C. H. COCHRANE.

PRINTING PRESS.

APPLICATION FILED NOV. 25, 1918.

1,414,339.

Patented May 2, 1922.

2 SHEETS—SHEET 1.

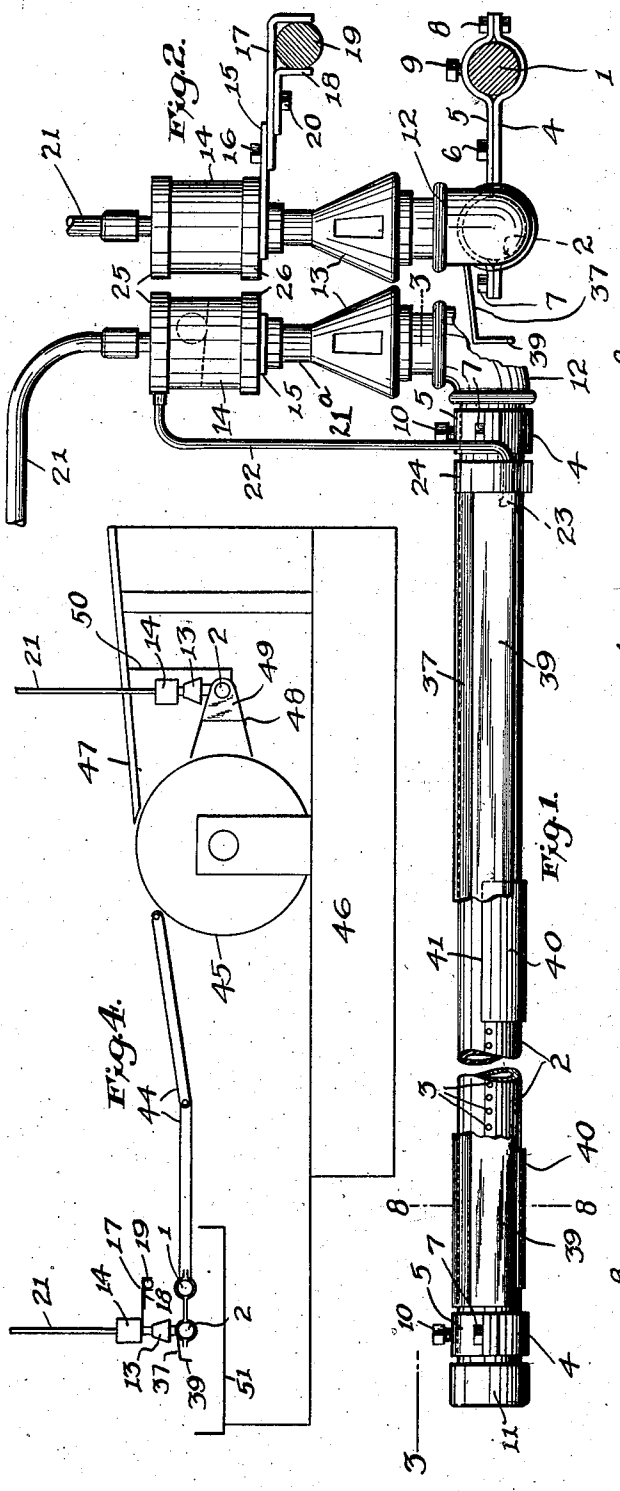


Fig. 2.

Fig. 4.

Fig. 1.

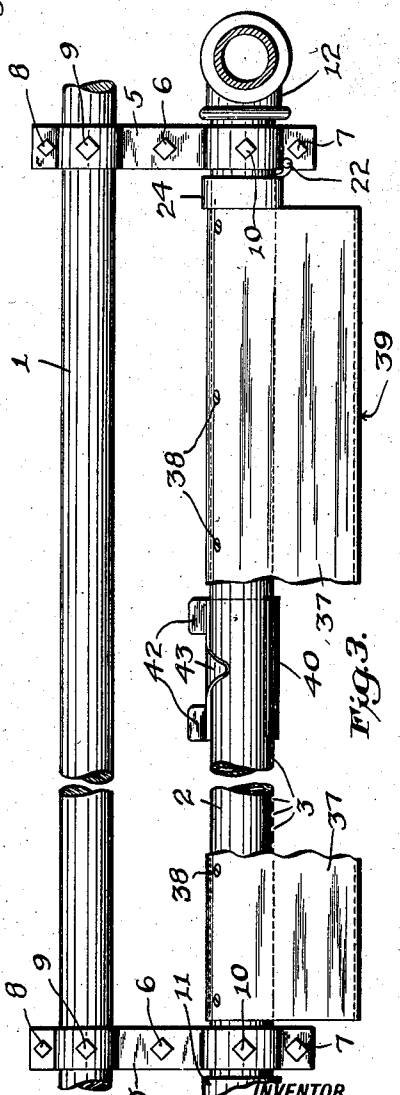


Fig. 3.

