Sept. 25, 1934. W. C. ROWELL 1,974,544

DOUBLE INKING DEVICE FOR PRINTING PRESSES

Filed June 10, 1932 2 Sheets-Sheet 1

Fig. 1

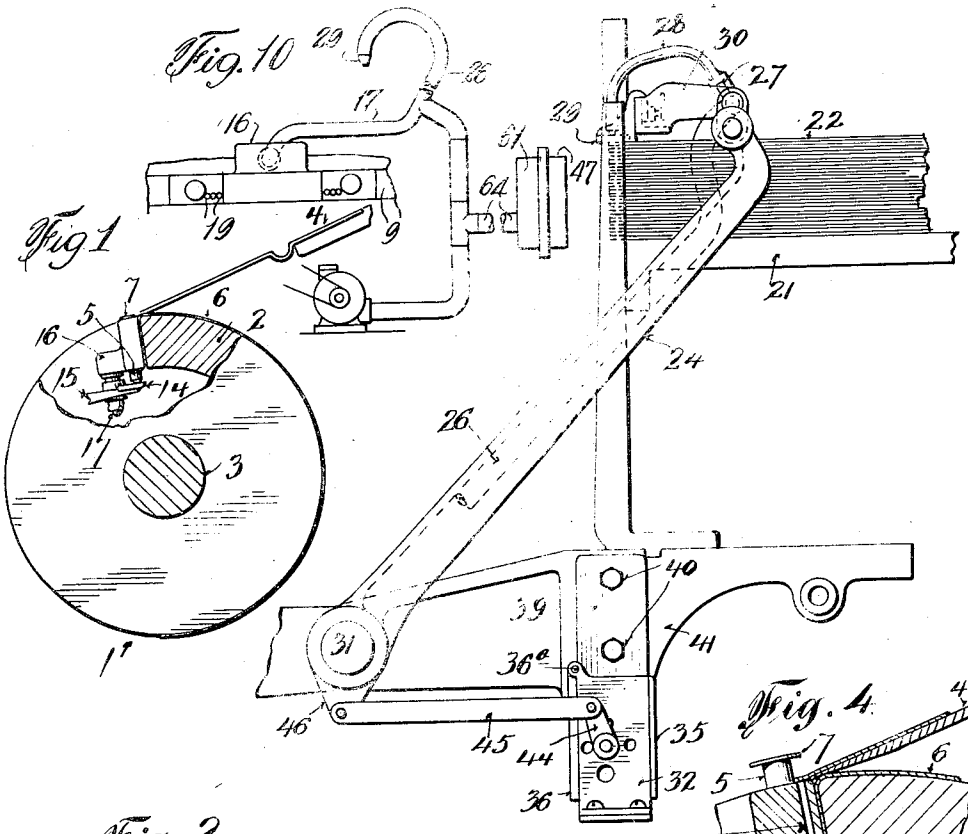


Fig. 4

Fig. 2.

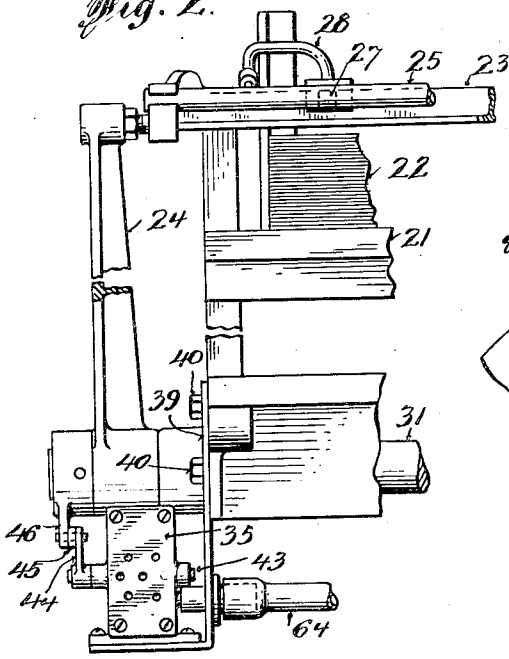
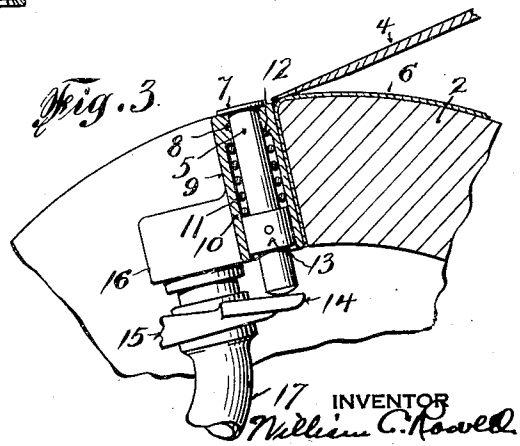


Fig. 3.



