June 13, 1961 L. BROOK 2,987,861

WRAPPING MACHINES

Filed Nov. 27, 1959 3 Sheets-Sheet 1

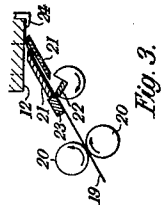

Fig. 3.

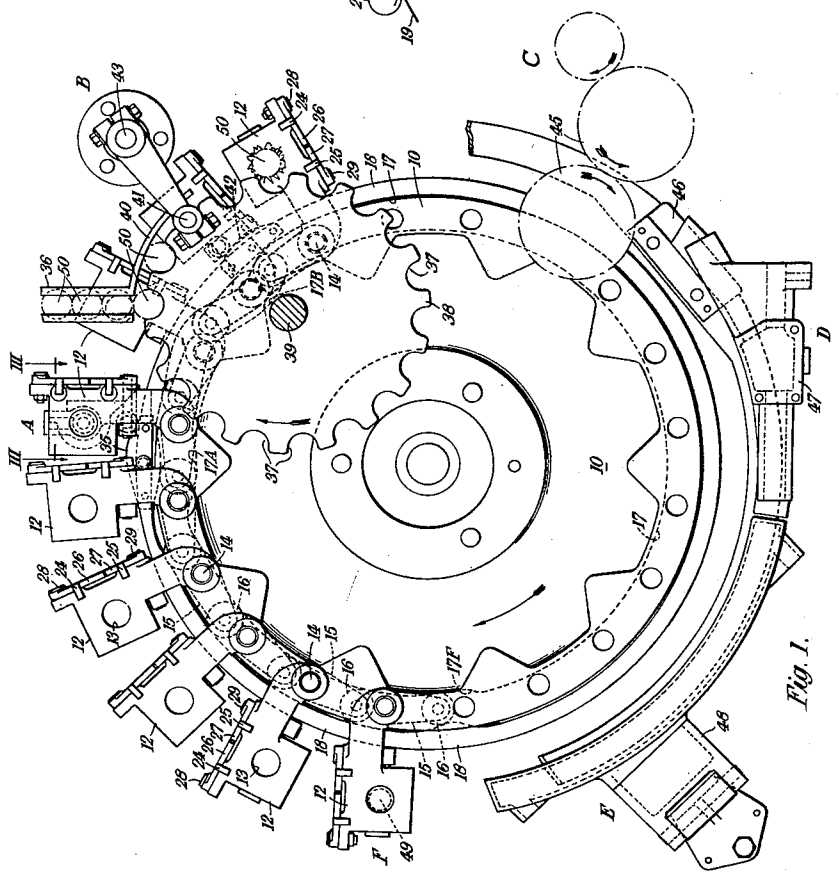

Fig. 1.

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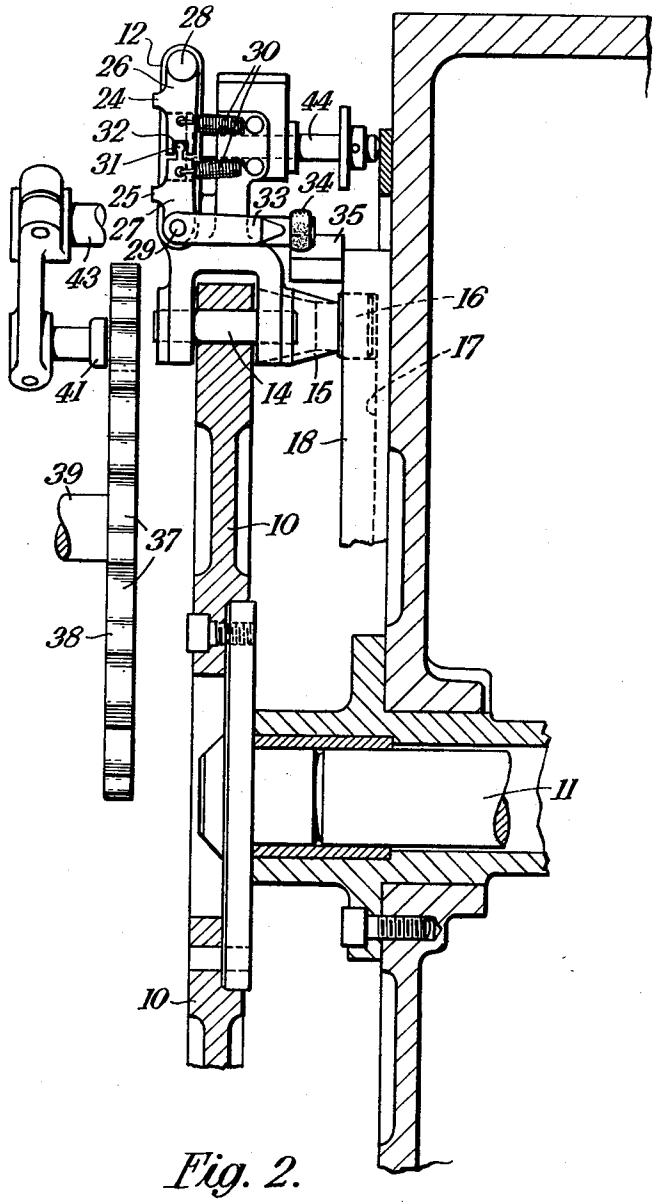

