

Nov. 7, 1967

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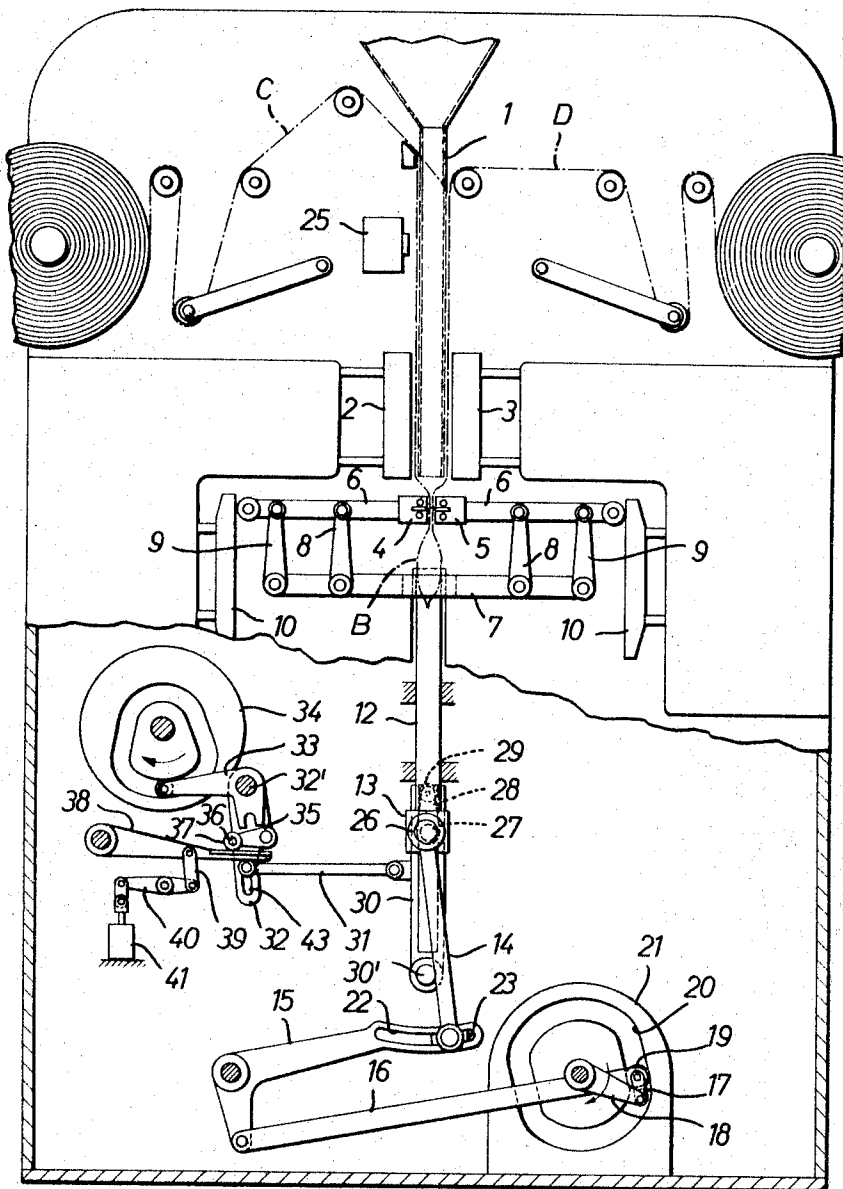
3,350,840

