July 3, 1934. A. BOLZA 1,965,029

PROCESS AND APPARATUS FOR CUTTING PRINTED PAPER WEBS

Filed June 17, 1929 4 Sheets-Sheet 1

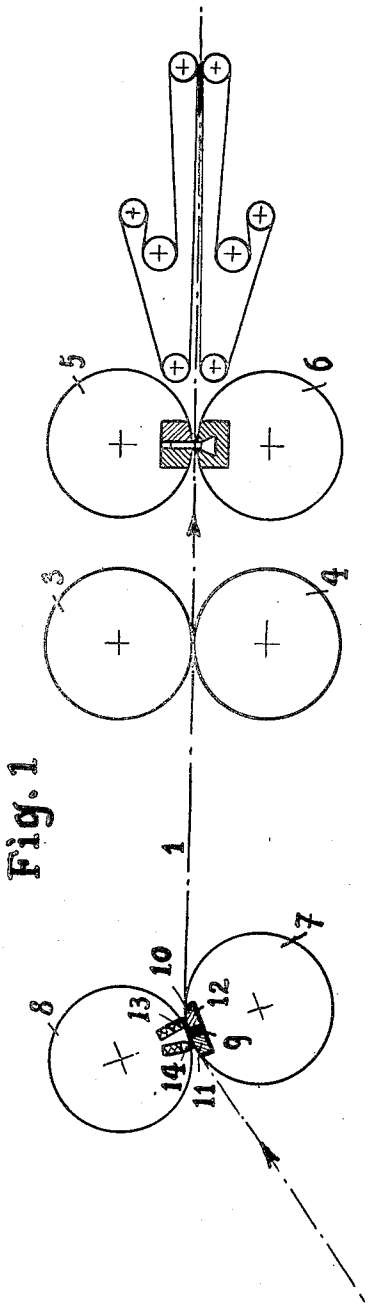


Fig. 1

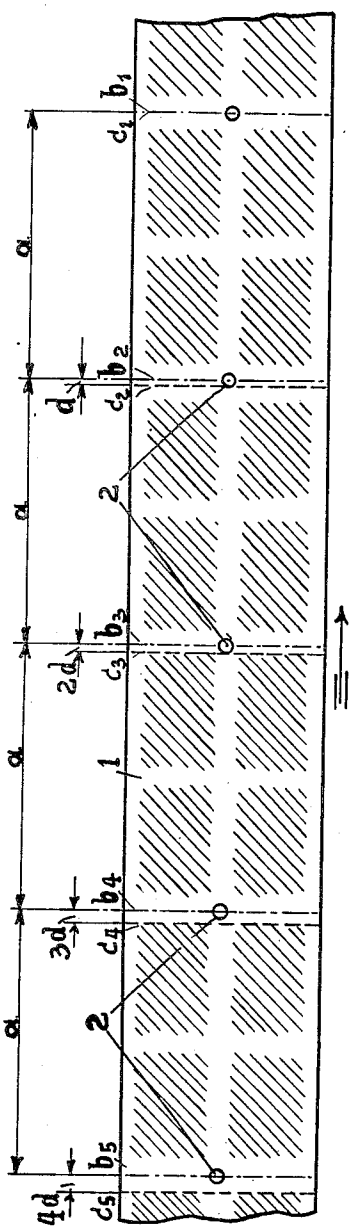


Fig. 2

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PROCESS