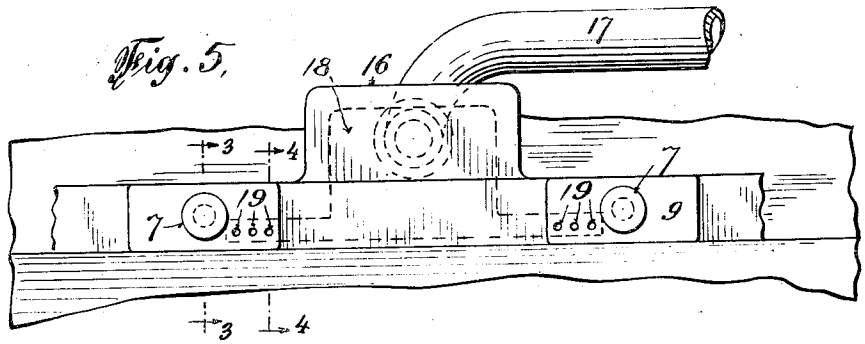
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DOUBLE INKING DEVICE FOR PRINTING PRESSES

Filed June 10, 1932 2 Sheets-Sheet 2

Fig. 5.



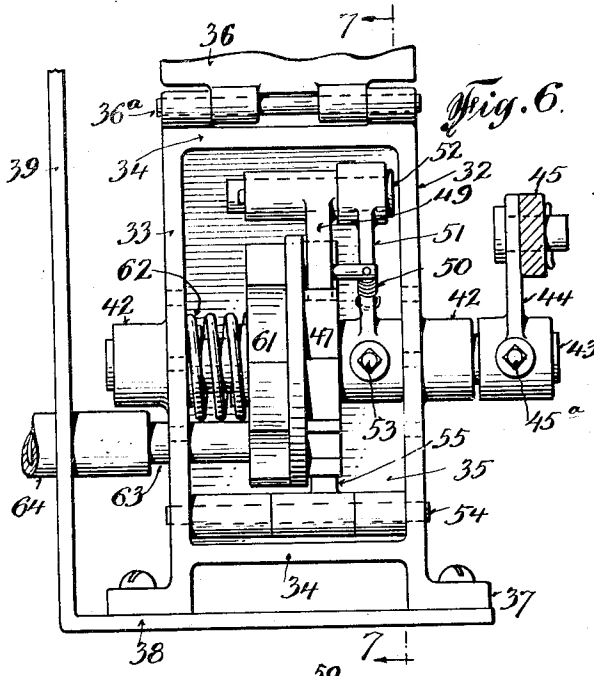


Fig. 6.

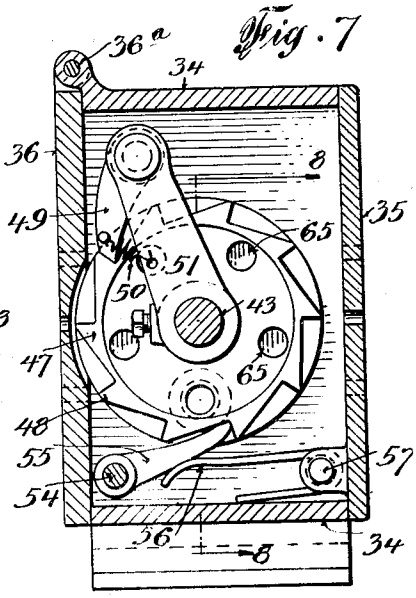


Fig. 7

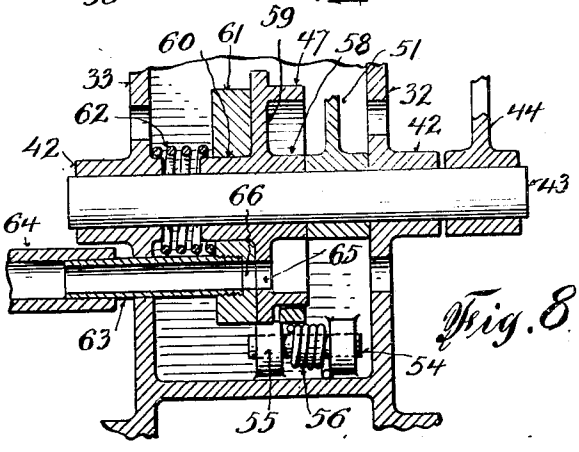


Fig. 8.

