

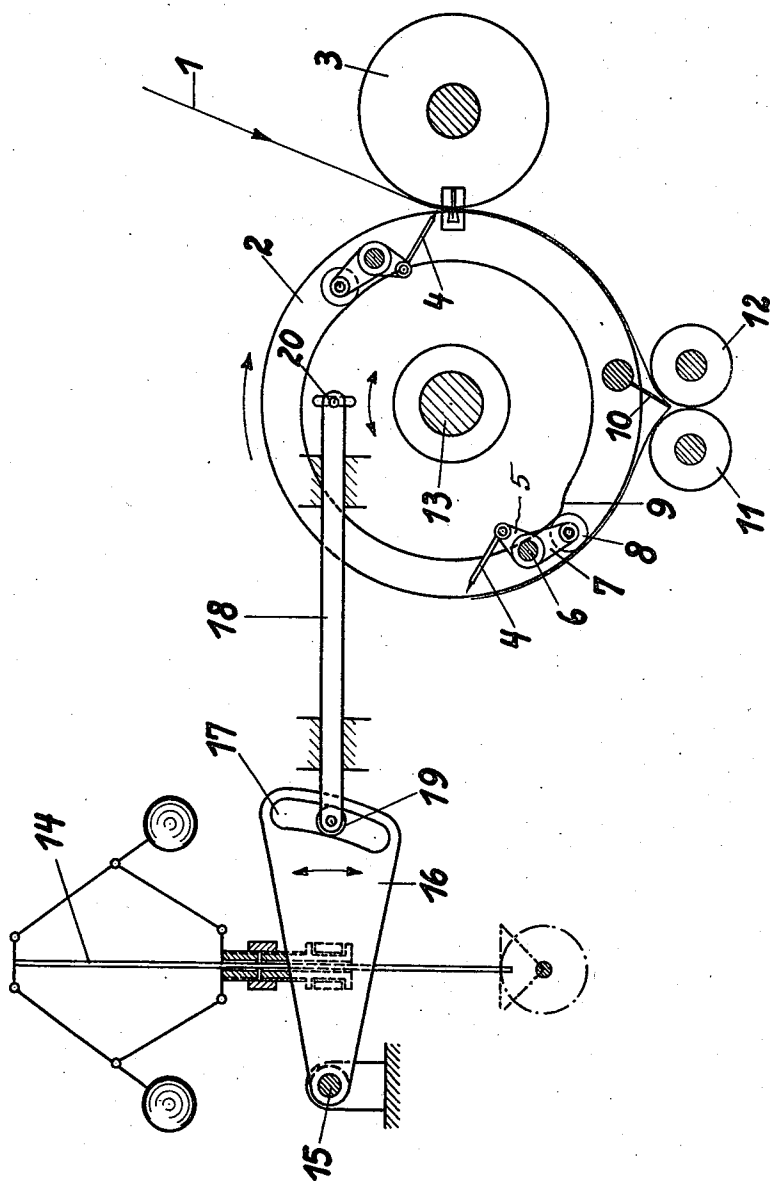
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FOLDING DEVICE FOR ROTARY PRINTING MACHINES

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FOLDING DEVICE FOR ROTARY PRINTING MACHINES

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This invention relates to a folding device intended primarily for use in rotary printing machines for the production of newspapers or similar work printed from an endless web and cut and
5 folded afterwards.

In a known type of such machines there is for this purpose a cutting and a folding cylinder working together and underneath the same a pair of folding cylinders into and between which
10 the cut sheets are folded by means of a folding knife. The folding cylinder is provided with suitable sheet holding means, e. g. pins which at the moment of cutting seize the running web and take it round by about half a revolution of the
15 folding cylinder until the front end of the web is cut off by the length of a sheet. Simultaneously with the folding of the sheet it is released again by the pins.

It is necessary that the sheets should be folded exactly in the middle. The above folding device has however the disadvantage that the exactness of the fold depends on the speed of the machine and that consequently it is not always uniform.
20 If for instance the machine furnishes exactly folded products at slow speed, the fold at higher speed will be inexact, i. e. the end of the copy will project over the other end. The contrary will be the case if the device is made so that the fold is exact at high speed but if the machine
25 then runs at a lower speed.

In order to prevent this it will be necessary that the cam or the like which controls the releasing of the cut sheet at the moment of folding, is—
30 conforming to the speed of the machine—adjusted so that the pins release the sheet a little earlier at high speed of the machine than at low speed.

For this purpose an adjusting device for the cam for controlling the movement of the pins has been known, by which device the adjusting
40 of the pin cam was operated by hand, the device itself comprising suitable mechanical means such as e. g. a worm and a worm wheel. In order to make the edges of the copies agree exactly with each other, this device makes it necessary for instance to adjust the pin controlling cam continually until the maximum speed of the machine has been reached. Nevertheless it cannot be avoided that badly folded copies are delivered. For different reasons, as e. g. for changing the reels,
45 washing the plates, further owing to paper breaks etc., the speed of rotary printing machines is frequently changed during the printing of an edition, such change having to be effected from stoppage up to maximum speed. Besides, the
50 speed of the machine is not always the maximum

speed, but at times is reduced more or less. Such being the case it will easily be understood that adjusting the fold by hand while the machine is running is not only a troublesome and unpractical but also an unreliable operation. This
5 deficiency is eliminated by the present invention.