PACKAGING MACHINE

Filed Feb. 3, 1964

3 Sheets-Sheet 1

FIG. 1



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FIG. 2

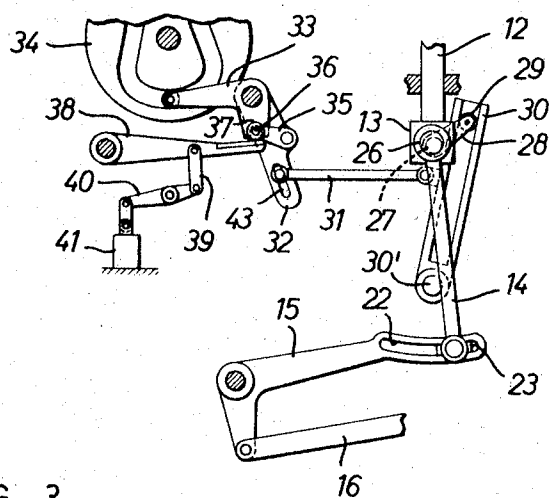
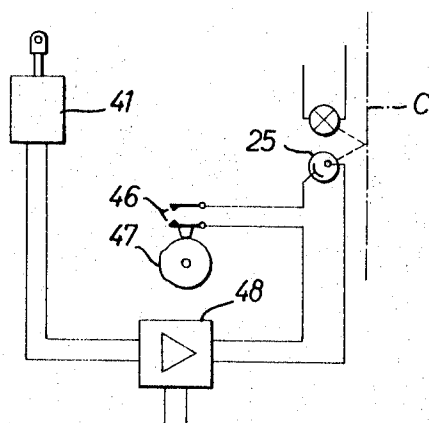


FIG. 3



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FIG. 4

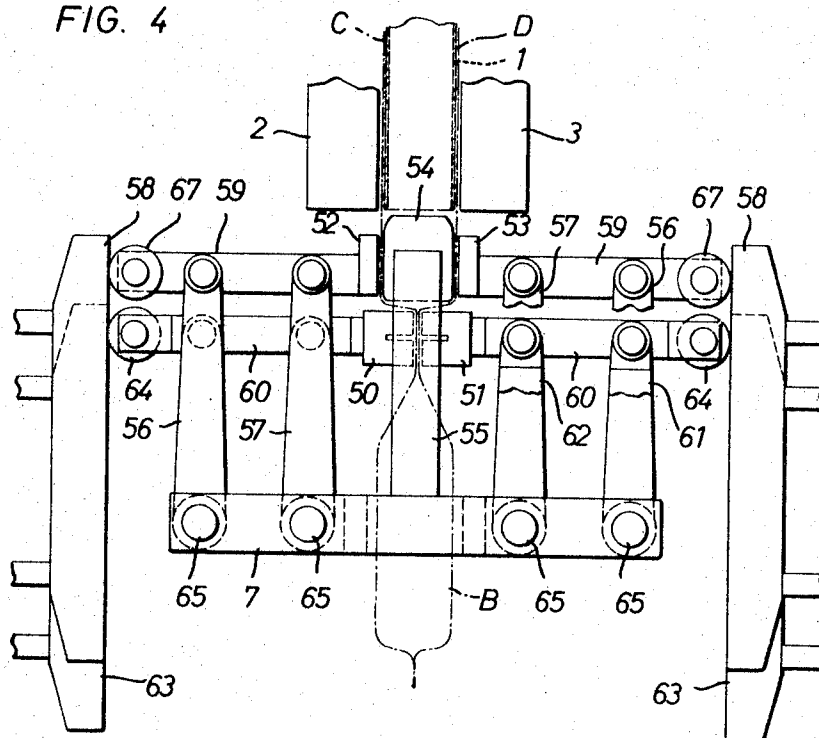
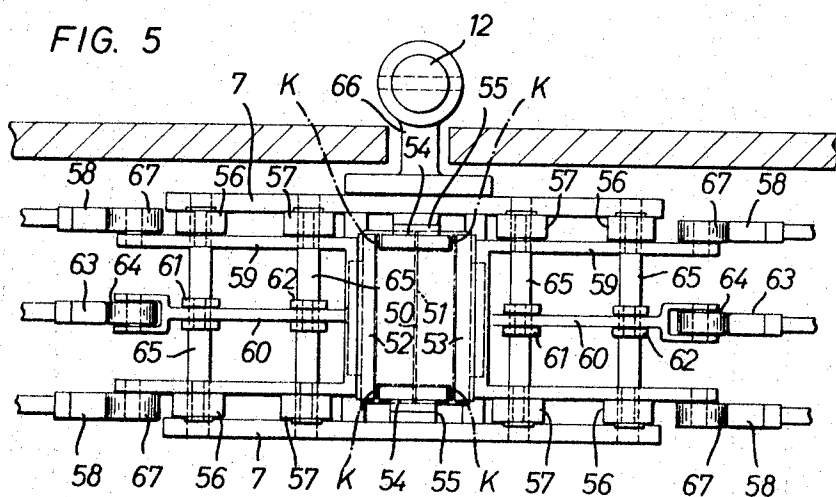


