Dec. 20, 1938. M. E. GAZETTE 2,140,834

PRINTING APPARATUS

Filed Sept. 7, 1937 3 Sheets-Sheet 1

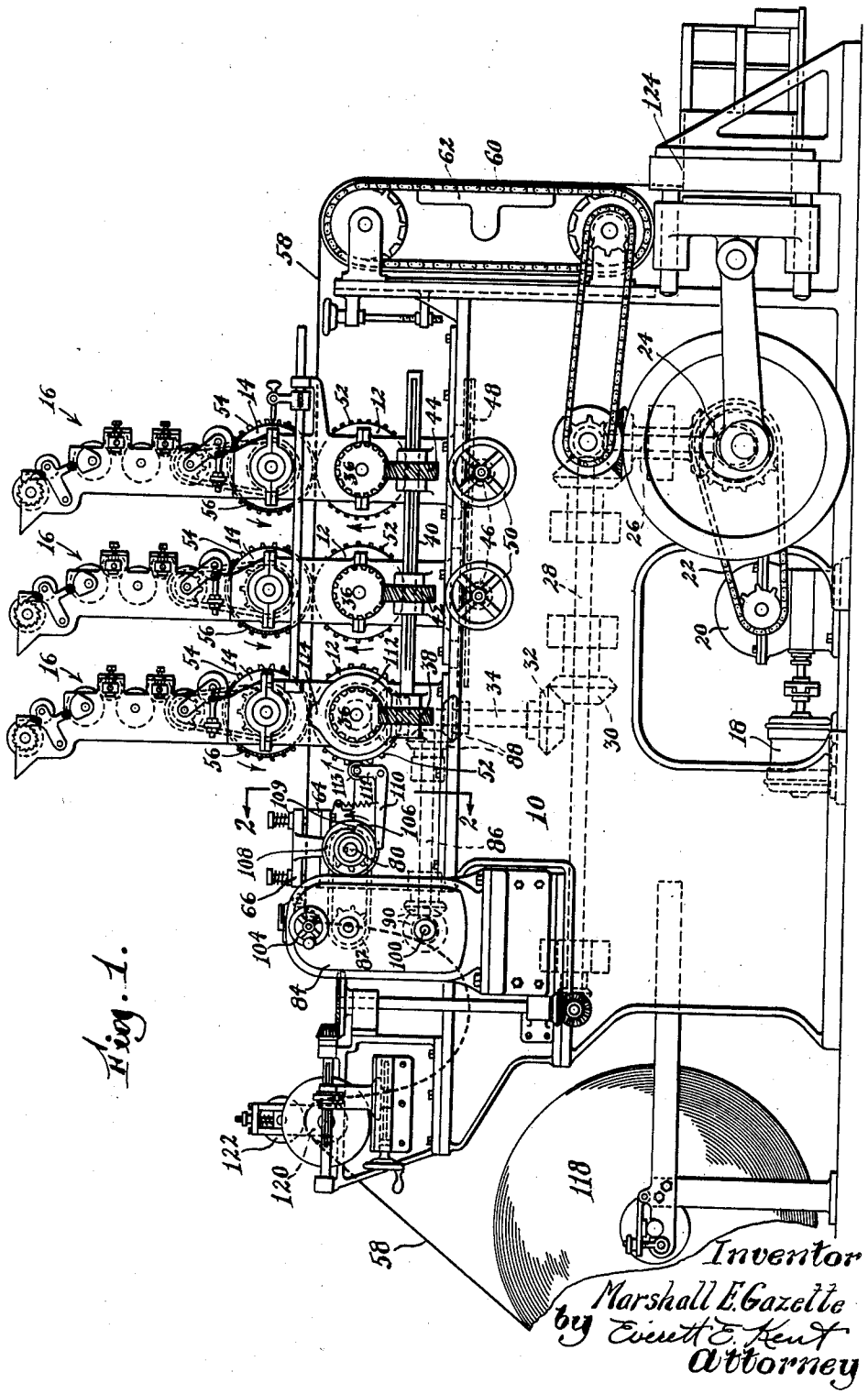


Fig. 1.