AND APPARATUS FOR CUTTING PRINTED PAPER WEBS

Filed June 17, 1929 4 Sheets-Sheet 2

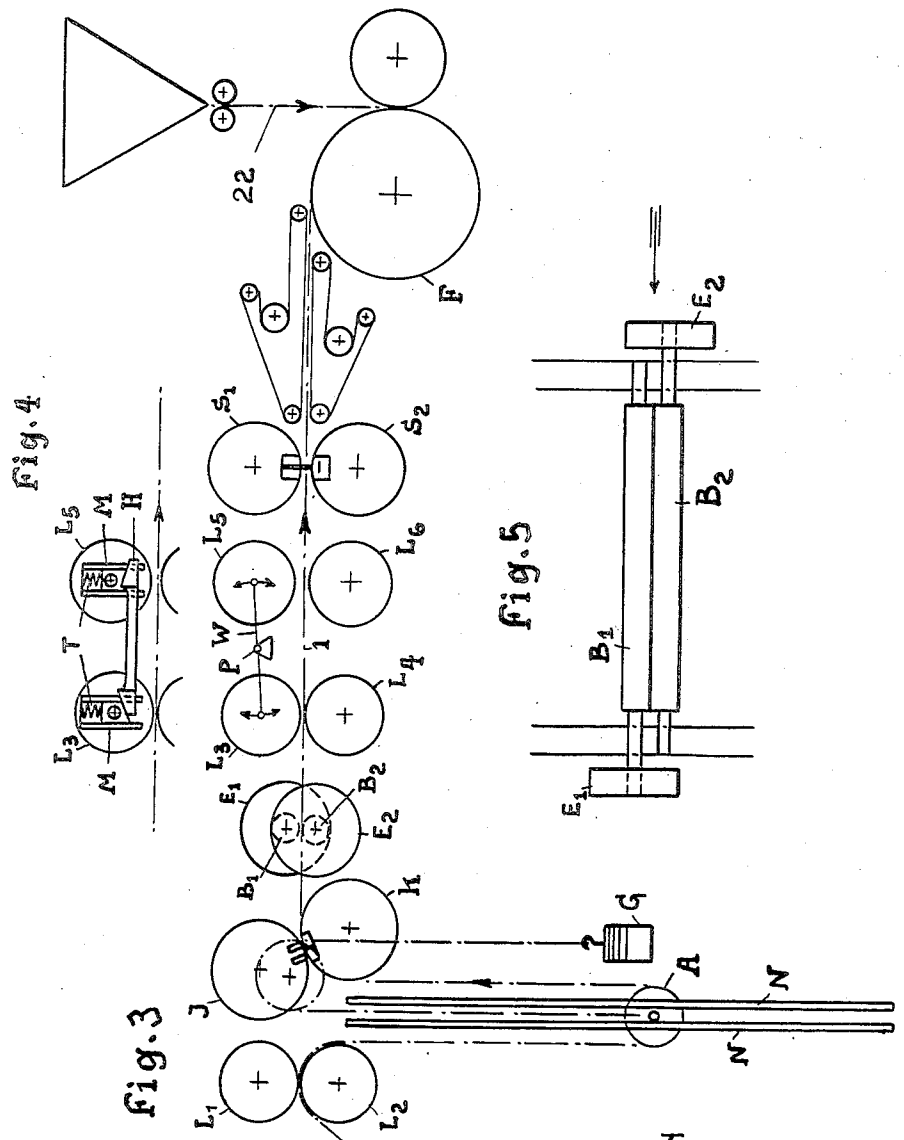


Fig. 4

Fig. 5

Fig. 3

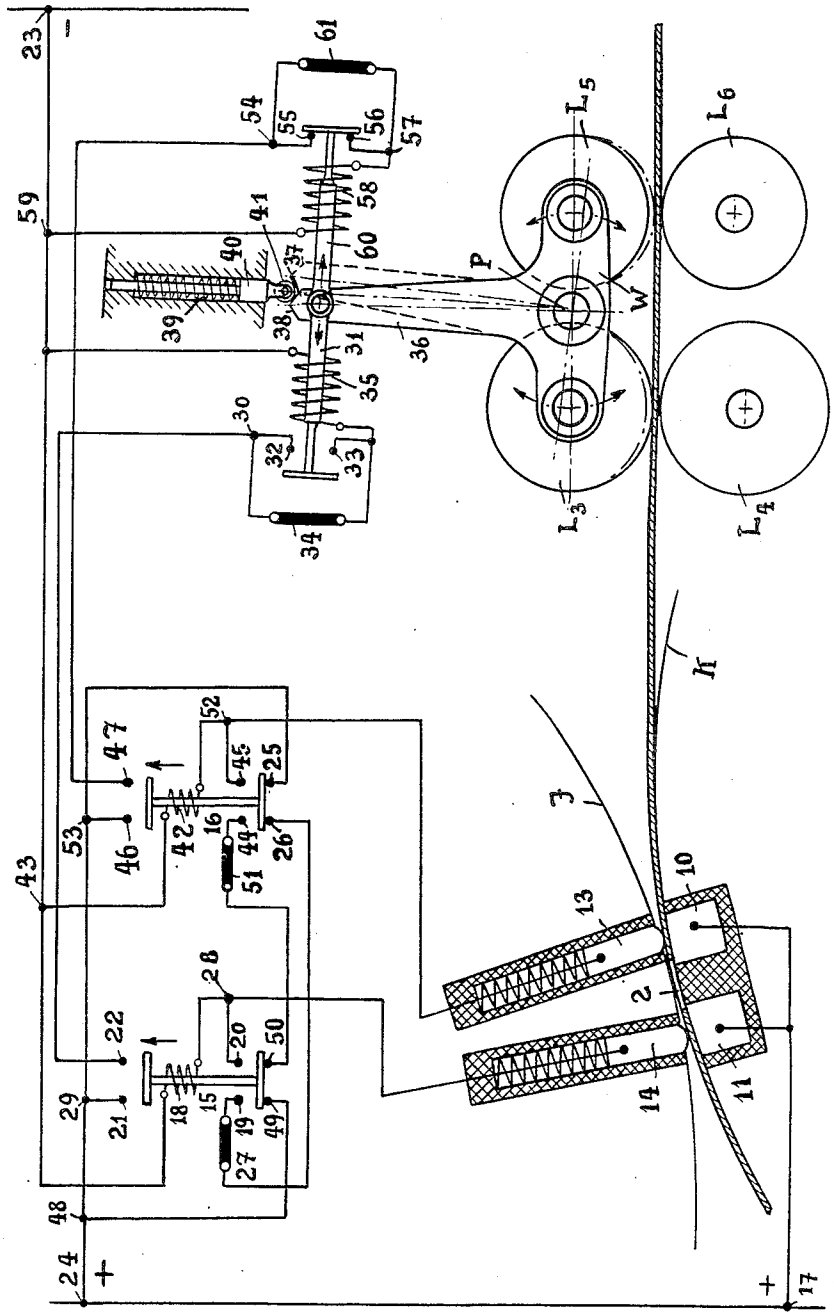
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July 3, 1934. A. BOLZA 1,965,029