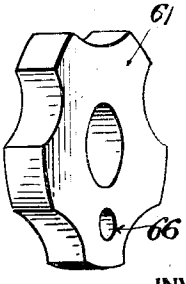


Fig. 9.

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Patented Sept. 25, 1934 1,974,544

UNITED STATES PATENT OFFICE

1,974,544

DOUBLE INKING DEVICE FOR PRINTING PRESSES

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Application June 10, 1932, Serial No. 616,419

4 Claims. (Cl. 271—56)

My invention relates to a double inking device for printing presses. In the operation of certain kinds of printing presses, especially those in which there is a limited number of ink rollers, it is necessary, in order to get proper distribution of ink, and sometimes to produce heavily printed portions without streaks, to allow the rollers to ink the form two or more times between successive printing impressions.

In certain types of printing, double inking of the form is necessary or desirable in order to produce high class results and the necessity for this double inking may depend more or less on the character of the matter contained in the form. A printing press is ordinarily set up to ink the form once for each printing cycle, but where it is deemed necessary or desirable to have the form inked twice for each printing impression, it has been customary, at least in some presses, to provide a manually operated plunger which was manually operated at each alternate revolution of the press for the purpose of tripping or discontinuing the printing operation at alternate revolutions, leaving the inking device in continual operation, so that there was one printing operation following two inking operations.

This manual device necessitated an operator standing at the press and actuating the trip device every second revolution of the press. Aside from the cost of employing labor to operate this manual device, the operation itself is a most tedious one and is also very monotonous.

The object of my present invention is to provide a very simple device actuated in synchronism with the printing press, which will avoid the necessity of using manual labor when double rolling is to be performed. The present device automatically trips the printing operation at every second revolution, thereby bringing about two operations of the printing rollers upon the form to each printing operation, in order to obtain what is called double rolling. While my invention may be applied to and adapted for various types of printing presses, I have chosen to illustrate it herein as applied to what is known as the "Miehle" vertical press.

This is a printing press having a revolving cylinder to which the sheets are fed automatically by a suction feeder from a stack, the form being mounted on a bed or carriage which moves in a vertical plane. The impression cylinder, in addition to revolving, also moves in a vertical plane in cooperative relation with the vertically moving bed on which the form is carried, the cylinder and bed counterbalancing each other and moving in relatively opposite directions during the printing stroke. As stated above, my invention is not necessarily limited to this type of press.

In the type of press described above, the suction feeder takes the sheets individually from the top of a stack and places them on the feed board so that the leading edge of the sheet is presented to a series of grippers arranged across the impression cylinder. After the sheet is accurately placed against the front guides or grippers the grippers close on the leading edge of the sheet, whereupon the impression cylinder is revolved and is moved in the manner described above in relation to the bed while the printing stroke is being performed.

In this type of press there are suction apertures adjacent the grippers of the impression cylinder which must be covered by the leading edge of the sheet in order to insure register. These apertures are connected with a suction device which is made effective or operative only when the apertures referred to are closed by the leading edge of the sheet at the time the grippers go into action to grip the sheet. This suction device controls the operation of the impression cylinder and if, during any cycle of the press, the feeding device fails to feed a sheet, or if the sheet does not move down into proper position against the front stops or the grippers, the apertures referred to will remain open and the suction device will then have the effect of preventing the operation of the impression cylinder, but this does not arrest the operation of the ink rollers.

By means of a simple attachment which forms part of the present invention, the same suction device which is associated with the sheet feeding device, and which is therefore in control of the operation of the impression cylinder, operates to release or destroy the suction in this system at each alternate cycle of the press when double rolling is desired, and in this manner bring about two operations of the ink rollers to one complete operation of the impression cylinder. The output or production of the press during double rolling is naturally reduced one half in order to obtain the desired advantages of double rolling.