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PRINTING APPARATUS

Filed Sept. 7, 1937 3 Sheets-Sheet 2

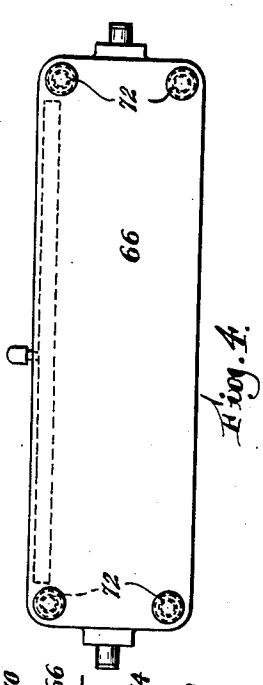


Fig. 4.

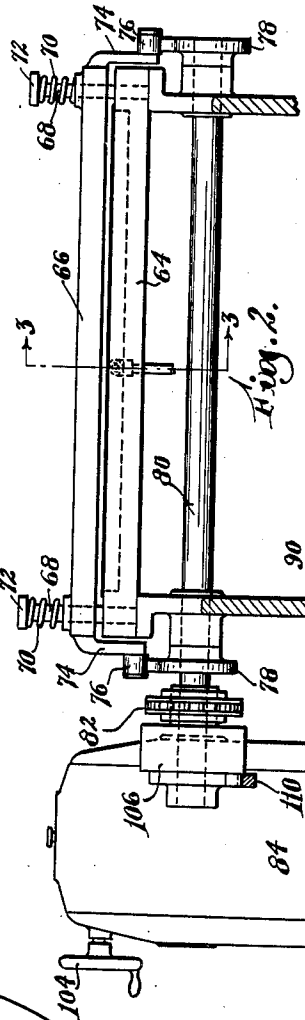


Fig. 2.

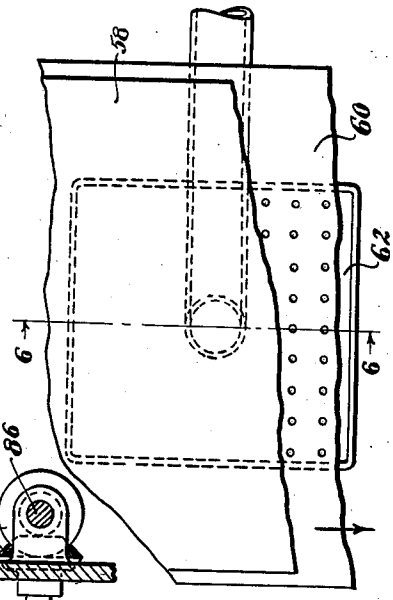


Fig. 5.

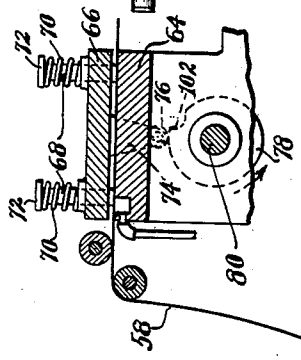


Fig. 3.

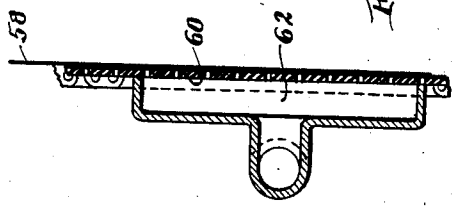


Fig. 6.

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Dec. 20, 1938. M. E. GAZETTE 2,140,834