PROCESS AND APPARATUS FOR CUTTING PRINTED PAPER WEBS

Filed June 17, 1929 4 Sheets-Sheet 3

Fig. 6



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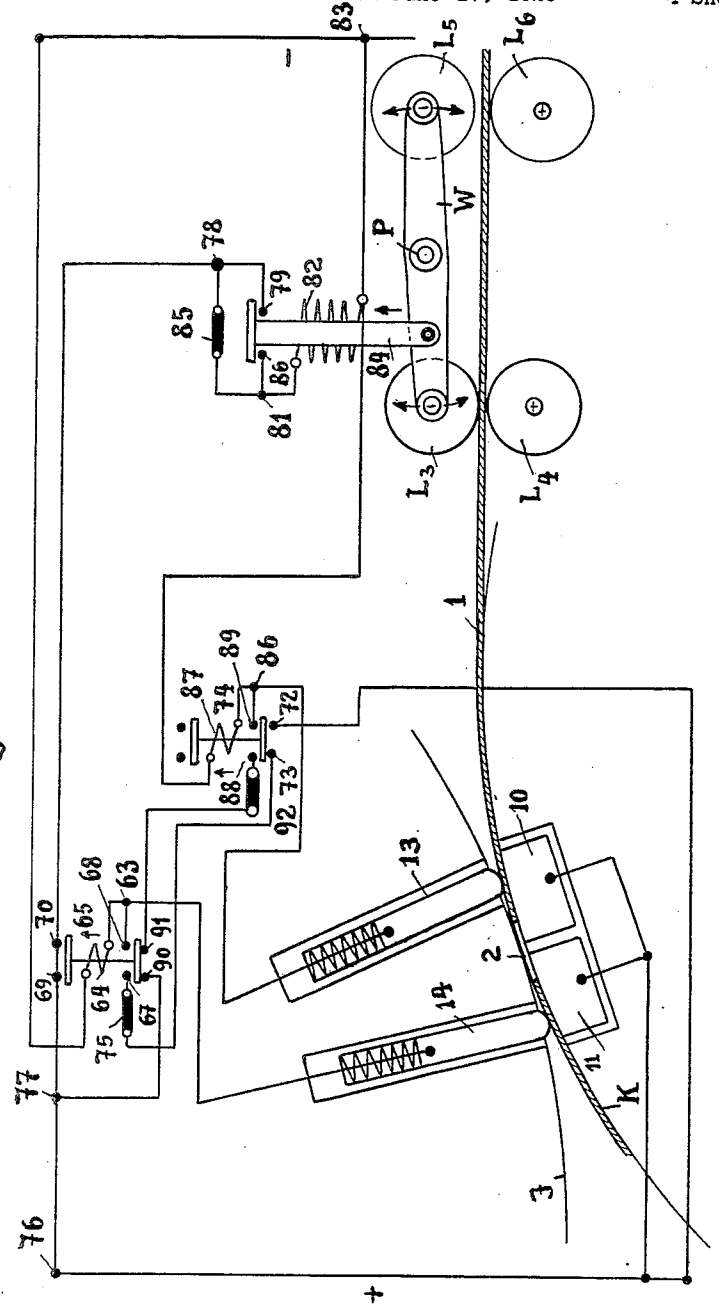
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July 3, 1934. A. BOLZA 1,965,029

PROCESS AND APPARATUS FOR CUTTING PRINTED PAPER WEBS

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Fig. 7



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UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR CUTTING PRINTED PAPER WEBS

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Application June 17, 1929, Serial No. 371,609
In Germany June 20, 1928

16 Claims. (Cl. 164—68)

In newspaper printing works it is often necessary to provide daily papers which are printed from the spools in the ordinary relief process with an occasional, for example weekly, supplement provided with pictures in relief in one or more colours or printed in a different process, for example offset or intaglio.

This difficulty is met in two ways.