By opening the suction system at each alternate cycle of the press the paper feed device remains inactive at each second revolution of the press and the failure of the feeding device to feed the sheets during these alternate operations results in the impression cylinder remaining idle during alternate cycles, because there is no sheet covering the small apertures near the cylinder grippers.

As explained above, in this type of press if

these latter apertures remain open, the impression cylinder is not set into revolution.

The present device is not only simple in construction but also in its operation and in addition it may be very easily applied to the press without material changes in the press itself. It is, therefore, very easily applied to presses now in use and special mechanical skill is not required to adapt the device to the press. Other advantages will be set forth in the following detailed description of my invention.

In the drawings forming part of this application,

Figure 1 shows an elevation of the impression cylinder and part of the sheet feeding device of a "Miehle" vertical press, together with the present invention applied thereto,

Figure 2 is an elevation of the parts shown in Figure 1, viewing the same from the right in Figure 1,

Figure 3 is a sectional view taken on the line 3—3 of Figure 5, showing one of the cylinder grippers and a portion of the suction device,

Figure 4 is a similar sectional view taken on the line 4—4 of Figure 5,

Figure 5 is an elevation looking at a portion of the forward end of the tympan of the impression cylinder, together with the associated parts of the suction device,

Figure 6 is an elevation of the parts for automatically releasing the suction, in which view the cover of the housing is in open position to show the interior parts,

Figure 7 is a sectional view taken on the line 7—7 of Figure 6 but with the cover of the housing in closed position,

Figure 8 is a sectional view taken on the line 8—8 of Figure 7,

Figure 9 is a perspective view of one of the parts contained in the housing, and

Figure 10 is a diagrammatic view of parts in assembled relaton.

In the drawings I have shown only such parts of the complete press as are necessary to understand the application of my invention. In Figures 1 and 2 the parts of the press which are shown in elevation are as follows: 1 is the impression cylinder which has a tympan or impression portion 2 extending partially around the cylinder and against the periphery of which the sheet to be printed engages. This cylinder is mounted on a shaft 3 which is revolved during the impression stroke.

In the type of press referred to above, to wit, the "Miehle" vertical, the impression cylinder not only revolves with the shaft 3 but the shaft and the cylinder move up and down in a vertical plane parallel with the movement of the bed and form (not shown). In the usual operation of the press this impression cylinder makes one complete revolution for each printing operation, but when the automatic device referred to herein is in action the impression cylinder is nonrevolvable during one cycle of the press and is revolvable during the next cycle.

The feed board 4 forms an inclined support on which single sheets are deposited by the suction feed device and when the sheet slides down to its correct position in relation to the impression cylinder, the forward edge of the sheet stops against the post 5 of the sheet grippers preparatory to the grippers engaging the sheet and pressing it against the periphery of the cylinder. At 6 I have shown the usual jacket or packing which is employed to cover the tympan of the impression cylinder and under which make-ready material is applied in accordance with common practice. The several grippers are all alike and there are generally a number of these distributed in a row across the cylinder so that the leading edge of the sheet rests against the portions 5 of each gripper when the latter are in raised position, as shown in Figure 4.

The grippers are shown as provided with circular heads or flanges 7 which move down upon the top of the sheet adjacent its leading edge for the purpose of pressing the sheet against the periphery of the cylinder to hold the sheet on the cylinder while it is making one revolution and receiving an impression from the type or cuts on the form. The shank or post 5 of each gripper extends through a radial bore 8 in a cross member 9 of the impression cylinder, and it extends also through a larger bore 10 which is in communication with the smaller bore 9 so that the lower portion of the shank 5 is of smaller diameter than the enlarged bore 10 in order to provide space for a coiled spring 11 which is disposed to surround the shank 5 and to be compressed between the shoulder 12 and between an adjustable collar 13 which is attached to the shank 5.

The shank extends through the open bottom of the bore 10 and its lower end is adapted to be engaged by a lifting arm 14 which serves to lift the gripper in opposition to the coiled spring 11 into the position shown in Figure 4 which is the position necessary to receive the leading edge of the sheet. When the lever arm 15 moves downwardly to the position shown in Figure 3, the gripper is moved down by the coiled spring 11 so that the flange or head 7 of the gripper presses against the periphery of the member 9 and presses tightly against the leading edge of the sheet if one has been fed to the grippers.