According to the invention there is a cam or the like which controls the release of the cut sheets by means of pins or the like in the folding
10 cylinder at the moment of the folding, such cam being automatically adjustable according to the speed of the machine.

For this purpose the cam is shifted automatically by the action of a centrifugal governor which is connected with the gearing of the ma-
15 chine.

Once the pin controlling cam has been adjusted after setting up the machine, an exact register of the edges of all copies will be ensured at any speed of the machine without the aid or the control of the operator. Any adjustment of the fold by hand while the machine is running
20 is eliminated.

The accompanying diagrammatic drawing illustrates, by way of example, a construction ac-
25 cording to the invention.

The printed web 1 is fed to the cutting cylinder 3 which works together with folding cylinder 2 and is cut into single sheets according to the size in question. At the moment of cutting the web
30 1 is seized by the collecting needles 4 which are arranged in the folding cylinder 2 and which may be drawn back. By these needles the web is taken round the cylinder by about half a cylinder revolution. The small arms 5 for the move-
35 ment of the needles are arranged on rockshafts 6. The movement of the needles at each gripping point is controlled by a roll arm 7, and a roll 8 coacting with a cam 9. At the same moment that the cut sheet is folded, the front end of the
40 same is released by the collecting needles 4. The fold is initiated by a folding knife 10 which folds the sheet into and between two rotating folding rollers 11, 12 arranged underneath the folding
45 cylinder.

Cam 9 for controlling the movement of the collecting needles is arranged shiftable on the folding cylinder 2 or rather on the folding cylinder axle 13. This cam is, according to the speed of the machine, shifted automatically in such a way that the collecting needles 4 release the sheet
50 earlier, relatively to the folding operation, at high speed of the machine than at low speed. For this purpose the centrifugal governor 14 is provided which is driven by the machine itself at a
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suitable speed. By this centrifugal governor the lever 16 is moved which is shiftable upon an axle 15 and which at the end that is opposite to the axle 15 is provided with a groove 17 of a suitable design. A bar 18 which may be shifted in a straight line carries at its one end the roller 19 which is guided by groove 17, whereas a pin 20 or the like which is fastened to the other end of the bar lies in a slot 21 of cam 9. Consequently when changing the speed of the machine, cam 9 is shifted so that the collecting needles release the sheet earlier or later relatively to the folding operation.

Especially in the case of high speed rotaries experience has shown that cam 9 should not be shifted proportionately to the changing speed of the machine. Corresponding to a given number of revolutions of the machine, the shifting of cam 9 is preferably effected by means of a curved piece 17 arranged between the centrifugal governor 14 and cam 9. The shape of the curved piece may be determined on the basis of observations made in practical service.

The centrifugal governor which may be of any design may also be connected with cam 9 by other suitable rods, links or gearings.

While the invention has been described in its preferred form, it will be understood that numerous changes and variations might be devised for carrying out the invention and it is therefore not to be restricted to purely mechanical controlling means, nor to the construction shown and described, but that the construction may be varied within the scope of the appended claims.

What I claim is:

1. In a folding apparatus a cutting cylinder, a folding cylinder working together with the cutting cylinder, sheet holding means on the folding cylinder, two folding rollers arranged underneath the folding cylinder, into and between which rollers the cut sheets are folded, means for releasing the sheets from said holding means including a shiftable cam and means for automatically shifting the cam in proportion to the speed of the machine to hasten or retard the re-

lease of the sheets from the sheet holding means.

2. In a folding apparatus a cutting cylinder, a folding cylinder working together with the cutting cylinder, sheet holding means on the folding cylinder, folding rollers arranged underneath the folding cylinder, into and between which rollers the cut sheets are folded, a cam for the movement of the sheet holding means of the folding cylinder and a centrifugal governor driven by the gearing of the machine for automatically shifting the cam which moves the sheet holding means of the folding cylinder.

3. In a folding apparatus a cutting cylinder, a folding cylinder working together with the cutting cylinder, sheet holding means on the folding cylinder, two folding rollers arranged underneath the folding cylinder, into and between which rollers the cut sheets are folded, means for releasing the sheets from said holding means including a shiftable cam, means for shifting the cam to vary the time of release of the sheets by the sheet holding means and a centrifugal governor for automatically operating the device for shifting the cam.

4. In a folding apparatus a cutting cylinder, a folding cylinder working together with the cutting cylinder, sheet holding means on the folding cylinder, two folding rollers arranged underneath the folding cylinder, into and between which rollers the cut sheets are folded, a shiftable cam for the movement of the sheet holding means of the folding cylinder, a shiftable curved piece by which the cam is shifted and a centrifugal governor for automatically shifting this same curved piece in correspondence with the speed of the machine.

5. In a folding apparatus, a cutting cylinder, a folding cylinder coacting therewith, sheet holding means on the folding cylinder, folding means to which the sheets are fed from the folding cylinder, means for releasing the sheets from the folding cylinder, and means for automatically varying the time of such release in timed relation to the speed of the machine.

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