The supplement can be inserted by hand or by special apparatus in the already folded newspaper or can be fed to the newspaper web before the cross folding or before the longitudinal folding. The insertion, whether by hand or mechanically, involves a considerable delay in the preparation of the newspaper, for which reason, when the machines are in much demand, the paper must be fed to the rotary machine without lowering the speed. An extra machine is sometimes connected to the main newspaper machine, the supplement being printed on a separate web and this web led together with the web of the main machine for insertion in the folding and cutting apparatus. This arrangement certainly gives results which are in themselves unobjectionable, but it is, however, inefficient since in large newspaper works where several machines must operate at the same time for setting up the daily edition, an extra machine must be supplied for each of the newspaper machines. Since also such supplements usually appear only weekly, the extra machines can only be utilized during a few hours once in each week. This process has also the drawback that the speed of the main machine must be reduced to allow for the finer printing process required by the supplement machine (pictures or coloured impressions, offset printing, intaglio printing).

The object of the invention is, on the one hand, with any required number of main machines, operating simultaneously, to necessitate only one supplement machine, and, on the other hand, to utilize to better effect machines for printing the supplement.

This advantage is obtained by printing the supplementary web, unwound from a reel, by a separate machine, the web not being at once folded, cut and laid out, but again wound on a reel. The web from this reel is then again unwound in the main machine and cut into lengths, corresponding to the impression. The sheets obtained in this way are then led for longitudinal or cross folding with the web of the main machine.

Therefore, with a single machine for the supplements in the course of the week as many reels containing the printed web can be set up in reserve as the edition requires and these can be distributed to all the main or news machines.

The difficulty then arises to feed the printed web unwound from the reel at such a speed that the cut always coincides with the end of the impression. This is in practice never completely obtained. When an extra machine is connected to the main machine, the cut actually coincides, as with every rotary printing machine directly connected to the cutting apparatus with the end of the impression, since as the extra web is printed and cut in one working process, the amount of the web fed to the cutting cylinder must be, for every revolution of the type cylinder, equal to the circumference of the latter, that is, the same as the form. In the cross cutting of the printed web unwound from the spool there is, however, the danger that the section may not coincide with the end of the impression, since the diameter of the feeding rollers determining the velocity of the paper cannot in practice be mathematically correct, and the length of the web after printing may be changed by stretching or crumpling, so that the length of the impression on the web during the further unwinding does not exactly correspond to the circumference of the type cylinder.

According to the invention, these differences between the end of the impression and the cutting section are obviated by the web being provided during the printing with perforations or other characteristic marks exactly at the distance apart of the impressions and by an arrangement which, when these differences occur, is set in action by the perforations or other characteristics electrically, pneumatically or mechanically, and suitably controls the speed at which the web is fed.

The accompanying drawings show examples of apparatus for carrying out the invention.

Fig. 1 is a diagrammatic representation of the cutting apparatus with the feeding and control rollers.

Fig. 2 shows in plan a web provided with perforations.

Fig. 3 is a diagrammatic representation of the parts of a device controlling the feed of the web co-operating with the control rollers and the cutting apparatus.

Fig. 4 shows diagrammatically means for changing over the rollers.

Fig. 5 is an elevation of a pair of inertia rollers disposed in the path of the web.

Fig. 6 is a diagram of connections of the circuit, which accelerates or decelerates the web by varying the position of the feed rollers.

Fig. 7 is another modified diagram of connections of said circuit.

A definite speed is imparted by a pair of rollers 3, 4 to the printed web 1, unwound from a reel not shown and provided with perforations 2 placed exactly at the distance apart a of the impressions. If the diameter of rollers 3, 4 is, for example, too great, the ends b_1, b_2, b_3 etc. of the impressions would gradually advance relatively to the cutting sections c_1, c_2, c_3 etc. of the web 1 made by the cutting gears 5, 6. If c_1 and b_1 were in coincidence (Fig. 2) at the first cut after one rotation of the cutting cylinder 5, the section c_2 would be retarded relatively to b_2 by an amount d. After the second rotation of 5, c_3 would be retarded relatively to b_3, by $2d$ and so on, so that the cutting section, unless the circumferential speed of 3 and 4 is controlled at the right time, would gradually move backwards over the whole impression. If the diameter of 3, 4 was too small, the end b of the impression would gradually be retarded relatively to the cutting sections c; the cutting section would, therefore, continuously move forwards over the impression. The value of d depends (apart from the stretching and crumping which cannot be calculated) on the exactness with which the rollers 3, 4 can be ground. This may be assumed to be 0.03 mm. in diameter, therefore, about 0.1 mm. in circumference. Since a reel contains about 8000 metres of web, with a form circumference of 1000 mm. the section would be displaced during the unrolling by 800 mm. Without special precautions it would, therefore, be impossible to lead the printed web from the reel to the folding apparatus of the main machine. In order to meet this difficulty, a control roller 7 is inserted before or after the roller pair 3, 4 and co-operates with a contact disc 8. The control roller 7, the contact disc 8 and the perforations 2 can initiate corrections effected by an electric current, with pressure or suction air or mechanical means. In the described example an electric current is selected. The control roller 7 is connected by gear wheels not shown with the disc 8, the rollers 3, 4 and the cutting cylinders 5, 6, so that 7, 8, 3, 4, 5 and 6 rotate at the same number of revolutions if their diameters are equal. The roller 7 is provided with an insulating strip 9 parallel to the axis and to right and left of this strip with conducting strips 10 and 11 which are insulated from one another by the strip 9 and from the body of the roller by an insulating coating 12. Spring pins 13, 14 are arranged on the disc 8 opposite to the two strips 10 and 11.