There is a suction box 16 on one side of the cross member 9 of the impression cylinder and there is a suction hose 17 connected with this box in order to create suction in the chamber 18 of this box. On opposite sides of the middle of the member 9 there are shown two sets of apertures 19 lying very close to the leading edge of the sheet when the latter rests against the shanks 5 of the line of grippers.

These apertures extend through the member 9 and are in communication with the chamber 18 so that suction produced from a pump (not shown) and acting through the tube 17 creates suction in the chamber 18 which acts through the apertures 19.

In Figure 1 I have shown a feed table 20 which supports the stack of sheets 22 to be fed to the press and in the type of press referred to this feed table is usually raised automatically, step by step, in order to keep the top of the stack of sheets constantly at the same level. There is a bar 23 which extends across the top of the stack of sheets and it is pivotally mounted at opposite ends on lever arms 24, only one of which is shown in the drawings, the other being a duplicate thereof at the opposite side of the machine. The bar carries a tube 25 which is in communication by means of a hose 26 with a suction producing device or pump ordinarily employed in this type of press. It might be noted that the hose 17 and the hose 26 are both connected with the same suction pump.

The tube 25 is provided with a number of nozzles 27 along its length and to each nozzle there is connected a flexible tube 28, the other end of these tubes being connected with suckers 29 which are mounted on the angle metal bar 23 which lat-

ter is supported by the arms 30 and are carried by the lever arms 24 at each side of the press. The suckers are adapted to rest on the top surface of the top sheet of the pile 22 when in the position shown in Figure 1, and they are adapted to grip the sheet adjacent the edge by suction action.

The arms 24 which are carried upon the shaft 31 are adapted to swing to the left in Figure 1 so that the suckers carry the sheet over and deposit it upon the top of the feed board 4, whereupon the suction in the suckers is broken, the sheet having been deposited upon the feed board, ready to slide down sufficiently to rest against the grippers.

After that, the arms 24 move back into the position shown in Figure 1 ready to perform another feeding operation.

The parts of the press thus far described are well known parts of the "Miehle" vertical press.

If the suction in the suckers which grip the sheet is broken during a particular revolution of the press, then although the suckers partake of the feeding movement, that is, the movement in the arcuate path, due to the swinging of the arms 24 they fail to grip a sheet and therefore fail to feed a sheet onto the feed board. As has been pointed out above, if there is no sheet present on the feed board at the time the grippers go down into active position as shown in Figure 3, the apertures 19 will remain open so that the suction in the box 18 will be broken and in accordance with the mechanism on presses of this type the cylinder will not revolve.

My improved device preferably operates to break or open the suction of the feeding suckers periodically or on alternate cycles of the press, so that by throwing the feeding device out of operation the cylinder will remain inoperative during alternate revolutions of the press. I have shown the device for effecting this more in detail in Figures 5 to 9 inclusive while in Figures 1 and 2 the device is shown applied to the press, together with a suitable connection for actuating it.

I have shown most of the operative parts of my device arranged in a housing 32 of rectangular shape having two sides 23, two end walls 34, a bottom 35 and a cover 36 hinged to one of the end walls at 36a. I have shown this housing provided with feet 37 which are secured by screws to an angular bracket 38 which bracket has a long arm 39 projecting above the height of the housing and provided with apertures to receive the two bolts 40 therethrough for the purpose of mounting the bracket upon one of the side frames of the press.

In presses of the type described, the two bolts 40 are present as a part of the structure so that it is only necessary to remove these bolts, apply the bracket 38 against the side frame 41 and reapply the bolts by passing them through the apertures in the bar 39 and into the side frame of the machine. If the metal of which the bracket 38 is made is thin, the same bolts may be used, whereas in some cases it may be necessary to replace the bolts which are on the machine with other bolts of slightly greater length.

The housing 32 is provided with two hubs 42 on opposite side walls and in these hubs there is journaled a shaft 43 one end of which projects beyond one of the hubs and has attached thereto a crank arm 44 the hub of which is fixed to turn with the shaft by means of the set screw 45. To the outer or free end of this arm there is connected a link or pitman 45 and the other end of the pitman is pivotally connected to a short arm 46 formed as a lower extension of the long feeder arm 24. It may be noted that this short arm 46 is to be found on presses of the type referred to. It will be apparent that the operating force for the shaft 43 may be taken from any other part of the printing press, although the connection shown herein is both simple and easy to apply. It will be apparent that when the shaft 31 which carries the arms 24 rocks back and forth, the motion will be transmitted through the pitman 45 to the arm 44 so that the shaft 43 will be rocked in time with the operations of the sheet feeding device of the press.