Fig. 2.

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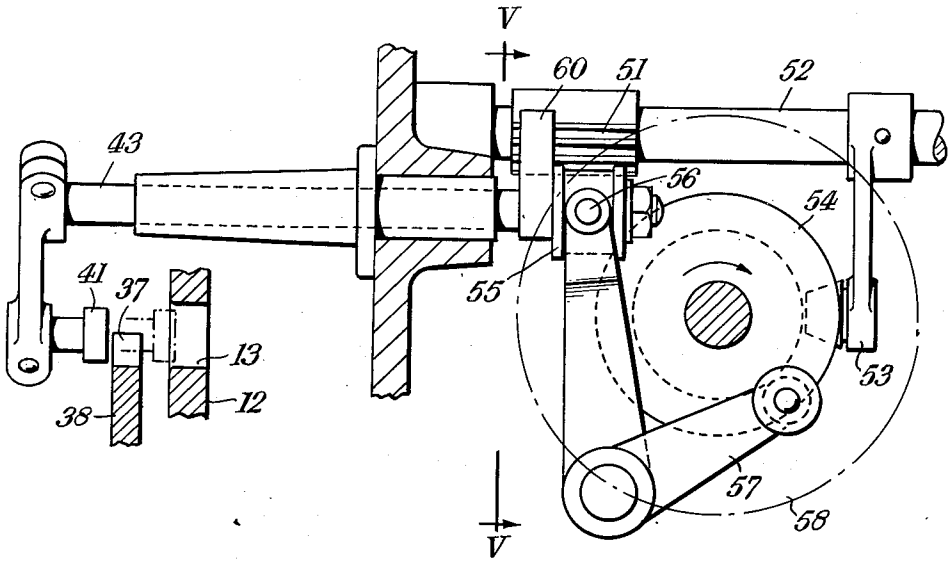

Fig. 4.

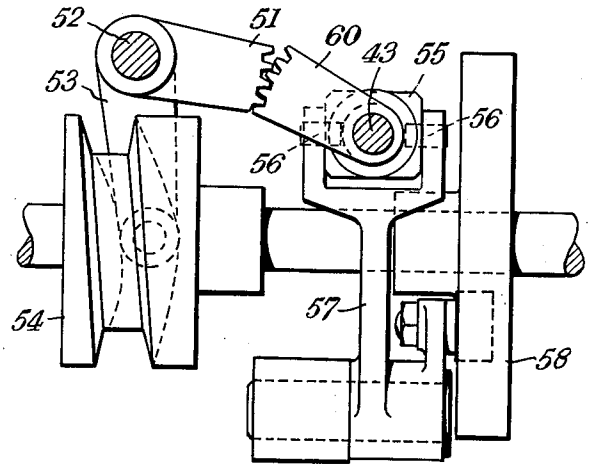

Fig. 5.