PRINTING APPARATUS

Filed Sept. 7, 1937 3 Sheets-Sheet 3

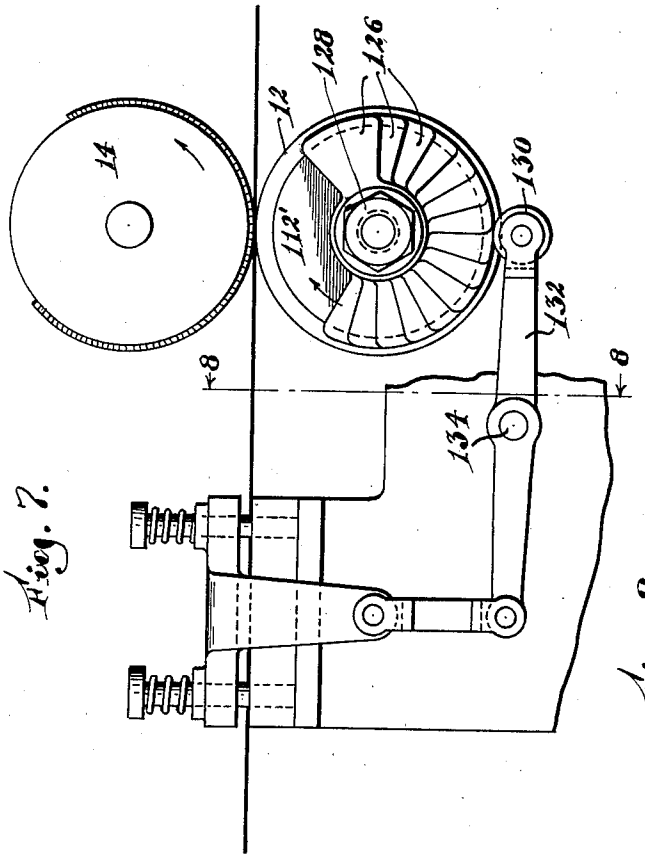


Fig. 7.

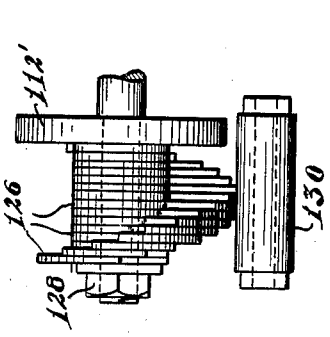


Fig. 9.

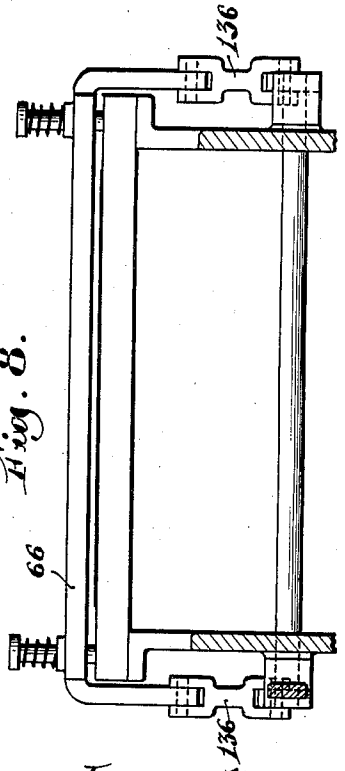


Fig. 8.

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Patented Dec. 20, 1938 2,140,834

UNITED STATES PATENT OFFICE

2,140,834

PRINTING APPARATUS

Marshall E. Gazette, Boston, Mass.

Application September 7, 1937, Serial No. 162,667

9 Claims. (Cl. 101—228)

This invention relates to improvements in printing apparatus.

More especially it provides mechanism by which a printing roll may repeat its impressions on a continuous sheet of paper at predetermined, precise intervals which are less than the circumference of the roll. The continuous sheet may then be cut at regular intervals making equal lengths, which are shorter than the circumference of the printing roll, each containing the printed text with precise margins. This is useful in the making of one-color or multi-color labels, or other sheets without it being necessary to have a different diameter of printing roll for each different length of sheet to be printed.

The printed and cut product sheets may be labels, notices, letters, pictures, hand bills or other unit sheets of infinite variety of utility, of content and of size, so that for brevity the term "labels" is used herein to typify and to signify any of the product.

The invention provides improvements whereby the intervals between recurrent printings on the continuous sheet may be definitely predetermined and controlled so as to be maintained at any desired fraction of the circle of the printing roll. For multi-color work, printing rolls may be arranged and suitably spaced in succession, to make a series of impressions registering together.

Machines of the general type to which the invention relates have rolls coacting in pairs for printing on a continuous sheet of paper which is fed between the two rolls of each pair. One roll of each pair may be a type-carrying roll, and the other its impression roll. Hitherto it has been impracticable for job shops to be equipped for this type of printing because the requirements for different jobs vary and an impracticable number of printing rolls of varying diameters would have to be available for interchange on the printing machine. The circumference of a roll determines the single length of label which each can print. With the device of the invention a single roll can supplant the whole number, because it can be used to do the work of any of them, above a structural minimum. This is because the invention provides mechanism for a controllable and precise intermittent feeding of the paper; and because the feeding mechanism is out of action during the passing of those parts of the type roll which neither are in use in the printing cycle nor correspond to spaces allowed for margins.

It is also among the objects of the invention to provide a mechanism for intermittency of the feed and printing action without trouble from the inertia and momentum of substantial mass, or even of the paper, in the starting and stopping of machine elements.

The mechanism of the invention provides continuous rotation of the printing and impression rolls, but coordinates the intermittent feed of the paper with only that part of their rotation which corresponds to the printing and the passing of margins; and to this end it provides adjustable means for determining with precision, relative to the printing, the times when feeding of the paper shall begin and shall end.