When the rollers 3 and 4 are working correctly, the perforations 2 of the web coincide with the position of the strip 9. If the diameter of 3, 4, on the other hand, is somewhat too great, the perforations 2 pass from the strip 9 to the strip 10, so that finally the contact pin 13 closes through the perforations a circuit which operates a relay whereby suitable means act on the feeding rollers so that the web is advanced more slowly. Conversely, if the diameter of 3, 4 is too small, the perforations 2 pass from the strip 9 backwards to the strip 11 until the pin 14 closes through the perforations a circuit which operates suitable means for accelerating the web. Since the contact pins 13 and 14 project to a certain extent from the surface of the cylinder 8 and are mounted under spring pressure at positions corresponding to the perforations, they engage with the metal strips 10 or 11 not only in the contact line of the cylindrical periphery of 7 and 8, but they remain in contact with the strips for a certain distance before and behind this contact line. This relatively long contact ensures a more certain closure of the circuit at high speeds of the web and rollers. The retardation or acceleration can, for example, be effected by the feeding rollers 3 and 4 being arranged, so that they can be drawn apart from one another and by means of the two circuits devices can be set in action for increasing or diminishing the diameter of the rollers 3, 4. The apparatus, therefore, controls automatically the position of the sections relatively to the edges of the impression within narrow or wider limits which are dependent on the construction of the control members.

In the example shown the widest deviations of the cutting sections are dependent on the width of the insulating strip 9 and the distance apart of the spring pins 13, 14.

In many cases, however, it is not easy to arrange constructions for separating the feeding rollers.

Consequently, the control device represented in Figs. 3–7 can be advantageously used, which feeds the web alternatively at two speeds, of which the one is smaller and the other greater than the theoretically correct speed. If the position of the cut advances relatively to the end of the impression, for example as soon as this advance has attained a predetermined value, the higher speed of the web is substituted by means of the controlling members, whereupon the section approaches the end of the impression until for a short time it coincides with the same and then lags behind with increasing distance from the end of the impression up to a predetermined maximum value. Thereupon, the lower speed of the web is substituted by the control apparatus.

The web 1 coming from the reel and printed in lengths corresponding to the impression is fed by a pair of feeding rollers L_1, L_2 the circumferential velocity of which approximates so far as possible to the theoretically correct speed of the web. The web then runs under a freely suspended roller A which is partly counterbalanced by a weight G, the ends of the roller spindle being guided vertically between rails M, N, then between the control roller K and the contact disc J and the driven pairs of rollers L_3, L_4 and L_5, L_6 to the cutting cylinders S_1, S_2 from which the separate sheets are led, for example, over the cross folding cylinder F together with the web 22 coming from the main printing apparatus.

The axes of the rollers L_4 and L_6 are fixed in position; L_3 and L_5, on the other hand, are mounted at the ends of a two-armed lever W (Fig. 3) which has its fulcrum at P. According to the position of the lever W, either L_3 and L_4 or L_5 and L_6 feed the web. The lever W is controlled by electromagnets by compressed or suction air in dependence on the control apparatus K, J. The upper rollers L_3 and L_5 can also be guided, instead of being carried on the lever W, between vertically parallel rails M (Fig. 4). Springs T ensure uniform contact pressure between L_3 and L_4 or L_5 and L_6. The change-over is then effected by wedges H which also can be moved horizontally by magnets, compressed or suction air. The means operating the change-over devices can be formed in many different ways.

The device as shown by Fig. 6 can be used as well for the arrangement of the feeding rollers according to Fig. 3, as for the arrangement according to Fig. 4. The contact pins 13, 14 are connected with solenoids 15 and 16 respectively. If the circuit for the higher speed of the web is

closed by means of the contact pin 14 engaging with the metallic strip 11 through the perforation 2 of the web, the current passes from the branching point 17 through contacts 11 and 14 and coil 18 of the relay 15, whose armature thereby is lifted and closes the contacts 19, 20 and 21, 22, whereupon the current returns into the network through the branching point 23. Even if the contacts 11, 24 are separated by the further turning of the control rolls I, K, a current flows from the branching point 24 through the closed contacts 25, 26 of the dead relay 16, the resistance 27, contacts 19, 20 and the branching point 28 into the coil 18, from which it returns through branching point 23 into the network. Said circuit is closed and the armature of the relay 15 is raised, until the contacts 25, 26 are separated, if the solenoid 16 is excited.