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WRAPPING MACHINES

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Claims priority, application Great Britain Nov. 28, 1958
7 Claims. (Cl. 53—225)

This invention relates to bunch wrapping machines. In the conventional type of bunch wrapping machine, the articles to be wrapped are lifted in succession each carrying a wrapper with it, through an annular brush into jaws on a carrier head which rotates intermittently on a vertical axis. As the result of passage through the brush, the wrapper is folded around the top and sides of the article and depends in irregular pleats from the base of the article. The carrier head then conveys the articles in succession to a tucking station, where the depending portions of the wrapper are folded against the base of the article, then to a heater which forms a heat seal at the base of the article, then over a cooler and finally to a discharge station.

The present invention provides a bunch wrapping machine comprising a number of pocketed wrapping elements mounted on a rotary carrier head so as to be carried thereby past successive wrapper feed, loading, tucking, sealing and discharge stations, means on each wrapping element for receiving a wrapper supplied at the wrapper feed station and holding it across the mouth of the pocket in the wrapping element, a pusher at the loading station for introducing articles in succession into the pockets of the wrapping elements as they arrive at the loading station, each article carrying a wrapper with it as it enters the pocket, and means at the discharge station for discharging wrapped articles from the packets.

In this machine, the wrapper is accordingly folded around one end and the sides of the article as it is pushed into the pocket of the wrapping element carrying the wrapper with it. The projecting skirt of the wrapper is folded against the other end of the article at the tucking station and the overlapping folds of the wrapper at this end of the article are subsequently sealed at the sealing station.

Preferably the carrier head is rotated continuously and means are provided for momentarily decelerating the wrapping elements as they pass the wrapper feed, loading and discharge stations. Preferably also the carrier head rotates about a horizontal axis and the articles are fed to it by the pusher at the loading station from recesses in a continuously rotating feed wheel which also rotates about a horizontal axis.

One specific embodiment of bunch wrapping machine according to the invention will now be described in more detail, by way of example with reference to the accompanying diagrammatic drawings, in which:

FIG. 1 is a front elevation of the carrier head and associated mechanisms with the wrapper feed mechanism omitted,

FIG. 2 is a corresponding vertical section,

FIG. 3 is a section on the line III—III in FIG. 1 showing the wrapper feed mechanism,

FIG. 4 is a side view, partly in section, of the mechanism for actuating the transfer pusher, and

FIG. 5 is a section on the line V—V in FIG. 4.

In the construction illustrated, the carrier head is constituted by a wheel **10** mounted on a horizontal shaft

11 which is rotated continuously by a motor (not shown) in a clockwise direction as seen in FIG. 1. The carrier head carries a number of wrapping elements, each constituted by a block **12** formed with an article-receiving pocket **13**. The wrapping elements are traversed in succession by rotation of the carrier head past a wrapper feed station A, a loading station B, a tucking station C, a sealing station D, a cooling station E and a discharge station F.

The wrapping elements **12** are pivoted to the wheel **10** near its periphery on horizontal studs **14** and each wrapping element is formed with a cranked arm **15** carrying a runner **16** engaging a cam track **17** in a fixed cam **18** concentric with and situated behind the wheel **10**. So long as the runners **16** engage a concentric portion of the cam track the wrapping elements rotate at the same angular velocity as the wheel. The cam track is, however, so shaped at the points **17A**, **17B** and **17F** as to provide momentary deceleration of the wrapping elements when they reach the wrapper feed station A, the loading station B and the discharge station F and subsequently to accelerate them again to their normal angular velocity.

