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APPARATUS FOR FOLDING PAPER WEBS IN ROTARY MACHINES

Filed Dec. 30, 1957

2 Sheets-Sheet 1

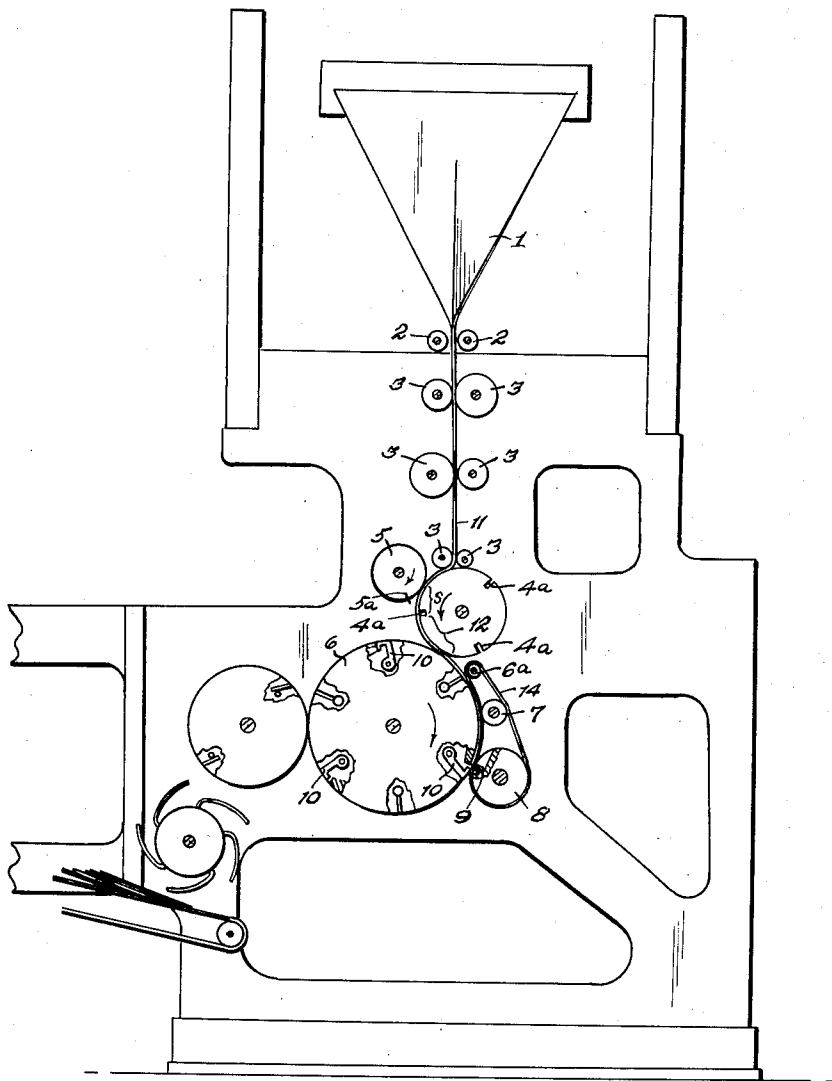


Fig. 1.

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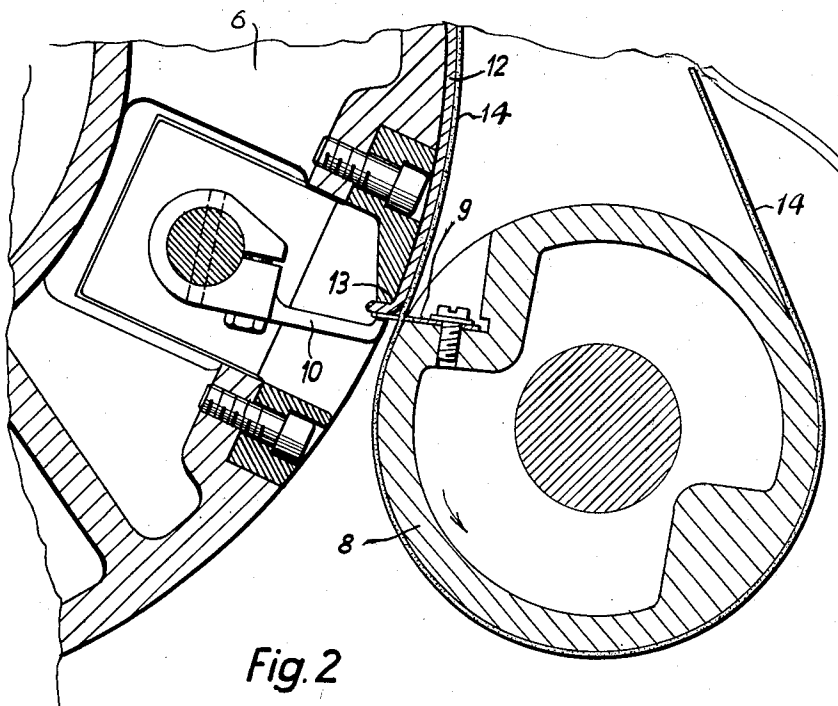


Fig. 2

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1

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2 Claims. (Cl. 270—60)

This invention relates to a method and apparatus for folding paper webs in rotary machines.

