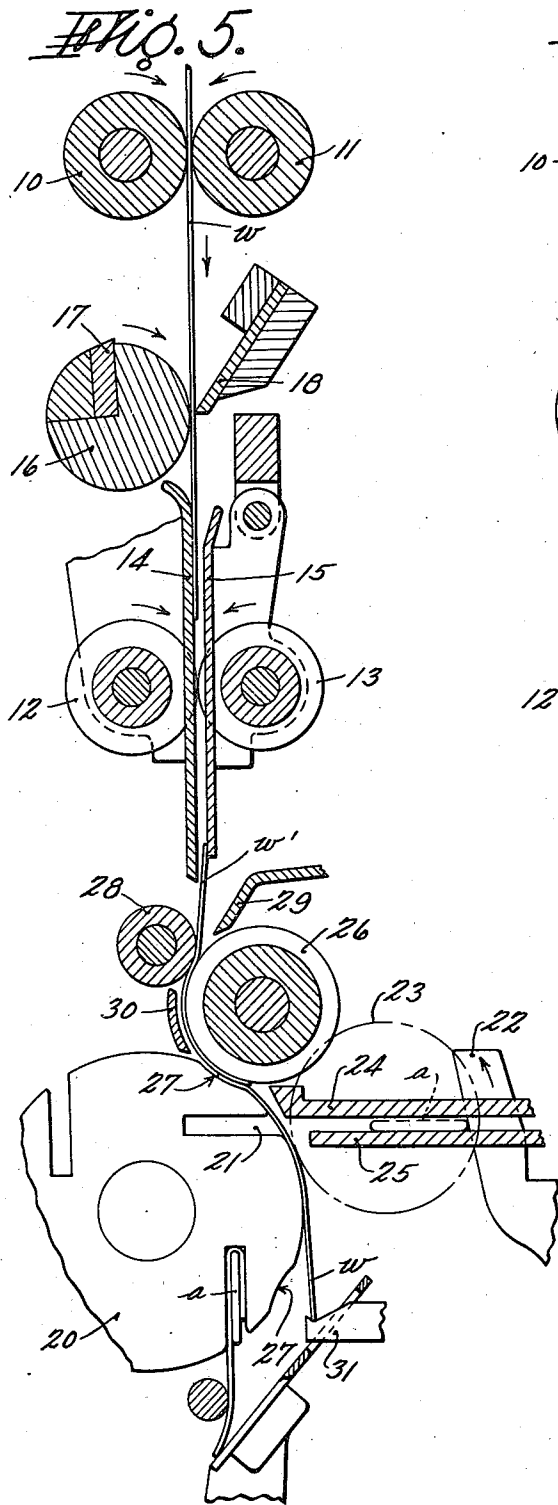
E. L. SMITH ET AL

2,279,843

WRAPPER FEED FOR WRAPPING MACHINES

Filed Jan. 14, 1941

3 Sheets-Sheet 3



INVENTORS
ELMER LOVELL SMITH AND
BY CARL E. MELHORN
Chapin & Neal ATTORNEYS

UNITED STATES PATENT OFFICE

2,279,843

WRAPPER FEED FOR WRAPPING MACHINES

Elmer Lovell Smith, Longmeadow, and Carl E. Melhorn, Springfield, Mass., assignors to Package Machinery Company, Springfield, Mass., a corporation of Massachusetts

Application January 14, 1941, Serial No. 374,308

10 Claims. (Cl. 93—2)

This invention relates to wrapper feeds for wrapping machines and has particular reference to a web feed adapted for use with a wrapping machine employing a tumble box or wrapping wheel. In machines of this kind the article is pushed into a pocket of an intermittently rotating tumble box while the latter is stationary and in such a manner as to carry a wrapper into the pocket with it. Upon the subsequent rotation of the tumble box and ejection of the article from it, the part of the wrapper initially trailing outside the tumble box will be folded around the article.

At low speeds the problem of feeding wrappers to a tumble box is not difficult and can be accomplished by severing wrappers from the end of a web or feeding them from a magazine. Modern high speed wrapping machines, however, are adapted to handle upward of nine hundred articles per minute; and the difficulty of feeding wrappers to the tumble box mounts rapidly with increasing speed. For many reasons it is desirable to employ a type of web feed in which the web itself is running continuously. Due to the intermittent rotation of the tumble box, however, the wrapper necessarily comes to rest when it is positioned for contact with the article and difficulty is experienced from the constantly advancing end of the main body of the web interfering with this stationary previously severed wrapper. In the prior application of Smith and Melhorn, Serial No. 307,996, this difficulty has in part been avoided by rotating the tumble box in a direction toward the advancing web which, as fully described in said application, permits the trailing end of the wrapper to be bent around a stationary abutment with the result that as the tumble box starts to rotate the speed of advance of the trailing end of the wrapper will be twice that of the tumble box itself. In some cases, however, it is not desirable to employ this direction of rotation of the tumble box and the present invention is directed to a wrapper feeding mechanism which can be operated at high speeds and which will feed a wrapper to an intermittently rotating tumble box, having its direction of rotation in the same sense as the motion of the advancing web, without interference between the continuously advancing body of the web and the momentarily stationary trailing end of the wrapper.