A web **19** of wrapping material is fed continuously, as shown in FIG. 3, in a vertical plane and at an angle of some 30° towards the front face of the wheel near the top thereof by continuously rotating feed rollers **20**. The leading end of the web is fed between guides **21** against the front face of the moving wrapping element **12** situated at the top of the wheel, wrappers are severed in succession from the web by a rotary knife **22** coacting with a fixed knife **23**, and the front end of each wrapper is gripped immediately after severance by a pair of grippers which hold the wrapper to the face of the wrapping element **12** in position over the pocket **13** therein. The grippers are constituted by outwardly bent fingers **24**, **25** on levers **26**, **27** pivoted at **28**, **29** to the side face of the wrapping element and urged by springs **30** to the closed position. The lever **27** has a projection **31** engaging a slot **32** in the lever **26** and is formed with an extension **33** carrying a runner **34**, which coacts with a fixed cam piece **35** as the wrapping element approaches the wrapper feed station A, causing the grippers **24**, **25** to open momentarily to allow the leading end of the wrapper to pass between them and the face of the wrapping element and then close to hold the wrapper to the wrapper element. As will be apparent from FIG. 2, when the roller **34** rides up the face of the cam **35**, the lever **27** will be rocked anticlockwise about its pivot **29** to lift the finger **25** from the face of the element **12**. During such movement the projection **32** rocks the lever **26** about its pivot **28** to lift the finger **24** from the element **12**. As soon as the roller **34** clears the fixed cam **35**, the springs **30** return the parts to the position shown in FIG. 2.

Since the uniform rotation of the wheel moves the wrapping elements **12** approximately 3⅛" per cycle, and the web **19** of wrapping material is also being fed continuously but at the uniform rate of approximately 2" per cycle, it will be obvious that the wrapping elements must be slowed up at this period in order to allow the leading edge of the web to overtake and be inserted beneath the grippers **24**, **25**. The cam track **17** is so shaped at **17A** that each wrapping element, as it traverses the wrapper feed mechanism, travels at a suitable speed to allow this to take place.

The articles to be wrapped, in the case in question

round tablets 50, are fed by any conventional feed mechanism into a vertical magazine 36 in which the tablets stand on edge, one above the other. From this magazine successive tablets fall by gravity into peripheral recesses 37 in a feed wheel 38 driven by a continuously rotating horizontal shaft 39. The feed wheel 38 is situated immediately below the magazine 36 and immediately in front of the wheel 10 and rotates on a horizontal axis at a uniform speed less than the uniform speed of rotation of the carrier head. Suitable guides 40 are provided for preventing the tablets from falling out of the recesses 37 in the feed wheel 38. Since the recesses 37 in the feed wheel are close together the articles are gently removed by the feed wheel from the magazine 36.

At the loading station B which is situated some 45° beyond the wrapper feed station A, a recess 37 in the feed wheel 38 is brought into regitser at each cycle with the pocket 13 in one of the wrapping elements 12. The reciprocating pusher 41 then moves inwardly from the front as described later to deliver the tablet from the recess in the feed wheel into the pocket in the wrapping element, the tablet taking with it the wrapper held by the grippers 24, 25 against the face of the wrapping element. At this time the follower 34 associated with the grippers encounters another fixed cam piece 42, which causes the grippers to open momentarily to release the wrapper.

It is desired that the angular velocity of the feed wheel and the particular wrapping element to be loaded should coincide for a reasonable period of time in order that the pusher 41 may transfer the tablet with its piece of wrapping material into the receiving pocket in the wrapping element. Therefore the wrapping element is again slowed down by suitably shaping the portion 17B of the track in the control cam. This is necessary since the pitch of the recesses 37 in the feed wheel is considerably less than the pitch of the pocket 13 in the wrapping elements.

To effect the transfer the pusher 41 is moved backwards and forwards by suitable movement of a rod 43 supporting it, but it is also swung sideways to match the rotational velocities by a rocking movement imparted to said rod. The mechanism for imparting these movements to the pusher is illustrated in FIGS. 4 and 5 and is of the following construction: The rod has attached to it a small gear quadrant 60 engaging with a similar quadrant 51 mounted on a shaft 52 extending parallel to the rod. This shaft carries a cam lever 53 coacting with a cam 54 to give a rocking action to the shaft 52. This is transmitted to the gear quadrants 51, 60 to give a sideways swinging action to the pusher 41. The gear teeth on the quadrant 51 are sufficiently wide to allow for the longitudinal movement of the rod 43, and this longitudinal movement is imparted through trunnion block 55 on the end of the rod engaging with trunnions 56 mounted on a bell crank lever 57. The bell crank lever 57 in turn coacts with another cam 58 in order to give the necessary loading action to the pusher 41. The major part of the sideways movement imparted to the pusher 41 by the cam 54 matches the speed and direction of the recess 37 and the pocket 13 over the small arc of movement during which the tablet is being pushed from the recess 37 into the pocket 13 as the result of the reciprocating movement imparted to the pusher by the cam 58. The pusher 41 receives in addition a small extra sideways movement to allow it to withdraw without fouling. Since there is no appreciable relative arcuate movement of the elements 37, 13 and 41 during the said small sideways movement, it is possible to effect the transfer of the tablet without momentarily stopping the wheel 38 or the wheel 10.