In the rotary folding apparatuses hitherto known the cutting of the paper web to the intended length takes place before it is led to the collecting cylinder. The grooved and knife rollers are always arranged in such a way that the paper web is first carried from the funnel or from the reversing bars by means of draw members to a cutting device independent of the collecting cylinder, whereby, only after the cut has taken place, the sheets are transferred to the collecting cylinder by means of tapes or transfer cylinders. Thereby the distance from the grooved roller to the collecting cylinder must necessarily be greater than the intended cutting length.

Accurate folding depends chiefly on the cut sheet lengths being led to the collecting cylinder at exactly equal distances apart. Actual practice, however, has shown that the sheet delivery guides, either tapes or transfer cylinders combined with tapes, are continuously subject to fluctuations in spite of accurate setting. Because of the stressing of the tapes, these must always be regulated. In addition, the conveying accuracy is adversely affected by the fluctuating speed of the tapes. These sources of errors render it impossible to maintain uniform feeding of the sheet lengths onto the folding cylinder, and hence accurate folding.

The chief object of the present invention is to eliminate the long sheet-conveying path, in order thus to accurately feed the cut material onto the collecting cylinder.

Another object of the invention is to provide a mechanism of the type described wherein a sheet is cut from the web only after its leading portion is guided upon the collecting cylinder.

Yet another object is to provide an apparatus wherein the web is gripped to the surface of the collecting cylinder and its leading edge releasably secured thereto after being at least partially wound about the cylinder.

Further features of the invention will appear from the following description and claims, taken in conjunction with the accompanying drawings which show by way of example a preferred form of embodiment of the apparatus.

In said drawing wherein like reference characters represent like or similar features:

Fig. 1 shows the general layout of a rotary folding apparatus with grippers for variable paper sizes, for lengthwise fold and transverse fold, i.e. funnel and cylinder folds.

Figure 2 is a sectional view to an enlarged scale, of the part of the apparatus by which the cut end of the web is transferred to and gripped by, the collecting cylinder.

In the embodiment shown, the web 11 is advanced from the rotary printing machine, not shown, over funnel 1 which acts to fold the web lengthwise. The folded web next passes between guide rollers 2 and is drawn

2

and guided by pairs of rollers 3, the final pair of which are closely adjacent to, and act to guide the web about, a grooved roller 4. A cut-off roller 5 has a knife 5a extending from its periphery along an element of the roller and rotates in synchronism with roller 4 so that its knife enters, in succession, the grooves in roller 4 to thereby shear the web transversely of its edge, into sheets of the desired length.

As the cut end of the web continues about groove roller 4 it passes into contact with the surface of collecting cylinder 6 and is almost at once secured thereto by a belt or a series of belts 14. These belts are guided over and axially spaced along, guide rollers 6a, 7 and 8 all of which are journaled with their peripheries contiguous to cylinder 6 so that a pass of the belts contacts a corresponding portion of the periphery of the collecting cylinder and acts positively to grip the advancing web to the cylinder. The dimensions and relations are such that the cut end of the web enters between the cylinder 6 and the belts 14 before it is severed into a sheet by the next rotation of knife 5a.

Roller 8 has fingers 9, Figure 2, each of which is located between a contiguous pair of belts 14. This roller rotates synchronously with collecting cylinder 6 in a manner such that for each rotation, its fingers 9 coincide with an edge 13 of a gripper element fixed in the periphery of the cylinder and extending therealong in the direction parallel with its axis of rotation. These fingers act to bend the leading edge of the advancing sheet 12 over and about edge 13, in position to be releasably secured to the cylinder by grippers 10, movable into contact with edge 13 and which act in proper sequence with the described operation of the fingers. At the greatest cutting length, the distance S will be at least equal to that which the grippers 10 require to open and close, in order to engage the sheet 12.

The velocity rate of the advancing web 11, at maximum cutting length of the paper, substantially agrees with the circumferential speed of the collecting cylinder 6. That is to say, the sheets will follow each other practically without separation. But if the intended cutting length is shorter than the maximum length, the speed of the advancing web 11 will be lower, and the distance S will be greater by the difference of the cutting length. The sheets will then follow each other at the distance apart which is caused by the difference between the maximum cutting length and the intended cutting length.

The grippers 10 always open and close at the point of tangency with roller 8, so that the leading edge of one sheet and trailing edge of the preceding sheet are both engaged by the same grippers 10. While passing over the distance S, that is to say after cutting the sheet from the web 11 until its engagement by the grippers 10, the sheet 12 is pressed to the collecting guide roller 6 by the roller 7 and the belts 14, thus preventing any displacement from the proper position.

By the apparatus of the present invention an inventive technical progress in delivering the cut material accurately on to the collecting cylinder has been achieved.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention set forth in the appended claims.

What I claim is:

1. In a rotary web machine having means for advancement of a continuous web, a coating grooved roller and knife roller for cutting said web into sheet lengths,

means to feed the web to said rollers, a collecting cylinder provided with spaced grippers, and contacting said grooved roller for maintaining said web therebetween, endless belt means having a concave run contacting said collecting cylinder and positioned to hold the free ends of said cut sheet lengths against said collecting cylinder surface, a belt-roller about which said belt means is trained, said belt-roller cooperating with said collecting cylinder through said belt means, fingers supported on and extending from the periphery of said belt roller and adapted to engage said sheets and push a portion thereof into said grippers, said collecting cylinder, said rollers and said belt means being driven at the same peripheral speed.

2. Apparatus according to claim 1, wherein an additional roller cooperates through said belt with the collecting cylinder during the opening and closing of the grippers.

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