FIG. 5



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PACKAGING MACHINE

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Filed Feb. 3, 1964, Ser. No. 341,955

Claims priority, application Germany, Feb. 18, 1963,

H 48,281

3 Claims. (Cl. 53—180)

This invention relates to an apparatus, used in packaging machines, by means of which a printed web of packaging material, or a tube which has been formed around a shaping mandrel from a printed web of packaging material, is drawn forward intermittently by a web-drawing means under the action of an oscillatory system which is coupled to the web-drawing means and reciprocates these means periodically between two end positions, the position of the imprint relative to the package to be produced being controlled by means of a registration-regulating means.

In a known machine for producing bag packages, a tube formed around a shaping mandrel from a printed web is drawn forward by a pair of clamping and sealing jaws which are moved intermittently up and down through one bag length per stroke. To guarantee the registration between the imprints and packages, the drawn length, that is the stroke of the clamping and sealing jaws, is set to be slightly more than the spacing between the imprints on the web. The deliberate faults thereby induced in the registration are to be corrected, when they reach a predetermined size, under the supervision of a photocell, the sealing jaws being opened by this cell during the drawing down of the tube and shortly before they reach their lower end position so that the tube is only drawn down through one bag length less approximately the size of the error.

Although the aim is to restore correct registration between the bag packages and its imprint, it is found impossible in practice to obtain exact maintenance of registration between the bag and its imprint in this way because it involves an abrupt release of the infed tube of packaging material, which is in motion and into the lower part of which filling material has been introduced with a free fall. Because of its momentum the tube comes to a standstill at an indeterminate instant which is sooner or later depending on the frictional conditions prevailing between the inside of the tube and the shaping mandrel and it becomes impossible to guarantee exact regulation of the registration.

To circumvent this defect, in accordance with the present invention it is proposed that the effective stroke of the draw means produced by the oscillatory system be adjustable in such a way that, in the event of a registration fault exceeding a predetermined amount, at least one of the two end positions of the draw means is displaced by means of the registration-regulating means. This produces a situation in which the tube is permanently under control during its forward movement, and the length drawn off can be optionally increased or reduced.

In a preferred embodiment of the invention the oscillatory system is connected to the draw means through a draw bar and an eccentrically adjustable coupling for controlling the stroke of this draw means. By this arrangement the point of engagement of the draw bar with the draw means is displaced when the coupling is adjusted.

The invention is described hereafter with reference to several embodiments illustrated in the attached drawing.

In the drawing:

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FIGURE 1 shows a first embodiment of a packaging machine in front view, partly in section,

FIGURE 2 shows the driving mechanism of the machine in FIGURE 1, separately and in a further operating position,

FIGURE 3 is a wiring diagram for a device for regulating registration in the machine,

FIGURE 4 is a front view of the draw means of a further embodiment, and

FIGURE 5 a plan view of the draw means of FIGURE 4.

In the embodiment of the invention illustrated in FIG. 1, bag packages B are fabricated from two heat sealable webs C and D, of which at least web C is printed. Both webs C and D are first folded into the form of a tube around a hollow vertical shaping mandrel 1, in a manner which is known per se and will not therefore be further explained, and then connected together by means of heat sealing jaws 2 and 3. The filling material is charged through the hollow shaping mandrel 1 into the lower end of the tube, which is closed by a transverse seam formed by a pair of heated clamping jaws 4 and 5. The clamping jaws 4 and 5, which are reciprocable between two end positions, are also used to draw the tube forward each time by a bag length and to transversely separate and form a top seal at the upper tube end of each filled bag package B.