There is a constant but not positive feeding draft on the paper, and there is another means whereby the paper is intermittently but positively held stationary, resisting said constant draft, this being during the passing of that part of the surface of the type roll which lies between the ending of its printing area and area for margins, in one cycle, and the arrival of the beginning of the printing area in position to print again on the paper, in the next cycle. The inertia and momentum of the paper are small, and are rendered negligible, so far as relations of paper with type are concerned.

My improved coordination of mechanism lends itself admirably to multi-color printing by a succession of printing rolls.

Another feature resides in the provision for selective adjustment of individual pairs of the coacting printing rolls.

It is an important feature that a blanking unit at the delivery end of the machine cooperates with the printing and intermittent feeding, to cut or blank the printed sheet into lengths of whatever predetermined size is the unit desired in order that the complete printed impressions shall be delivered in individual sheets, herein called labels. And these cut sheets may be stacked as they are delivered from the blanking unit.

In attaining the objects and results the continuous sheet of paper will be threaded between the impression roll and the type-carrying roll of a single pair of printing rolls or similarly through a succession of pairs. All of the rolls will have continuous rotation in the direction of travel of the paper, the rolls of each pair being in positions to coact for the printing when a sheet of paper or the like is passed between them. The type-carrying rolls may be inked in any conventional or suitable manner, each with a different colored ink.

The sheet material to be printed has intermittent feed between the coacting printing rolls, at

times which are positively coordinated in relation to the arrival in printing position, of the leading edge of the type on the type-carrying rolls. The length of paper advanced per revolution of a type roll is adjustable. Feed draft of the paper may be by a suction conveyor which continually exerts mild frictional pull on the paper, but which slips over the paper when the paper is positively held against advance. The suction draft is located beyond the printing rolls and maintains the paper taut at all times. The positive holding means is a clamp applied to the paper before it reaches the printing rolls, whose intermittent clamping action is here illustrated as being induced by single revolution cams, which are illustratively shown as being controlled as to duration of clamping by a regulating of the speed of rotation of the cam.

Each rotation of an impression roll causes release of the cam, which makes its one complete rotation and then stops. During the period when the cam is in motion, the clamp will be open and paper will be fed by the suction draft, or by the pull of the printing rolls. When the cam stops the clamp is closed and the feed of paper stops.

One pair of coacting printing rolls may be fixed in position, and the others are individually adjustable, each as a unit, toward and away from the fixed pair, to vary the spacing apart of the respective pairs according to the requirements of any particular labels which are at any time being printed.

At the delivery end of the machine a suitable cutting or blanking mechanism severs the printed sheet into proper lengths and stacks them for convenient removal.

Other features of the invention will appear in the more detailed description which follows.

It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

The accompanying drawings illustrate one embodiment of the invention, to which however the patent is not limited.

Figure 1 is a side elevation of a multi-color printing machine;

Figure 2 is an endwise elevation, in section on 2—2 of Figure 1;

Figure 3 is a diagrammatic elevation, in section on 3—3 of Figure 2, but with the cam nearing completion of a complete rotation;

Figure 4 is a top plan of the clamp of Figure 3;

Figure 5 is an end elevation of a fragment of the suction unit of the conveyor, showing also fragments of the perforated belt and of a sheet of paper thereon;

Fig. 6 is an elevation, in section on 6—6 of Figure 5; and

Figure 7 is an elevation of a modified form of clamp control;

Figure 8 is an elevation in section on 8—8 of Figure 7; and

Figure 9 is an elevation, looking from the right in Figure 7, showing the laminated sector assembly.

As represented in the drawings, the supporting frame 10 mounts three conventional assemblages of printing rolls with their respective ink supply and ink transfer means, indicated generally at 16, by which the type-roll 14 of each assemblage may be inked in any suitable manner. These assemblages are arranged in succession along the course of the continuous sheet of paper or other material 58 which is to be printed. As represented in Figure 1 of the drawings, the impression rolls 12 are directly below their respective type-carrying rolls 14, and have continuous rotation in clockwise direction, while the type-rolls 14 rotate continuously anti-clockwise. Each pair of coacting rolls 12, 14 will print with a different colored ink, to produce a multi-color effect. Obviously, however, only a single pair of rolls 12, 14 would be needed for one-color printing.

