ABSTRACT: The machine comprises a perforating unit, which precedes the tube-making unit, a tear-off unit, which succeeds the tube-making unit, a feeding unit and an end-folding and adhering mechanism. A first automatic register control system acts on the web-feeding unit and ensures a formation of registering transverse perforation lines in the preprinted web. A second automatic register control system comprises a sensing head for scanning the web provided with transverse perforation lines, a synchronizing rotary switch, which is in rigid operative connection with the end-folding and adhering mechanism, and a positioning device for changing the phase of the end-folding and adhering mechanism.
The second automatic register control system operates in such a manner that the synchronizing rotary switch, which is in rigid operative connection with the end-folding and adhering mechanism, assumes such a position that the pulse delivered by the sensing head in response to the passage of the printed mark is not transmitted when the end-folding and adhering mechanism is in phase with the leading edge of the workpiece, whereas the synchronizing rotary switch assumes that at the time of the arrival of the pulse a position in which said pulse is transmitted to the positioning member in one sense or the other, depending on whether the pulse is advanced or delayed relative to its desired-position occurrence, so as to change the phase of the end-folding and adhering mechanism in one sense or the other, when the end-folding and adhering mechanism is out of phase relative to the leading edge of the workpiece. Because the synchronizing rotary switch is also shifted owing to its rigid operative connection with the end-folding and adhering mechanism, the desired value is adjusted at the same time. When the next tube section arrives in the same position as the foregoing one, the pulse delivered by the sensing head in response to said following workpiece will not be transmitted by the synchronizing rotary switch to the positioning member. This cut perforation then will travel to the pairs of restraining and tear-off rolls 23, 24 and will be torn immediately. A second sensing head 26 is arranged.

According to a second proposal, the means for driving the end-folding and adhering mechanism may include a pair of helical gears, one of which is axially slidable to effect a peripheral rotation so as to change the phase of the end-folding and adhering mechanism.

An embodiment of the invention will now be described by way of example with reference to the drawing, in which:

FIG. 1 is a diagrammatic side elevation showing a bag-making machine according to the invention.

FIG. 2 is a top plan view showing a workpiece which arrives in proper position.

FIG. 3 is a side elevation showing the workpiece according to FIG. 2 when it has been folded.

FIG. 4 is a top plan view showing an arriving workpiece in an advanced position and

FIG. 5 is a side elevation showing the workpiece according to FIG. 4.

The feeding unit 1 continuously pulls the web 2 from the supply roll 3 and over the rollers 4 to 8 and the tube-making unit 9. At a point which is in rigid operative connection with the end-folding and adhering mechanism, and a positioning device for changing the phase of the end-folding and adhering mechanism.

Whereas the essential criterion is the position of the transverse perforation lines and of the ends of the tube sections, rather than the position of the prints, the prints or printed marks may be scanned because the first automatic register control system ensures that the transverse perforation lines have the same, predetermined distance from the print so that the position of the prints co-determines the position of the tube section ends. The prints or printed marks can be sensed much more easily than the transverse perforation lines.
between the pairs of rolls 23 and 24 and has a second synchronizing rotary switch 27 associated with it. The synchronizing rotary switch is in rigid operative connection with the end-folding and adhering mechanism 25.

The pulses delivered by the first sensing head 10 are transmitted by the first synchronizing rotary switch 15. If the printed marks 28 on the arriving web 2 are not in register with the perforating unit 14, these pulses will result in positioning movements of a first positioning device 29, which is associated with the feeding unit 1 and consists, e.g., of an infinitely adjustable transmission 30 of the means for driving the feeding unit, and an electric motor 31 for adjusting said transmission. The electric motor 31 is energized to rotate in one direction or the other in response to pulses delivered by the sensing head 10. The first automatic register control system 10, 15, 29 ensures that the perforation lines 16 to 21 are produced in register with the printed marks 28, which have been produced on the web together with the prints. This control is known in connection with bag-making machines provided with a cutting mechanism.