As long as the contacts 21, 22 are closed, a current flows from the branching point 24 over the point 29 and the closed contacts 21, 22 to the branching point 30. If the armature 31 of the solenoid has reached already its left outmost position and the contacts 32, 33 are broken, the current traverses the resistance 34 and the coil 35 maintaining the armature in its left end-position and also the lever 36, which can be swung around the fixed point and shows on its free end two tapers 37, 38 engaged by a bolt 40, which is influenced by a spring 39 and supports on its lower end preferably a roll 41, so that the lever 36 is maintained in its outmost positions, even if the two magnet-coils are dead. Since the double-armed lever W is rigidly connected with the lever 36, in the present case the roller L_3 is pressed against the roller L_4, whereby the web 1 is moved with a velocity, corresponding to the circumferential speed of said roller pair, i. e. with a velocity, which is greater than the theoretically correct speed of the web, so that the perforations 2 begin to advance relatively to the contacts 10, 13 and 11, 14 in the feeding direction of the web. If a perforation 2 reaches the contact pin 13, said pin is pressed by its spring against the contact plate 10 whereby the circuit is closed and the current passes from point 17 through the contacts 10, 13, the coil 42 of the relay 16 and the branching point 43 to point 23. Thereby the armature of the solenoid is raised and the contacts 44, 45 and 46, 47 are closed, so that the same effect can be obtained with respect to the relay 16 as by the contact of pin 14 with plate 11 in view of the relay 15.

If the holding circuit is closed by connecting the contacts 44, 45 the current flows from the branching point 24 over point 48, the resistance 51, the closed contacts 44, 45 and the branching point 52 through the coil 42, branching points 43 and 23 back into the network. The current passes at the same time from the branching point 24 over point 53 through the closed contacts 46, 47 to the branching point 54 and in consequence of the smaller resistance of the corresponding branch over the contacts 55, 56 and the branching point 57 through the coil 58 and thereupon over point 59 to the branching point 23. By traversing the coil 58 the current pulls the armature 60 into the coil and brings thereby the lever 36 into its right outmost position, so that the roller L_5 is pressed against roller L_6 and the web is fed with a smaller velocity than its theoretically correct speed. When the contacts 55, 56 are broken, the current which feeds the magnet coil 58 is forced to flow round through the resistance 61.

If the aforesaid connection shall be used for the regulating device according to Fig. 4, the lever 36 is abandoned and the double armature 31, 60 is separated and the left moiety 31 is connected with the left wedge and the right moiety 60 with the right wedge.

The circuit system according to Fig. 7 is simplified in view of the system according to Fig. 6 since only one solenoid is required for moving the double-armed lever W and pressing the roller L_5 against the roller L_6, whereas the roller L_3 is pressed against the roller L_4 whether by the weight of the armature or by an additional weight, if the arrangement of the swing rollers according to Fig. 3 is employed, or by a spring, if the rollers are displaced by the wedges according to Fig. 4.

If the paper web 1 is fed with the smaller velocity by the roller pair L_3, L_4 the perforation 2 will remain gradually until the contact pin 14 touches through the perforation the contact plate 11, whereupon the current flows from the branching point 62 over the contacts 11, 14 and the branching point 63 through the coil 64 of the relay 65 and returns into the network over the branching point 66. Thereby the armature of the relay 65 is lifted and closes the contacts 67, 68 and 69, 70. Now a holding current passes from the branching point 17 through the closed contacts 72, 73 of the dead relay 74 and the resistance 75 and returns over the contacts 67, 68, the branching point 63 through the coil 64 and the branching point 66 into the network. At the same time a current flows from the branching point 76 over the point 77, the closed contacts 69, 70, the branching point 78, the closed contacts 79, 80 and the branching point 81 to the coil 82 of the magnet 84 and to the branching point 83 of the network. The coil 82 being now alive attracts its armature 84 and separates thereby the contacts 79, 80, so that the current is forced to flow around from the branching point 78 through the resistance 85 and the branching point 81 to the coil 82. The armature therefore remains in its raised position and the rollers L_5, L_6 feed, until by energizing the relay 74, the armature of relay 64 is obliged to come down and the coil 82 is dead, the contacts 69, 70 being separated.

Since the rollers L_5, L_6 feed the paper web 1 with higher velocity than the theoretically correct speed, the perforation 2 advances with respect to the contact device by little and little in the feeding direction of the paper, until one perforation comes under the contact pin 13 whereby the circuit is closed, so that the current can flow from the branching point 62 over the contacts 10, 13 and the branching point 86 through the coil 87 of relay 74 to the branching point 83 of the network. Thereby the armature of the relay 74 is raised and the holding circuit of the relay 65 is interrupted, since the contacts 72, 73 are separated, so that the armature of the relay 65 and the armature 84 of the solenoid 82 come down. The lifted armature of the relay 74 closes a circuit over the contacts 88, 89, whereby the current can flow from the branching point 76 over the point 77, the contacts 90, 91, the resistance 92, the contacts 88, 89, the branching point 86 through the coil 87 to the branching point 83 of the network. The armature of the relay 74 remains in the same manner as above, the armature of the relay 65 in its raised position, until the relay 65 is again energized and the contacts 90, 91 are separated.