The drive for the rolls 12, 14 may be positive from the motor 18, through the reducing unit 20. A sprocket and chain connection 22 from the reducing unit drives shaft 24 which in turn drives vertical shaft 26 through suitable bevel gears. Geared to shaft 26, a horizontal shaft 28 extending along the side of the machine parallel to the course of the paper has bevel gear 30 meshing with bevel gear 32 on a second vertical shaft 34 which rises at the end of one of the impression rolls 12, and has gear connection to the shaft of the roll 12 for direct drive thereof. The motor 18 and reducing unit 20 conveniently may stand on the floor, within the frame 10, and the shaft 24 preferably will extend out of the frame at one side of the machine so that driving connections to the impression roll, as heretofore described, may be at one side of the machine, such as at the far side thereof as represented in Figure 1. On the near side of the machine in Figure 1 the driven impression roll 12 has a spiral gear 36 meshing with a spiral gear 38 on a horizontally mounted shaft 40 which extends along the course of the paper and has a long spline or groove by which the spiral gears 42, 44 are slidably keyed on the shaft 40, for driving the other two impression rolls 12, each of which has a similar spiral gear 36; so that the three impression rolls rotate in unison in clockwise direction at whatever locations the second and third printing assemblages may be along the course of the paper.

The second and third of the coacting pairs of rolls 12, 14 are independently movable toward and from the other pair, which may have a fixed setting. For this purpose, the second or mid-pair of rolls 12, 14, and the third pair being that to the right in Figure 1, are each mounted on frame 10 for independent horizontal positional adjustment by means of pinions 46, 46 working in a fixed rack 48. Each pinion shaft may be equipped with a hand wheel 50 to facilitate adjustment.

A spur gear 52 on one end of each impression roll shaft meshes with a similar gear 54 on the shaft of the coacting type-carrying roll 14, so that the type-carrying rolls rotate continuously in counterclockwise direction.

The entire circumference of each type roll 14 is adapted to carry type, a plate, or other printing devite. In practice, however, the matter to be printed may vary between a minimum of length and what would require the whole periphery of the particular type-rolls employed.

As seen in Figure 1, a body of type 56 is diagrammatically represented as extending over approximately two-thirds of the full circumference of each type-roll 14, leaving the other one-third devoid of type and thus incapable of contacting the sheet of paper, indicated at 58. The paper may stand stationary while this typeless portion of a roll 14 is passing; but when the leading edge of the body of type 56 comes to paper-engaging position, feed of the paper must begin, if not already proceeding.

The invention provides so that feed of the paper sheet is by suction draft which is contin-

ually exerting pull on the sheet, but which actually moves the sheet only during the intervals when the paper is not held against movement. Beyond the printing rolls 12, 14, a perforated belt 60, travelling over a suction chamber 62, acts as a conveyor for the sheet of paper which, when spread on the belt 60, and passing chamber 62, has a considerable part of its area there sucked closely against the belt. Unless the paper is securely restrained by a means presently to be described, the paper is thus frictionally drawn along with the belt. But if the paper is held against movement the moving belt slips along under it until such time as the holding ceases.

The means for intermittently holding the paper against the continuously acting frictional pull is set in advance of the printing rolls and is represented as a clamp comprising the stationary platen 64, on which the presser plate 66 is superimposed. At each end of the platen 64, a pair of pins 68, 68 project through the plate 66 and a compression spring 70 is threaded on each pin to intervene between the plate and a head 72 on the end of the pin. Springs 70 are strong enough to hold the presser plate 66 normally pressed tightly against platen 64, so that a sheet of paper engaged by the clamp is held securely against movement, notwithstanding the continuous pull thereon exerted at the suction belt 60.

At each side of the machine the presser-plate 66 has a depending ear 74, and a roller 76 on each ear runs on the periphery of a disk cam 78, whose rotation controls the presser-plate 66 and thus controls the feed of the paper. Cams 78, 78 are fixed on shaft 80 which may extend across the frame under the platen 64, and this shaft may be positively driven by the chain and sprocket drive 82 from a positive transmission unit 84, of infinitely-variable speed ratio, which may be of any known or suitable construction, which in turn may be driven from motor 18 through a short horizontal shaft 86 geared at 88 to the vertical shaft 34, and geared at 90 to the lower shaft 100 of unit 84.