When a tablet is inserted into a pocket 13 in a wrapping element it is supported at the rear by a friction plunger 44 slidably mounted in the pocket. The wrapper covers the rear surface of the tablet, is pleated in a random

fashion round the periphery and stands forward in a kind of skirt from the face of the carrier element. At station C, which is situated approximately 30° below the horizontal, rotary tuckers indicated diagrammatically at 45 and co-acting with a stationary tucking piece 46 complete the folding, and the folds then pass over a heated segment 47 at station D and a cooling segment 48 at station E in order to complete the wrapping.

Soon after this the wrapping elements are again momentarily slowed by the portion 17F of the cam track 17 in order that the wrapped tablet may be discharged at station F by means of the friction plunger 44. The friction plunger receives its stroke from a tappet rod 49 actuated by a cam, not shown.

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

1. A bunch wrapping machine comprising a number of wrapping elements mounted on a rotary carrier head so as to be carried thereby past successive wrapper feed, loading, tucking, sealing and discharge stations, said wrapping elements being constituted by blocks formed with open-mouthed pockets extending into them in a direction parallel to the axis of rotation of the carrier head, means on each wrapping element for receiving a wrapper supplied at the wrapper feed station and holding it across a face of said wrapping element across the mouth of the pocket in the wrapping element and a pusher at the loading station for introducing articles in succession into the pockets of the wrapping elements as they arrive at the loading station, each article carrying a wrapper with it as it enters the pocket, and means at the discharge station for discharging wrapped articles from the pockets.

2. A wrapping machine according to claim 1 which includes driving mechanism for imparting continuous rotation to the carrier head and means for momentarily decelerating the wrapping elements as they pass the wrapper feed, loading and discharge stations.

3. A wrapping machine according to claim 1 in which the wrapping elements are displaceably mounted on the carrier head and comprising means for rotating the carrier head continuously and at a uniform speed, means for feeding wrappers continuously to the wrapper feed station at a uniform rate less than the normal peripheral speed of the wrapping elements and means for momentarily decelerating each wrapping element as it reaches the wrapper feed station.

4. A wrapping machine according to claim 1, in which the wrapping elements are displaceably mounted on the carrier head and comprising means for rotating the carrier head continuously and at a uniform speed, a feed wheel mounted for rotation about an axis parallel to that of the carrier head and having peripheral recesses located closer together than the pockets in the wrapping elements, means for rotating the feed wheel continuously at a uniform speed to bring its recesses successively into register with the pockets of the wrapping elements at the loading station, means for introducing articles in succession into the recesses of the feed disc, and means for momentarily decelerating each wrapping element as it reaches the loading station.

5. A wrapping machine according to claim 2 in which the carrier head is mounted for rotation about a horizontal axis and which includes a recessed feed wheel arranged to rotate continuously about a horizontal axis and a magazine for charging articles into the recesses of the feed wheel, the feed wheel bringing its recesses successively into register with the pockets in the wrapping elements at the loading station to permit of transfer from the recesses to the pockets by the pusher.

6. A wrapping machine according to claim 2 wherein the wrapping elements are pivotally mounted on the carrier head for movement about axes parallel to the axis of rotation of the carrier head and carry followers coacting with a fixed track shaped to provide the required deceleration of the wrapping elements.

7. A wrapping machine according to claim 2 wherein each wrapping element carries wrapper grippers which are spring urged to position to hold a wrapper against the wrapping element and comprising fixed cam pieces which coact with the wrapper grippers to open them momentarily as each wrapping element passes through the wrapper feed and loading stations.

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