April 30, 1963 J. R. OAKLEY 3,087,391

APPARATUS FOR SETTING-UP CARTONS

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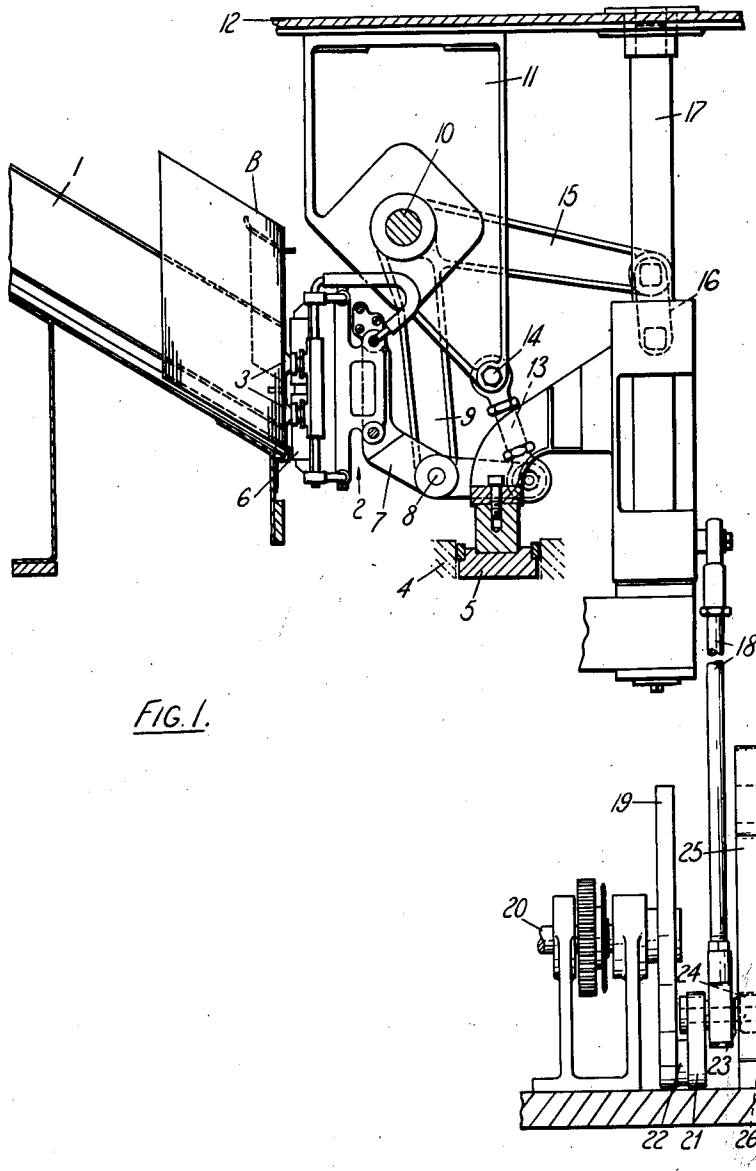


FIG. 1.