There is loosely mounted on the shaft 43 within the housing 32 a ratchet wheel 47. This ratchet is shown as provided with ten ratchet teeth 48 although it will be understood that the number of teeth may be varied. The number is referred to herein in order to point out the relation of the ports through which the vacuum is released.

This ratchet wheel is acted upon by a pawl 49 which is drawn toward the teeth of the ratchet by a coiled spring 50 having one end attached to a pin on the pawl and the other end being attached to the lever arm 51. The pawl is pivotally mounted on a stud 52 which is carried on the free end of the lever arm 51 and this lever arm has a hub surrounding the shaft 43 and fixed to it by a set screw 53 so that the arm oscillates whenever the shaft 43 is oscillated.

On the stud 54 in the lower part of the housing there is pivoted a hold-back or detent pawl 55 which is forced into engagement with the teeth of the ratchet by a spring 56 secured around a pin 57 and pressing against the detent. The purpose of the detent or hold-back pawl is to prevent retrograde movement of the ratchet when the feed pawl 51 is retracting to engage another tooth of the ratchet.

The hub 58 of the ratchet wheel is shown as extending in both directions from the plane of the wall 59 so that one end rests against the hub of the lever arm 51 and the other end of the hub extends through a central opening 60 in a disc 61. The latter is therefore loosely journaled on the hub 58 and one face presses against one face of the disc 59. There is a coiled spring 62 surrounding the shaft 43 with one end pressing against the inner side of one wall of the housing and the other end pressing against the disc 61 to hold it against the face of the member 59. There is a nozzle 63 fixed in an aperture in the wall of the housing and one end of this nozzle is threaded into an aperture in the disc 61. A hose 64 is attached to the outer end of this nozzle 63 and this hose is connected in any suitable way with the suction system or pump. Preferably it is connected with the hose 26 which controls the suction on the sheet feeding device.

The vertical wall or disc 59 of the ratchet wheel is provided with a number of apparatus 65 arranged in circular relation, each of which is adapted to be individually brought into register with the aperture 66 of the disc 61 and the intervening face between the apertures 65 is sufficient to entirely close the aperture 66. If there is to be double rolling of the ink rollers, then there will be half as many apertures 65 as there are teeth on the ratchet wheel, so that in the particular embodiment shown in the drawings there will be five apertures 65 as illustrated, or half as many as the ten teeth on the ratchet wheel.

Operation

If the press is to be operated for single rolling

my improved device will be thrown out of operation. This may be done by disconnecting the pitman 45 from the short lever arm 46 and the disc 59 will be left in a position where none of the apertures 65 is in register with the aperture 66 of the disc 61 or, in other words, the imperforate portion of the member 59 will be opposite the apertures 66. As the spring 62 keeps the disc 61 close against the member 59 the aperture 66 will be closed and therefore the suction will not be released by the present device. Another way of throwing the device out of operation would be to have a valve connected with a hose 64 which could be turned off to prevent the release of the suction and in that event the operator could disregard the position of the ratchet wheel.

Assuming that it is desired to provide for double rolling, the present device will be connected for operation, as shown in the drawings. As the lever arms 24 oscillate in performing the sheet feeding operations, the small arm 46 will be rocked back and forth one complete stroke for each sheet fed and this will rock the shaft 43 back and forth.

At one complete rocking operation of the shaft 43 the pawl 49 engaging the ratchet wheel will advance the latter counterclockwise in Figure 7 one step or one tooth length for each oscillation of the sheet feeding device. As there are half as many apertures 65 as there are teeth on the ratchet, it will be apparent that at one moment one of the apertures 65 will be brought into register with the aperture 66 and the nozzle 63, as shown in Figure 8; and at the next succeeding operation of the feeding device the imperforate portion of the member 59 will stop opposite the aperture 66 thus closing off the latter and preserving suction in the hose 64.