When the bag-making machine has been initially adjusted and started, the spacing of the prints on the web may vary, e.g., as a result of changes in the web tension in the printing machine. In response to such change of the spacing of the prints, the first automatic register control system will effect a corresponding decrease or increase of the spacing of the transverse perforation lines. When the latter spacing is increased, e.g., the increases of all six workpieces associated with the perforation line 16 to 21 will be accumulated so that the perforation line 21 is displaced toward the end-folding and adhering mechanism by an amount which is six times the amount by which the spacing is changed. When the workpieces have entered the end-folding and adhering mechanism in accordance with FIG. 2 and have been folded in accordance with FIG. 3 along the dash-dot line 32 before the automatic control operation, the workpieces will enter the end-folding and adhering mechanism in an advanced position, as shown in FIG. 4, and will be formed with a fold line indicated as a dash-dot line 32 in FIG. 5 at a position further to the near when the automatic control operation has been performed. This will result in a nonpermisssible shortening of the bag, which is then provided with an excessively long, reversely folded end portion 33. Such bag must be rejected.

To avoid this, the second sensing head 26 is disposed adjacent to the tear-off unit 23, 24. The first automatic register control system ensures that the printed marks 28 are always at the same distance from the leading edges 34, 35 of the workpiece. These leading edges are offset owing to the configuration of the transverse perforation lines in the upper and lower plies of the workpiece. The second sensing head 26 senses the position of these leading edges of the workpiece with the aid of the printed marks 28. During the initial adjustment of the bag-making machine, the second synchronizing rotary switch 27 was adjusted so that the pulses delivered by the sensing head in response to a printed mark 28 on a workpiece which is positioned as shown in FIG. 2 will not be transmitted. If a subsequent automatic control operation of the first automatic register control system causes the workpieces to arrive at the end-folding and adhering device in a position as shown in FIG. 4, the printed mark 28 will also arrive in a changed position and the pulses delivered in response thereto will be transmitted by the synchronizing rotary switch 27 to a positioning device 36, which adjusts the end-folding and adhering unit 25 in such a sense that in the case which is illustrated the infolding is effected at an earlier time so that a workpiece which arrives in the position shown in FIG. 4 is infolded as shown in FIG. 2. If the workpieces would lag behind because the spacing of the transverse perforation lines is reduced, the function of end-folding and adhering mechanism will be retarded accordingly.

The positioning device 36 consists of a differential transmission 37, which is included in the means for driving the end-folding and adhering mechanism and constitutes an adjustable clutch. The third member of said differential transmission 37 is actuated by a positioning motor 38 in one sense of rotation or the other in response to the position of the synchronizing rotary switch 27.

The adjustment of the end-folding and adhering mechanism will also adjust the synchronizing rotary switch 27, which is directly driven by said mechanism. When the adjustment has been effected, the synchronizing rotary switch is adjusted too so that a succeeding pulse, which has been derived, e.g., from a printed mark in the position shown in FIG. 4, is no longer transmitted and further positioning movements will not be effected until the workpieces have been shifted again.

1. A machine for manufacturing bags from preprinted webs, such as webs of paper or plastics materials, which machine comprises a perforating unit, which precedes a tube-making unit, a tear-off unit, which follows the tube-making unit, a feeding unit and an end-folding and adhering mechanism, characterized by a first automatic register control system, known per se, which acts on the web-feeding unit and ensures a formation of registering transverse perforation lines in the preprinted web, and a second automatic register control system comprising a sensing head for scanning the web provided with transverse perforation lines, a synchronizing rotary switch, which is in rigid operative connection with the end-folding and adhering mechanism, and a positioning device for changing the phase of the end-folding and adhering mechanism.

2. A machine according to claim 1, characterized in that the sensing head of the second automatic register control system is disposed adjacent to the tear-off unit between a pair of restraining rolls and a pair of tear-off rolls having a higher speed.

3. A machine according to claim 1, characterized in that the positioning device for changing the phase of the end-folding and adhering mechanism and of the synchronizing rotary switch consists of an adjustable clutch in the form of a differential transmission.

4. A machine according to claim 1, characterized in that the positioning device for changing the phase of the end-folding and adhering mechanism and of the synchronizing rotary switch is a pair of helical gears, which are included in the means for driving the end-folding and adhering mechanism and comprise an axially displaceable helical gear.