The invention will now be described in connection with the accompanying drawings, in which—

Figs. 1 to 6 inclusive are sectional views illus-

trating the various web handling devices in successive positions of operation.

The web *w* is continuously advanced by continuously rotating rolls 10 and 11. Spaced 5 these two rolls are a second pair of continuously driven rolls 12 and 13, preferably formed as spaced disks in order to pass between guide plates 14 and 15 in a customary manner. The speed of rotation of the rolls 12 and 13 is slightly higher 10 than that of the preceding pair of rolls.

Between the two roll pairs is a cutting roll 16 bearing a cutter blade 17 adapted to pass a stationary cutter blade 18 to sever a wrapper from the end of the web as will be indicated by a comparison of Figs. 1 and 2. The cutting roll 16 is 15 timed so that the wrapper is severed at the moment when its leading end is grasped by the rolls 12 and 13, as shown in Fig. 1, so that the rapidly rotating rolls 12 and 13 will carry the cut wrapper 20 quickly away from the more slowly advancing main body of the web (Fig. 2). The driving mechanism for these rolls can be of any desired type and has not been shown here.

The tumble box is indicated at 20 and has a series of four preferably non-radial pockets 21 25 into which an article *a* is positioned by a transport finger 22 adapted to move in a known manner, as through a circular path 23. The article is positioned in any desired way between guides 30 24 and 25 and is pushed by the finger 22 into a pocket of the intermittently rotating tumble box at a time when the tumble box is stationary. Successive positions in this feeding operation are indicated by Figs. 5, 6, 1 and 2. The intermit- 35 tently rotating tumble box may be driven in any suitable way, preferably by a mechanism such as is shown in the Smith Patent 2,210,734, August 6, 1940, and the driving mechanism has not been shown herein.

Closely adjacent the tumble box and the guide 40 24 is a roll 26 geared to the tumble box for rotation therewith at the same surface speed. The gearing has not been shown as its nature will be obvious. The roll 26 is sufficiently close to the 45 tumble box so that it will normally roll a wrapper along the surface of the latter, but periodic depressions 27 are formed in the surface of the tumble box so as to come opposite the roll 26 when the tumble box is at rest for a purpose to be 50 described below.

Mounted for rotation with and positioned to be in wrapper feeding contact with the roll 26 is a roll 28. The line joining the axes of rolls 26 and 28 is inclined from the line joining the axes of the other pairs of rolls, as will be clearly appar-

ent in the drawings. As a wrapper is projected beyond the guides 14 and 15, as shown in Fig. 3, it will be seized between the rolls 26 and 28 and will be fed forward by them as soon as it is released from the rolls 12 and 13. The space between these two pairs of rolls is such that the wrapper is drawn beyond the rolls 26, 28.

The guide 15 is made shorter than the guide 14 so that as the trailing end of the wrapper passes beyond it it can snap over against a stationary guide plate 29, this motion being caused by the angular position of the line joining the axes of the rolls 26, 28. This action is clearly shown by comparison of Figs. 1 and 2 and has for a problem the removal of the trailing end from the path of the on-coming wrapper. As will be seen in Figs. 3 to 6 inclusive, the end of the on-coming wrapper tucks itself into the bight of the rolls 26, 28 beside the trailing end of the previous wrapper so that the two are overlapped for a short distance. This is for the purpose of giving time for the feed of the wrapper, as in high speed machines it is otherwise impossible to get a wrapper of the desired length positioned in correct registration with a tumble box rotating in the same direction as the advancing web. Were the tumble box to be rotating in the opposite direction the long trailing side of the wrapper would be pushed above the pocket and not below it so that a lesser travel of the wrapper is necessary to push it in correct registration to the tumble box. With the direction of rotation of the present device, however, it will be seen that a very substantial travel of the wrapper is necessary after this initially contacts the tumble box to bring it into the final registration position of Fig. 5. For this purpose the overlapping of the trailing end of the position end by the leading end of the next wrapper to advance is necessary.