The cams 78, 78 are identical, each having a sharp drop at 102 from the high point to the low point thereof, so that as they rotate counterclockwise, the presser plate is forced open against the compression of springs 68, 68, to permit feed of the paper, and then, as the rollers 76, 76 drop from the high to the low points on their respective cams, the presser plate snaps closed under the urge of springs 68, 68 and clamps the paper and holds it against feed. The interval of feed of the paper may be varied by varying the speed of rotation of the cams, by adjusting the variable speed hand wheel 104, as is well known in positive infinitely-variable gear transmission units, represented here by the enclosing box 84 thereof.

The cam shaft 80 has a single-revolution, short-throw clutch 106, of known type, for which that known as Hilliard is suitable, mounted toward one end thereof for automatically controlling the clamping action of presser-plate 66 through control of the cam shaft 80 and its cams 78, 78. The details of such a clutch are not here shown, being not a part of the invention, but it will be understood that this clutch has rollers acting as wedges for transmitting drive from the outer housing to an inner hub, having flat surfaces, which is keyed to cam shaft 80. A trip element 108 is secured to the roller cage so that the rollers move when the trip moves. Springs hold the trip, cage and rollers in proper position to engage the clutch. The throw of the clutch between engagement and disengagement may be of the order of a few thousandths of an inch, and thus is practically instantaneous.

The trip element 108 is stopped after each revolution when its shoulder 109 engages the end of pivoted lever 110 which stands normally in the path of that shoulder. This arresting of motion of trip 108 results in a slight shifting of the clutch rollers sufficient to disengage the clutch. One sprocket wheel of the chain drive 82 is fixed to the outer housing of clutch 106, so that when the clutch is released the housing is the only part of the clutch being driven; but, as soon as lever 110 moves out to free the trip element, the clutch instantly takes hold and drives cam shaft 80 a complete revolution before shoulder 109 is again engaged by lever 110 to release the clutch.

The automatic intermittent engagement of clutch 106 occurs as a result of rotation of an impression roll 12 and occurs at a precisely predetermined stage in each rotation of that roll. A disk 112 fixed on the shaft of the roll has a lug or hump 114 for engaging lever 110 and rocking it to free the trip of the clutch. For this purpose, lever 110 may have a short arm 111 with roller 113, for riding on the periphery of disk 112. As hump 114 engages roller 113 the longer arm of the lever is swung away from the trip, against the tension of a connected spring which tends to pull the lever back to its stop position as soon as the hump 114 has passed the roller 113, so that the trip is stopped after making a complete rotation. Whatever time it takes for the trip element 108 and the cam shaft 80 to perform a complete revolution, will be the interval of feed of paper 58 to the printing rolls. The interval may be varied by increasing or decreasing the speed of rotation of clutch 106 and shaft 80 by means of the hand wheel 104.

In operation, a supply roll of paper 118 may be rotatably mounted in any suitable manner at the entrance end of the machine, so that the sheet of paper 58 may be drawn therefrom by the feed rolls 120, 122, in a manner to provide a depending loop of paper between those feed rolls and the clamping unit 66, ready, with no inertia except the little which inheres in the paper, to be drawn forward by the suction friction draft when the clamp permits. As represented, a variable speed friction disk drive for the lower feed roll 120 permits regulation of the feed to conformity with the average progress, so as to assure an ever-ready loose supply of paper at the entrance to the clamp.

The setting of hump 114 relative to the leading edge of type 56 may be adjusted by adjusting the disk 112 on its shaft, for which purpose the disk 112 may have a set screw or other means for securing it to the shaft, and may optionally have a micrometer adjustment. Preferably the hump 114 will be set to cause opening of the clamp 64, 66, a little before the leading edge of type 56 comes to printing position, so that the paper will be moving when the type contacts it. This initial feed will be caused by the suction-friction draft of the conveyor 60, at a speed approximating the peripheral speed of the type on the printing rolls; and as soon as the printing of an impression begins, these coacting rolls control the movement of the paper.

Blank spaces between printed areas, desired for margins at top and bottom of each label may be provided. At the option of the operator, and by a suitable setting of hump 114, a predetermined length of suction-friction feeding of

the paper may be allowed before each beginning of an impression, or after each impression is completed. A single elapsed unprinted area provides the bottom margin for one label and the top margin for the next. If the feeding for margins is to precede the printing the hump will be set for the paper clamp to open a suitable time ahead of the beginning of each impression, and to close when the printing of it is completed. But if the feeding for margin is to follow the printing, the clamp remains open the requisite time, and then, will be opened for the next printing a little before the instant of actual printing contact, so that the paper will be put into motion by the suction-friction, and will have attained a speed approximating that of the type roll when the type contacts it, thus eliminating all trouble from inertia.