It will be apparent from what has been said that the aperture 66 is alternately opened and closed as the ratchet wheel is advanced step by step. Each time the aperture 66 is opened by the registering of one of the apertures 65 therewith the suction in the pipe 64 is released and as this pipe is connected directly or indirectly with the pipe 26 which applies suction to the sheet suckers, at each alternate operation of the sheet feeding device, there will be no suction in the suckers, and while the arms 24 may nevertheless oscillate the same as if a sheet were being fed, no sheet will be carried over by the suckers when the aperture 66 of the disc 61 is opened by one of the registering apertures 65. In other words, at each alternate operation of the sheet feeder the suction is opened in the hose 64 by one of the holes 65 and the feeding of the sheet is arrested although the feeding device may otherwise perform its movements.

During the alternate operations, when a sheet is not fed to the feed board, the apertures 19 will not be closed because of the lack of the sheet. Without these apertures being closed, the mechanism for revolving the impression cylinder will remain inoperative in accordance with the function of the devices ordinarily provided in presses of this type.

During the cycles of the press, when the feeding device fails to present a sheet onto the feed board, the impression cylinder will not revolve and no sheet will be fed during such cycle. It follows that there will be no impression made during such cycles, but the inking rollers will apply ink to the form the same as if a printing operation were taking place.

This will apply an additional supply of ink to the form and it will distribute the ink more evenly thereover. Following each intermission of the operation of the impression cylinder, the sheet feeding device will be operative, that is, during the cycles when the imperforate portion of the disc 59 is opposite the aperture 66. During these cycles of the press the sheet feeder will feed the sheet to the feed board and the leading edge of the sheet will cover the apertures 19 so that when the grippers press the sheet against the member 9 there will be suction in the chamber 18 and through the usual devices on the press the impression cylinder will be revolved.

It will be apparent from the above that when the present device is in operation it automatically releases the suction in the suckers 29.

Having described my invention, what I claim is:

1. In a printing press having an inking mechanism, an impression cylinder, a suction sheet feeding device and suction means controlled by the sheets for controlling the operation of the impression cylinder, of means for releasing the suction of said sheet feeding device periodically during certain cycles of the press, and means operated synchronously from the printing press for operating said latter means to periodically arrest the feeding of sheets and thereby tripping the operation of said cylinder to cause multiple operations of the inking device between successive sheet feeding operations.

2. In a printing press having inking mechanism and an impression cylinder, a suction sheet feeding device and suction means including bleeding means adjacent the cylinder controlled by the sheets for controlling the operation of the impression cylinder, with means for periodically rendering said suction sheet feeding device inoperative upon alternate cycles of the press, and means operated synchronously from the printing press for operating said latter means whereby said impression cylinder will be interrupted upon alternate cycles of the press because of the absence of a sheet on said bleeding means.

3. A suction sheet feeding device for presses including means for periodically gripping a sheet by suction and feeding the same to a press and means for rendering said suction sheet feeding device inoperative, including a shaft, means operated from the press for rocking said shaft, a ratchet wheel revolvable on said shaft, an arm mounted on said shaft and carrying a pawl for advancing said ratchet wheel step by step, a non-revolvable disc on said shaft, a spring for pressing said latter disc against said ratchet wheel, said disc having an exhaust port, means connected with the suction device of said sheet feeder and with said exhaust port, said ratchet wheel having apertures adapted to be intermittently registered with said exhaust port upon the step by step movement of said ratchet wheel.

4. A suction sheet feeding device for presses including means for periodically gripping a sheet by suction and feeding the same to a press and means for rendering said sheet feeding device inoperative, including a bracket, a housing mounted thereon, a shaft journaled in said housing and having one end projecting therefrom, a lever arm connected with the projecting end of said shaft, a pitman connected with said lever arm and with an oscillating member of said press whereby said shaft will be rocked in synchronism with the press, a ratchet wheel mounted on said

shaft within said housing, a detent for preventing retrograde movement of said ratchet wheel, a lever arm mounted on said shaft and having a pawl arranged in said housing to act on said ratchet wheel, a disc in said housing and a spring for pressing the same against a face of said ratchet wheel, said disc having an exhaust port, means connected with the suction device of said sheet feeder and with said exhaust port, said ratchet wheel having apertures adapted to be brought intermittently into register with said exhaust port to release the suction in said sheet feeding device upon predetermined cycles of the press.

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