The overlapped ends of the wrapper travel in contact with the roll 26 and between it and a guide 30 to a point where the tumble box and the two rolls are brought to rest so that an article may be advanced. This position is shown in Fig. 5 and brings the leading wrapper against a stop 31. The trailing end of this wrapper and the leading end of the next wrapper *w'* are at this time between the roll 26 and the tumble box, and are located in one of the depressions 27. As the article advances into the tumble box, as in Fig. 1, the trailing end of the wrapper *w* will be withdrawn from the depression 27 leaving the forward end of the wrapper *w'* in position readily to be fed forward at the next rotation of the tumble box. It will be seen from this figure that by reason of the overlapping referred to, the leading end of the wrapper *w'* is extremely close to the pocket into which the article has been pushed so that a long length of wrapper may be located in advance of the next pocket as is best shown in Fig. 5. To hold the wrapper against the surface of the roll 26 a curved guide 30 is preferably used.

We claim:

1. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, and a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of rolls having the plane of their axes oblique to the

plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper.

2. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, and a pocketed tumble box intermittently rotating in synchronism with the last-named pair of rolls.

3. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, and a pocketed tumble box intermittently rotating in synchronism with the last-named pair of rolls and in a direction away from the advancing wrapper.

4. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, a pocketed tumble box intermittently rotating in synchronism with the last-named pair of rolls and in a direction away from the advancing wrapper, and a guide for directing the wrapper around the periphery of one of the last-named rolls into contact with the surface of the tumble box.

5. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, and a pocketed tumble box intermittently rotating in synchronism with the last-named pair of rolls and in a direction away from the advancing wrapper, the tumble box having a cylindrical depression therein in regis-

tration with one of the last-named pair of rolls at each rest position of the tumble box.

6. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, the distances between the first pair of rolls and the cutter, between the cutter and the second pair of rolls, and between the second and third pairs of rolls, all being substantially equal to the length of the cut wrapper.

7. A web feed for a wrapping machine comprising a pair of continuously rotating feed rolls, a second pair of continuously rotating feed rolls spaced from the first pair and driven at a higher surface speed, means intermediate the pairs of rolls for severing a web extending between them, a third pair of intermittently rotating rolls positioned to receive a severed wrapper from the second pair of rolls, said third pair of intermittently rotating rolls having the plane of their axes oblique to the plane of the axes of the second pair of rolls to direct the trailing end of a wrapper out of the path of the advancing end of the next wrapper, the distances between the first pair of rolls and the cutter, between the cutter and the second pair of rolls, and between the second and third pairs of rolls all being substantially equal to the length of the cut wrapper, the tumble box having a cylindrical depression therein in registration with one of the last-named pair of rolls at each rest position of the tumble box.

8. In a wrapping machine having an intermittently rotating tumble box, means for feeding a wrapper web towards the tumble box in the direction of rotation thereof, means for severing wrappers from the web, a pair of feed rolls rotating intermittently at the same surface speed as the tumble box and having one of the rolls in wrapper-feeding contact with the tumble box and the

other of the rolls so located that the plane of the axes of the pair of rolls departs sufficiently from a right angle with respect to the advancing severed wrapper to deflect the trailing end of one wrapper out of the path of the advancing end of the next wrapper to permit said ends to become overlapped.

9. In a wrapping machine having an intermittently rotating tumble box, means for feeding a wrapper web continuously towards the tumble box in the direction of rotation thereof, means for severing wrappers from the web and advancing the severed wrappers continuously at a higher speed than that of the web, a pair of feed rolls rotating intermittently at the same surface speed as the tumble box and having one of the rolls in wrapper feeding contact with the tumble box and the other of the rolls so located that the plane of the axes of the pair of rolls departs sufficiently from a right angle with respect to the continuously advancing severed wrapper to deflect the trailing end of one wrapper out of the path of the advancing end of the next wrapper to permit said end to become overlapped by the continuous advance of said next wrapper.

10. In a wrapping machine having an intermittently rotating tumble box, means for feeding a wrapper web continuously towards the tumble box in the direction of rotation thereof, means for severing wrappers from the web and advancing the severed wrappers continuously at a higher speed than that of the web, a pair of feed rolls rotating intermittently at the same surface speed as the tumble box and having one of the rolls in wrapper feeding contact with the tumble box and the other of the rolls so located that the plane of the axes of the pair of rolls departs sufficiently from a right angle with respect to the continuously advancing severed wrapper to deflect the trailing end of one wrapper out of the path of the advancing end of the next wrapper to permit said ends to become overlapped by the continuous advance of said next wrapper during the period of rotation of the tumble box, the tumble box having a cylindrical depression therein in registration with one of the last-named pair of rolls at each rest position of the tumble box.

ELMER LOVELL SMITH.
CARL E. MELHORN.