The rollers L_1, L_2, L_3, L_4, L_5, L_6 rotate at the same speed. L_3 and L_4 are somewhat smaller in diameter than L_1, L_2, L_5, L_6, on the other hand, are somewhat larger. If L_3 and L_4 are pressed

together they advance the web more slowly than L_1, L_2, and more paper is led to than from them. The paper loop takes up the excess, the roller A descends. As soon as the greatest permissible deviation between the position of the cut and the end of the impression is obtained, the rollers L_3 and L_5 are changed over by the control apparatus, so that now L_5 is pressed on L_6. L_5, L_6 feed the web more quickly than L_1, L_2, so that less paper is supplied than is carried away. The difference is taken up by the loop and the roller A therefore rises.

At the moment of changing over the rollers L_3 and L_5 there is the danger that the web may be pulled back in consequence of the weight of the roller A. In order to obviate this, loosely mounted rollers B_1, B_2 which are each provided at one end with inertia discs E_1, E_2 are inserted between the paper loop and the rollers L_3, L_4 in the path of the web.

Not only do the two rollers by their inertia prevent the web from slipping back during the small interval of time in which the roller pairs L_3, L_4 and L_5, L_6 are ineffective, but they cause it to move on with its former velocity.

Since the moment of inertia of a rotary body increases with its mass, with the square of the distance of the particles of its mass from the axis of rotation and with the square of the angular velocity, it is preferable that the diameter of B_1, B_2 should be as small as possible, that of E_1, E_2, on the other hand, as large as possible. In order to prevent the paper from being torn between the inertia rollers when the machine is braked, the inertia rollers are automatically braked with it.

I claim:

1. Apparatus for cutting printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders and two alternatively effective pairs of feeding rollers, and a lever having two arms each carrying a roller of one of said pairs said last-named rollers being driven respectively at higher and lower speed than the theoretically correct speed of the web whereby a change in the angular position of the lever causes one or other of the rollers to press on the web and so change the speed of the web, a floating roller suspended in a bight of the web, and a pair of inertia rollers for maintaining the feed of the web during a change in the feeding rollers.

2. Apparatus for cutting printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders and two alternatively effective pairs of feeding rollers, a lever having two arms each carrying a roller of one of said pairs said last-named rollers being driven respectively at higher and lower speed than the theoretically correct speed of the web whereby a change in the angular position of the lever causes one or other of the rollers to press on the web and so change the speed of the web, a floating roller suspended in a bight of the web, a pair of inertia rollers for maintaining the feed of the web during a change in the feeding rollers, and a counterbalance for a part of the weight of said floating roll.

3. Apparatus for cutting printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, contact rollers controlling the changes of speed of the printed web, the speed of rotation of said rollers and their diameters being in the relation of whole numbers to the speed and diameter of the cutting cylinders and the distance of the registering marks of the web, two alternatively effective pairs of feeding rollers the circumferential speed of said pairs of rollers being respectively a little greater and a little smaller than the theoretically correct speed of the web, and a lever supporting a feed roller of each pair whereby said pairs may be alternately rendered active.

4. Apparatus for cutting printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, contact rollers controlling the changes of speed of the printed web, the speed of rotation of said rollers and their diameters being in the relation of whole numbers to the speed and diameter of the cutting cylinders and the distance of the registering marks of the web, two alternatively effective pairs of feeding rollers the circumferential speed of said pairs of rollers being respectively a little greater and a little smaller than the theoretically correct speed of the web, a pair of interconnected wedges arranged under the bearings of the upper rollers of said pairs, and springs pressing upon said bearings, means for moving said wedges to raise and lower said rollers alternatively.

5. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with perforations at the distance apart of the impressions, comprising a pair of contact rollers situated in the path of the web before two cutting cylinders and being driven at such a speed that a whole number of turns of the contact rollers corresponds to one turn of the cutting cylinders, said control rollers being provided with two pairs of insulated conducting means, the distance between the conductors being equal to the predetermined greatest displacement of the perforations of the web on the control cylinders.

6. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with perforations at the distance apart of the impression, comprising a pair of contact rollers situated in the path of the web before two cutting cylinders and being driven at such a speed that a whole number of turns of the contact rollers corresponds to one turn of the cutting cylinders, the one control roller being provided with a pair of insulated conducting strips mounted on each side of an insulating strip parallel to the axis of said roll and corresponding to the correct position of the registering perforations and the other roller carrying a pair of spring mounted contact pins at a distance equal to the predetermined greatest displacement of the perforations of the web on the control cylinders, the free rounded ends of the contact pins projecting beyond the surface of the roller in such a manner that every pin may close a control circuit for a time longer than that corresponding to the simple passage of the pins past the line of contact of the engaging rollers when a perforation concurs with said contact pin and permits a contact between the conducting strip and its associated pin.

7. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, a pair of contact rollers situated in the path of the printed web in advance of the cutting cylinders said contact rollers controlling the changes of speed of the web and being driven at such a speed that a whole number of turns of the contact rollers corresponds to one turn of the cutting cylinders, and means for feeding the paper web alternative-

ly at one and the other of two different constant speeds.

8. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, a pair of contact rollers situated in the path of the printed web in advance of the cutting cylinders said contact rollers controlling the changes of speed of the web, and two alternatively effective pairs of feed rollers, the circumferential constant speed of said pairs of feed rollers being respectively a little greater and a little smaller than the theoretically correct speed of the web.

9. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, a pair of contact rollers situated in the path of the printed web in advance of the cutting cylinders said contact rollers controlling the changes of speed of the web, two alternatively effective pairs of feeding rollers, and a lever having two arms each carrying a roller of one of said pairs the roller of the one arm being driven at higher circumferential speed and the roller of the other arm at lower circumferential speed than the theoretically correct speed of the web whereby a change in the angular position of the lever produced by the contact between the control rollers causes one or other of the rollers to press on the web and so change the speed of the web.

10. Process for continuously feeding to a cutting apparatus printed paper webs provided with registering indications at the distance apart of the impressions, consisting in alternating the feed speed of the uncut web between two constant speeds that diverge from the theoretically correct feed speed in opposite directions for a predetermined amount exceeding the greatest possible deviation of the web from the register, the feed speed being automatically selected at any time by means cooperating with the registering indications of the uncut web when the displacement of the indications towards the division line has reached a predetermined maximum.

11. Process for continuously feeding to a cutting apparatus printed paper webs provided with registering indications at the distance apart of the impressions, consisting in alternating the feed speed of the uncut web between two constant speeds that diverge from the theoretically correct feed speed in opposite directions for a predetermined amount exceeding the greatest possible deviation of the web from the register, the feed speed being automatically selected by means of two electrical circuits closed by two pairs of oppositely faced detecting means rotated synchronously with the cutting device and cooperating with register perforations of the uncut web at a predetermined register deviation.

12. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, controlling means situated in the path of the printed web in advance of the cutting cylinders, said means controlling the changes of speed of the web and cooperating with the registering marks of the uncut web, when the displacement of the indications towards the division line has reached a predetermined maximum, and means for feeding the paper web alternatively at one and the other of two different constant speeds.

13. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, a contact roller situated in the path of the printed web in advance of the cutting cylinders, said contact roller controlling in cooperation with oppositely faced contact means the changes of speed of the web and being driven at such a speed that a whole number of turns of the contact roller corresponds to one turn of the cutting cylinders, and means for feeding the paper web alternatively at one and the other of two different constant speeds.

14. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering marks spaced correspondingly with the impressions, comprising cutting cylinders, a contact roller situated in the path of the printed web in advance of the cutting cylinders, said contact roller controlling in cooperation with oppositely faced contact means the changes of speed of the web and being driven at such a speed that a whole number of turns of the contact roller corresponds to one turn of the cutting cylinders, and means for feeding the paper web alternatively at one and the other of two different constant speeds that diverge from the theoretically correct feed speed of the uncut web for a predetermined amount exceeding the greatest possible deviation of the web from the register.

15. Apparatus for continuously feeding to a cutting apparatus printed paper webs provided with registering perforations spaced correspondingly with the impressions, comprising cutting cylinders, oppositely faced detecting means situated in the path of the printed web in advance of the cutting cylinders, said detecting means being rotated synchronously with the cutting device and closing two electrical circuits through the register perforations of the uncut web at a predetermined register deviation, said electrical circuits controlling the changes of speed of the web, and means for feeding the paper web alternatively at one and the other of two different constant speeds that diverge from the theoretically correct feed speed in opposite directions for a predetermined amount exceeding the greatest possible deviation of the web from the register.

16. Apparatus for continuously feeding to a cutting apparatus a separately printed supplement provided with registering marks spaced correspondingly with the impressions, comprising means for unwinding the supplement web from a reel, a cutting apparatus synchronously operated with a cutting device cutting the products of a news paper printing machine, detecting devices carried by control rollers situated in the path of the supplement web in advance of the cutting apparatus, said detecting devices controlling the changes of speed of the supplement web and cooperating with the registering marks of the aforesaid web when the displacement of the perforations toward the division line has reached a predetermined maximum, and means for feeding the supplement web alternatively at one and the other of two different constant speeds that diverge from the theoretically correct feed speed determined by the speed of the newspaper web in opposite directions from a predetermined amount exceeding the greatest possible deviation of the supplement web from the register.

ALBRECHT BOLZA.