Figure 1 represents a stage when printing is in progress, with the presser-plate 66 of the clamp open for free feeding of paper to the printing rolls. The position shown in Figure 1, for shoulder 109, indicates that cam shaft 80 has yet to perform three quarters of a complete rotation before clamp 64, 66 will close. Figure 3 shows a cam 78 on cam shaft 80 approaching the clamp-closing stage of its travel. A slight further travel of the cam in Figure 3 will permit the presser plate 66 to snap to paper-clamping position. The trip 108 of the clutch will then have engaged stop lever 110 to release the clutch and cam shaft, until the hump 114 again causes engagement of the clutch.

The speed of rotation of the cam shaft is to be regulated by the operator to suit the particular printing requirements, i. e. so that while the printing is progressing from the leading edge to the rear edge of the body of type on a roll 14 plus the predetermined interval of suction-friction feed for providing margins, the cam makes its complete revolution to the clamp-closing point.

The drawings illustrate a blanking unit 124 provided at the delivery end of the conveyor 60, for blanking and stacking the printed labels by positive gearing. This is made synchronous with the type rolls 12.

For a long continued operation of the apparatus requiring only a minimum of attention of an operator for occasional readjustments, it is desirable that the distance between beginnings of the successive impressions on the continuous sheet shall be uniform and be equal to the length into which the sheet is later severed to make the individual labels. To this end the control hump 114 on disk 112 for the closing of the clamp 66 is mounted and geared so that it turns in synchronism with the type roll 14, which controls the paper feeding during the printing. But a part of the paper feeding is done by suction-friction draft at 60. The speed at which the cam 78 executes each revolution can be adjusted so as to conform to the integrated value of all slippage, inertia and lag, for any particular conditions of humidity and of paper, but if the behavior of the feeding in this respect is not sufficiently uniform during a particular run, a precise uniformity can be attained by mounting the control disk so that it turns in exact harmony with the feeding travel of the continuous sheet. That is, a non-slip meter, may be applied to the paper sheet 58, so as to register exactly its progress, and the control disk may be applied to a shaft or wheel turning in conformity with the paper's travel, so that the clamp 66 closes only when a predetermined length of paper has passed, in which will be comprehended the printed impression and the desired total of margins.

In that case the cutting at 124 should be coordinated with the clamp closings, to blank out lengths of the sheet which are equal to those fed at each open period of the clamp.

The spacing apart of the successive pairs of printing rolls 12, 14 is to be adjusted by the operator so that the successive printings will register together properly on the labels, depending on the length of label.

The speed of the friction-suction draft belt 60 is to be made at least equal to the peripheral speed of the type on the roll 12, so that the paper will be maintained taut. During the printing the paper's speed will be that of the type and impression rolls.

In Figures 7–9, there is shown a modified form of control mechanism for the clamp. In this case the control disk 112' may be fast on the shaft of the impression roll 12, and has a series of sector laminations 126 mounted thereon in overlapping relation and adjustable, fan-like, on the disk. A suitable securing means 128 may secure the sectors in any selected spread arrangement, to provide a laminated composite sector with arcuate edge which may be set to have an extent precisely equal to the extent of the type on the printing roll 14. The radius of curvature of disk 112' will be somewhat less than that of the sectors 126.

A roller 130 is adapted to ride on the periphery of disk 112' where it is bare of sectors, and on the edge of the composite sector throughout the remainder of a rotation of disk 112'. Roller 130 is on the end of lever 132 which is pivoted at 134 on a fixed part of the machine, and the opposite end of the lever may be connected to the presser-plate 66 of the clamp by means of link 136. As the disk 112' rotates, the composite sector will engage roller 130 to rock lever 132 and open the clamp at the precise time when the leading edge of type on printing roll 14 comes to printing position, or preferably a little in advance thereof to permit the paper to be already in motion when printing contact commences. Or if a top margin is to precede each printing, the composite sector will be set to open the clamp at a proper predetermined interval in advance of the printing, and to permit its closing at a similarly predetermined time. This direct control of the clamp eliminates the need for the more complicated single-revolution clutch control of Figure 1.

I claim as my invention:

1. Apparatus for printing sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; pulling means beyond the said rolls for maintaining the sheet material continuously under tension, and for feed of the sheet material to the rolls; clamping means in advance of said rolls for intermittently holding stationary the entire sheet of material between the clamp and the pulling means; and means, including an element rotating in unison with one of said rolls, for disengaging the holding means each time a particular part of one of said rolls arrives at printing position.