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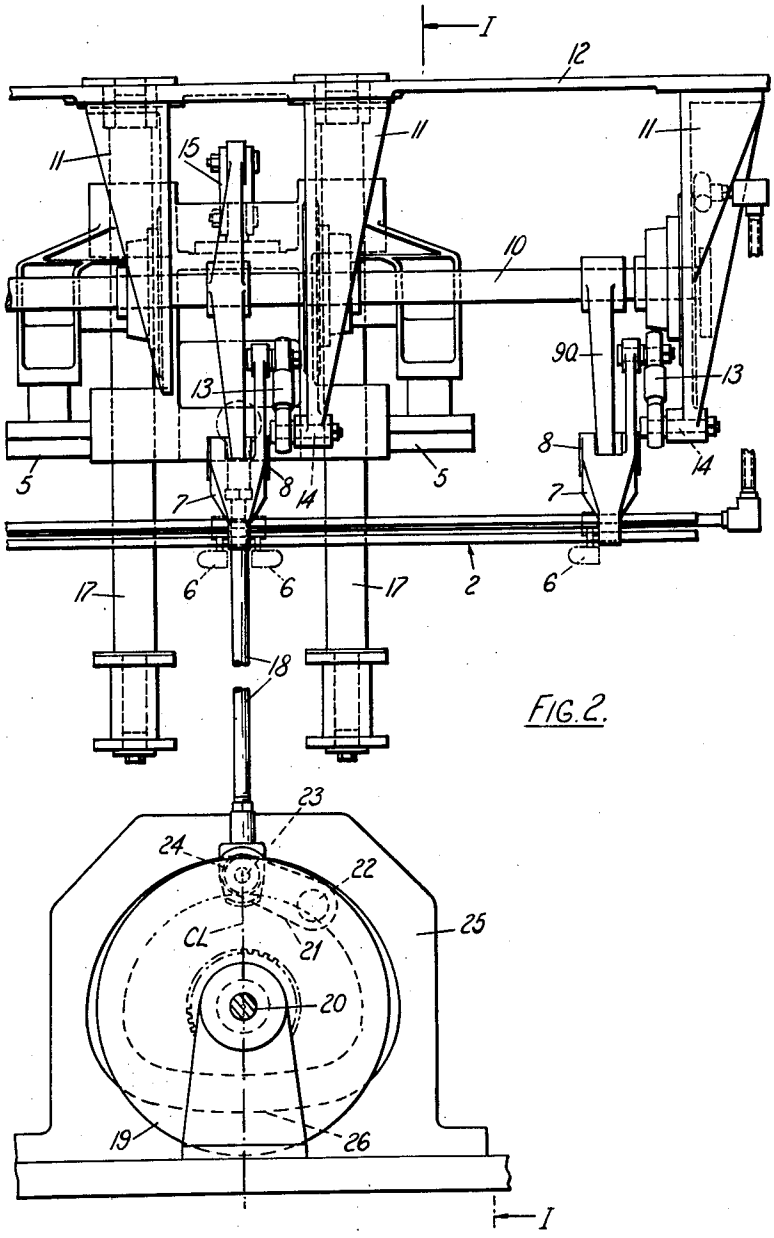


FIG. 2.

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APPARATUS FOR SETTING-UP CARTONS

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2 Claims. (Cl. 93—51)

This invention relates to apparatus for setting-up cartons from carton blanks which in the set-up condition thereof have overlying portions arranged to be secured one to the other by a thermoplastic adhesive composition pre-applied to the blanks.

In United States Patent No. 3,008,386 there is described carton setting-up apparatus in which a blank having a thermoplastic adhesive composition pre-applied thereto is movable from a magazine by a transfer device and is positioned thereby over a die for setting-up in the die by a reciprocable plunger arranged to remain stationary in the die for a predetermined interval, the transfer device being provided with heater means movable therewith and arranged to effect heating of the blank in the regions of the blank to which the adhesive composition is applied. The apparatus is also provided with auxiliary heater means arranged to effect a pre-heating of the adhesive composition on a blank before the blank is removed from the magazine by the transfer device.

It is a main object of the present invention to provide apparatus of the kind just mentioned but which is so constructed that the heater means which are movable with the transfer device perform all the heating of a blank prior to movement thereof into the die thus avoiding the use of auxiliary heater means and thereby simplifying the apparatus and reducing the cost thereof.

According to the invention movements of the transfer device are effected in timed relation with the reciprocation of the plunger by operating means arranged to retain the transfer device in the blank-receiving position thereof relative to the magazine while the plunger is stationary in the die whereby a pre-heating of the adhesive on the blank is effected by said heater means prior to removal of a blank from the magazine by the transfer device. In a preferred embodiment of the invention the operating means are coupled to the plunger for actuation by the plunger during movement of the plunger.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a section, on line I—I, FIG. 2, of apparatus according to the invention, and

FIG. 2 is an elevation of the apparatus.

Referring to the drawings, blanks B of the kind described in the said United States Patent No. 3,008,386 are contained in a magazine **1**, FIG. 1, from which the endmost blank is removed by a transfer device **2** which incorporates suction pads **3**, FIG. 1, but omitted from FIG. 2, by which the blank is gripped and withdrawn from the magazine. The apparatus illustrated in the drawings is arranged simultaneously to withdraw a blank from each of two magazines and to position each of the blanks over a die appropriate thereto and in which the blank is set-up. Since, however, the transfer devices and dies are identical only one set thereof is illustrated in the drawings and FIG. 2 shows only a part of the apparatus, it being understood that, as viewed in FIG. 2, the apparatus is of like construction on both sides of the centre line CL.

The blank is moved by the transfer device and positioned over a die **4**, FIG. 1, but omitted from FIG. 2, at which position the blank is released, as described in United States Patent No. 3,008,386, for movement into the die by

a reciprocable plunger **5**. As illustrated in FIG. 1 the plunger **5** is located within the die but the set-up carton has, for clarity, been omitted. In FIG. 2 the plunger is shown in the retracted position thereof.