The conversion of the transverse movements into the transverse separating and sealing of the tube is performed by securing the clamping jaws 4 and 5 to arms 6 which, in conjunction with levers 8, 9 pivoted to a carrier 7, provide a parallelogram linkage. The transverse movement of the clamping jaws 4 and 5 is effected by bars 10 which are reciprocated in timed fashion in known manner as for example shown in applicants' prior U.S. Patent 3,091,902 and impart movement to the arms 6.

The forward draw of the tube with the clamping jaws 4, 5 closed, is effected by moving the carrier 7, the levers 8, 9 and arms 6 downwards. For this purpose the carrier 7 is firmly attached to a vertically guided bar 12 having a draw link 14 pivotally connected to its lower end 13. The other end of this draw link 14 is pivotally connected to a rocker 15 which is pivoted about a fixed pivot point and is coupled by a link 16 and a tie 17, to a crank 18. To ensure that there is a pause in the movement of the clamping jaws 4 and 5 when they are in their upper and lower end positions, with the crank 18 turning uniformly, the tie 17 is equipped with a roller 19 guided in a kidney-shaped guide groove 20 in a fixed cam plate 21.

To allow for setting the tube for forward movement through a predetermined length of travel corresponding to a required bag length, the rocker 15 has a longitudinal slot 22 in which is adjustably engaged a block 24 articulated to the draw link 14, thus enabling the length of the effective lever arm of the rocker 15 to be varied. This slot 22 is of arcuate shape so that the upper dead center of the clamping jaws 4, 5 will invariably be in the same place when there is a change in bag format.

In the present embodiment the stroke of the draw link 14, and that of the carrier 7 and clamping jaws 4, 5 are set a little more than the theoretical distance from imprint to imprint on the tube formed from webs C and D. When the predetermined sizing error occasioned thereby is detected by a photocell 25 associated with the shaping mandrel 1, the upper end position of the clamping jaws 4 and 5 is offset downwards by a specific amount corresponding to this error.

For this purpose (see FIGURES 1 and 2) the draw link 14 is pivoted to an eccentric pin 26 on a stud 27 which is rotatably mounted in the lower end 13 of the bar 12. This stud 27, which is comparable to a crank, has at its other end a lever 28 (see FIGURE 2) which

carries a roller 29 engaged in the slideway of a rockable bar 30. Rocking of the bar 30 about the pivot 30' through lever 28 turns the stud 27, through a predetermined angle so that the eccentric axis of the pin 26, which is normally located in a horizontal plane with the axis of the stud 27, is now set higher than the axis of the stud. This reduces the actual distance between the rocker 15 and the bar 12 so that the upper end position of the clamping jaws 4, 5 is displaced downwards a predetermined distance. During the subsequent forward draw of the tube the return pivoting of the bar 30 increases the distance between the member 15 and the bar 12 to the normal value again, so that the clamping jaws 4, 5 will now execute a smaller distance of forward travel than normal, and a shorter bag length will be advanced.

To implement a registration correction by this means, the bar 30 is connected through a link 31 with a lever arm 32 having a bell crank lever 33 mounted on the pivot axis 32' thereof, this lever 33 being rocked in timed fashion by a cam 34 which turns continuously at the same angular speed as the crank 18. The lever arm 32 is coupled to the bell crank lever 33 when the photocell 25 emits a signal for correction of the registration. To this end the lever arm 32 has a rockable lever 35 with a pin 36 and a roller 37. The roller 37 is applied against a pivotable arm 38 which is coupled through levers 39 and 40 with the armature of an electromagnet 41 (FIGURES 1 and 2). When the electromagnet 41, as disclosed in more detail hereinafter, is energized by the photocell 25, the arm 38 turns the lever 35 so that the pin 36 of the latter engages in the forked free end of the bell crank lever 33. As a result of this positive coupling, the lever arm 32 is obliged to perform a pivotal motion along with the bell crank lever 33 and this is transmitted to the bar 30.