2. Apparatus for printing on sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; pulling means beyond the said rolls for maintaining the sheet material continuously under tension, and for feed

of the sheet material to the rolls; clamping means in advance of the said rolls for intermittently holding stationary the entire sheet of material between the clamp and the pulling means; and means associated with the holding means for predetermining and setting the time interval between successive holdings of the sheet material stationary.

3. Apparatus for printing on sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; a suction conveyor beyond the said rolls for maintaining the sheet material continuously under tension, and for draft feed of the sheet material to the rolls; a clamp in advance of the said rolls for intermittently holding the sheet material stationary; and means for opening the clamp at intervals each corresponding to the time interval required for a complete rotation of one of said coacting rolls.

4. Apparatus for printing on sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; a suction conveyor beyond the said rolls for maintaining the sheet material continuously under tension, and for draft feed of the sheet material to the rolls; a clamp in advance of the said rolls for intermittently holding the sheet material stationary; means for opening the clamp at intervals each corresponding to the time interval required for a complete rotation of one of said rolls; and means associated with the clamp for predetermining and setting the time interval through which the clamp shall remain open.

5. Apparatus for printing on sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; a suction conveyor beyond the said rolls for maintaining the sheet material continuously under tension, and for draft feed of the sheet material to the rolls; a clamp in advance of the said rolls for intermittently holding the sheet material stationary; a cam shaft with cam for opening the clamp, said cam being adapted to open the clamp and to hold it open while the cam is making approximately a complete rotation and then to permit the clamp to close; driving means for the cam shaft including a clutch for engaging and disengaging the cam shaft; means for automatically disengaging the clutch after each complete rotation of the cam shaft; and means for causing engagement of the clutch at intervals each corresponding to the time interval required for a complete rotation of one of said coacting rolls.

6. Apparatus for printing on sheet material, comprising a pair of rolls rotating in opposite directions and coacting for printing on sheet material fed between the rolls; a suction conveyor beyond the said rolls for maintaining the sheet material continuously under tension, and for draft feed of the sheet material to the rolls; a clamp in advance of the said rolls for intermittently holding the sheet material stationary; means for opening the clamp at intervals each corresponding to the time interval required for a complete rotation of one of said coacting rolls; and means at the delivery end of said conveyor for cutting the printed sheet material into predetermined lengths and for stacking the individual pieces thereof.

7. Apparatus for multi-color printing on sheet material, comprising a succession of pairs of rolls, of which the individuals of each pair rotate in opposite directions and coact for printing on sheet material fed between the coacting rolls of the successive pairs; means beyond the said rolls for maintaining the sheet material continuously under tension, and for draft feed of the sheet material to the rolls; holding means in advance of the said rolls for intermittently holding the sheet material stationary; means for disengaging said holding means at intervals each corresponding to the time interval required for a complete rotation of one of said coacting rolls; means for supplying a different colored ink to a roll of each coacting pair of rolls; and means for setting the pairs of coacting rolls at various distances apart for proper relative placing of the printing done by the succession of pairs of rolls.

8. In apparatus for printing sheet material including a pair of rolls coacting for printing on sheet material fed between the rolls, the combination with said rolls of a clamp, on the entrance side of said rolls, through which the sheet material feeds to the rolls; means beyond the rolls exerting continuous pull on the sheet material for feed thereof; a control disk fixed on the shaft of one of said rolls; and connections between said disk and said clamp whereby said disk controls the opening of said clamp; there being a raised portion on said disk set relative to the leading edge of type on a said roll so that said raised portion causes actuation of the clamp to open position at a time predetermined relative to commencement of the printing.

9. In apparatus for printing sheet material including a pair of rolls coacting for printing on sheet material fed between the rolls, the combination with said rolls of a clamp, on the entrance side of said rolls, through which the sheet material feeds to the rolls; means beyond the rolls exerting continuous pull on the sheet material for feed thereof; a control disk fixed on the shaft of one of said rolls, having a series of segments adjustable thereon in relatively overlapping relation with uniform radii slightly greater than the radius of said disk; a pivoted lever with broad roller for riding on the periphery of said disk where it is bare of segments and for riding on the edges of said segments throughout the remainder of a rotation of the disk; and a connection from said lever to said clamp, whereby the clamp is opened when said roller is riding on the segment edges and is closed when it is riding on the periphery of said disk.

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