As is described in United States Patent No. 3,008,386, the transfer device is provided with radiant heaters **6** which operate to effect heating of the blanks in those regions thereof to which the thermoplastic adhesive has been pre-applied. The transfer device is secured to transfer device carrying arms **7** each of which between the ends thereof is pivoted at **8** to one arm **9** of a bell-crank lever, or to an arm **9a**, FIG. 2, the bell-crank lever and arm **9a** each being pivoted about a fixed axis, which is the axis of a rocking shaft **10** supported by brackets **11** secured to a machine frame **12**. The other end of the arm **7** is connected to a connecting rod **13** which is pivoted about a second fixed axis which is the axis of a pivot pin **14** carried by a bracket **11**. The second arm **15** of the bell-crank lever is coupled to the plunger **5** by a connecting link **16**.

The plunger **5** is reciprocable lengthwise of a pillar **17** by an operating rod **18** which, in known manner, is connected through a lost-motion device which determines the interval of time during which the plunger remains stationary in the die to ensure adherence between the overlying portions of the set-up carton in the die before the plunger commences its return stroke.

The lost-motion device may be of any suitable kind but as illustrated in the drawings comprises a crank disc **19** rotatable continuously with the main shaft **20** of the machine, a link **21** pivoted at **22** to the disc **19** and to a stub shaft **23** to which the operating rod **18** is connected, and a cam follower **24**, FIG. 2, carried by the stub shaft **23** and co-operating with a stationary track cam **25**. Thus although the pivot **22** is rotated continuously the plunger remains stationary in the die while the cam follower **24** is moved along the dwell portion **26**, FIG. 2, of the cam **25**.

As can be seen from FIG. 1, while the plunger **5** is stationary in the die the transfer device is located by the plunger in position ready to remove a blank from the magazine **1**. Thus while the plunger is stationary in the die the heater means **6** are effective to pre-heat the blank prior to removal thereof from the magazine. Suction is applied to the suction pads **3** at about the time the plunger is to commence its return stroke and it will be understood that the heater means **6** not only effect a pre-heating of the blank but continue to heat the blank while it is being transferred from the magazine to the die as described in United States Patent No. 3,008,386. It will also be understood that because the transfer device is coupled to the plunger the transfer device will be caused to withdraw the blank from the magazine and to move it into position over the die during, and as the result of, the return stroke of the plunger.

To avoid overheating of a blank in the magazine when the machine is stopped the apparatus is so timed that on operation of the stop button, not shown, for the machine the transfer device will always be arrested at a position thereof which is mid-way between the magazine and the die.

We claim:

1. Carton setting-up apparatus for a blank having a thermoplastic adhesive composition pre-applied thereto, comprising the combination with a magazine to contain a stack of blanks, a die, a plunger reciprocable into and out of the die, plunger operating means operable to effect reciprocation thereof and to cause the plunger to remain stationary in the die for a predetermined interval, a transfer device operable to remove a blank from the magazine and to position it relative to the die for movement into the die by the plunger, and heater means movable with

the transfer device to effect heating of the blank in the regions of the blank to which the adhesive composition is applied, of transfer device operating means operable in timed relation with the plunger operating means and arranged during the interval in which the plunger is stationary in the die to retain the transfer device stationary relative to the magazine in the position at which the transfer device receives a blank from the magazine whereby a pre-heating of the adhesive on the blank is effected by said heater means prior to removal of the blank from the magazine by the transfer device, said transfer device operating means comprising a bell-crank pivoted about a fixed axis and having one arm thereof coupled to the plunger by a connecting link, a transfer device carrying arm pivoted between the ends thereof to the other arm of the bell-crank and connected at one end to the transfer device, and a connecting rod pivoted about a second fixed axis and connected to that end of said carrying arm opposite the end thereof to which the transfer device is connected.

2. Apparatus according to claim 1, in which the plunger is reciprocable lengthwise of a pillar through an operating rod and a lost-motion device, said device including a continuously rotatable crank disc, a stub shaft carried by the operating rod, a link pivoted to the crank disc and to said stub shaft, a stationary cam having a dwell portion which determines the interval during which the plunger remains stationary in the die, and a cam follower carried by said stub shaft and engaged continuously with said cam to control the movements of the operating rod.

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