To provide for a predetermined amplitude of correction, the lever arm 32 has a longitudinal slot 43 in which the link 31 can be attached in articulated fashion at a desired location.

To provide for maintenance of the registration, the imprint on the tube is scanned by the photocell 25 in known fashion each time during a pause in the travel. To arrange for this, a switch contact 46 is provided in the circuit of the photocell 25 (FIGURE 3) and is periodically closed by a rotating cam 47. The impulse produced by the photocell 25 in response to an error in the registration is amplified in an amplifier 48 and passed to the electromagnet 41 so as to energize it.

Additionally it is to be noted that, for correction of errors in the registration, the oscillatory system for effecting the forward draw on the tube can of course be such that the correction increment of travel is more than the normal stroke. This arrangement will be used if the normal distance of the forward draw is set less than the distance between imprints.

Moreover the oscillatory system can be constructed in simple fashion so that the lower end position of the travel of the clamping jaws is offset to correct faulty registration.

Whereas, clamping jaws 4 and 5 are provided to draw the tube in the embodiment illustrated in FIGURES 1 and 2, and also to serve as sealing jaws for forming the transverse seams, in the embodiment of FIGURES 4 and 5 two separate devices are used for this purpose, namely, sealing jaws 50, 51 and additional clamping jaws 52, 53 and blocks 54 which co-act with the latter. All these parts are supported by the carrier 7 which is rigidly connected to the bar 12 through a web 66.

This embodiment provides for the formation of a tube with corner ribs K. To enable the draw means to engage the corner ribs K the jaws 52, 53 are arranged for transverse movement relatively to the tube, while the blocks

54, which serve as a counter support, are connected to stays 55 which are firmly connected to the carrier 7, so that each lies between two ribs K of the tube. The clamping jaws 52, 53 are secured to U-shaped arms 59 which, together with the levers 56, 57 and the carrier 7 form parallel linkages. To impart a transverse movement to the clamping jaws 52, 53, use is made of bars 58 which reciprocate in timed fashion and against which run rollers 67 on the arms 59.

In a similar way, the transversely movable sealing jaws 50, 51 are secured to arms 60 which constitute a parallelogram linkage with levers 61, 62 and carrier 7. Bars 63, against which run rollers 64 on arms 60, control the formation of the transverse seam through the medium of a reciprocatory motion of the sealing jaws 50, 51, independently of the clamping movement described. The levers 56, 57 and 61, 62, to which the arms 59 and 60 for the clamping and sealing jaws are pivotally connected are rockably mounted on four spindles 65 secured in the framework carrier 7.

In the last-described embodiment the register-retaining forward draw on the tube is ensured in very effective fashion because the separate clamping jaws, together with the small blocks, preselect the bottom of the bag packages in unequivocal fashion.

The apparatus according to the invention can be directly used for other kinds of packaging machine in which there is the requirement for an exact maintenance of registration in the forward draw of a web of packaging material.

We claim:

1. In a packaging machine, draw means for engaging packaging material, an oscillatory system coupled to said draw means to reciprocally move the same between end positions to advance said material, said oscillatory system including a draw bar pivotally connected to said draw means, a pivotal rocker member connected to said draw bar and driving means for pivotally moving said rocker member, an eccentrically-adjustable coupling between said draw bar and said draw means for modifying their point of connection and adjustable regulating means for acting on said coupling for varying at least one of the end positions of said draw means, said coupling comprising a rotatable member in said draw means, and an eccentric pin on the rotatable member, said draw bar being pivotally mounted on the eccentric pin to change the end positions of the draw means when the rotatable member is rotated in the draw means.

2. A machine as claimed in claim 1 wherein said regulating means includes a pivotal adjusting bar coupled to the rotatable member for rotating the same, adjusting means for acting on said bar and material scanning means coupled to the latter means for pivotally moving said bar.

3. A machine as claimed in claim 2 in which the adjusting means comprises a guide bar connected to said adjusting bar and rockable to pivot the latter, and a lever and linkage system operable by said scanning means to actuate said guide bar.

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