INVENTOR

Charles H. Cochrane

BY

Stewart & Berry

ATTORNEYS

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2 SHEETS—SHEET 2.

Fig. 5.

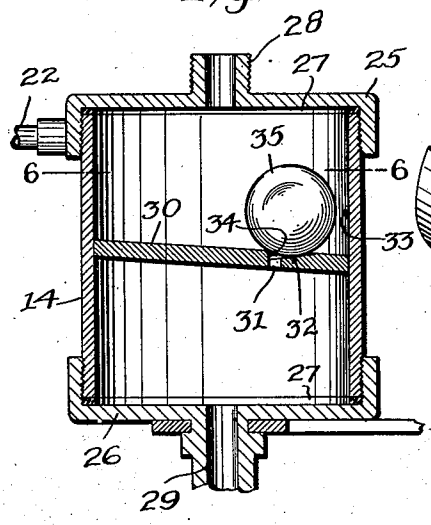


Fig. 7.

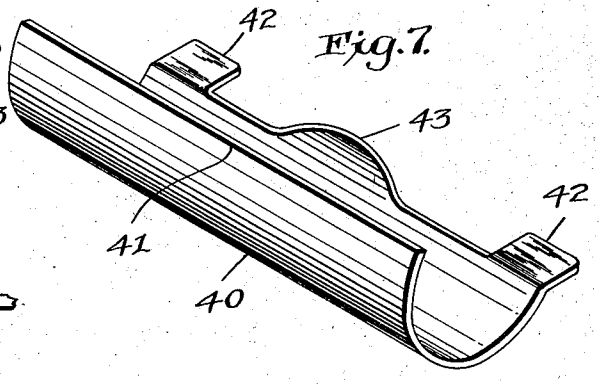


Fig. 6.

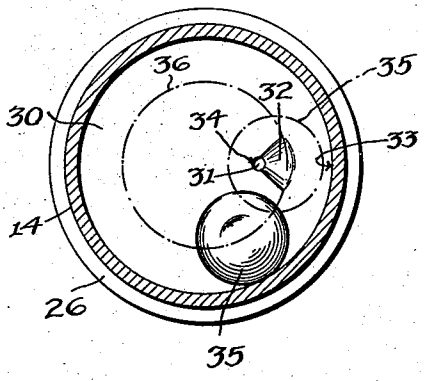


Fig. 8.

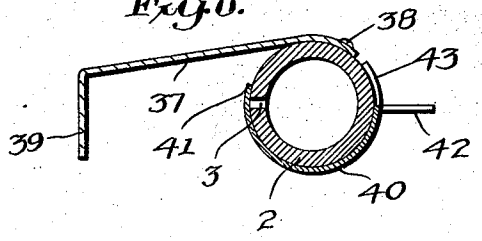
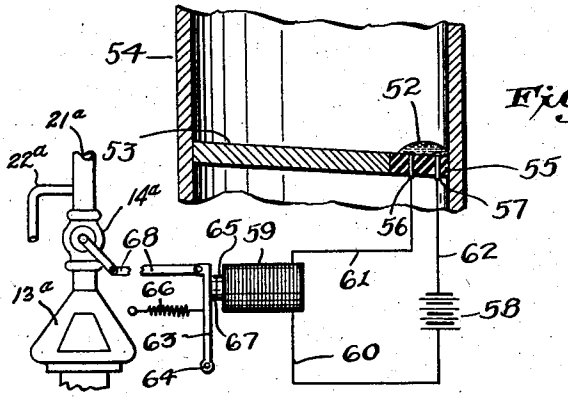


Fig. 9.



INVENTOR

Charles H. Cochrane

BY

Menard & Berry

his ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES H. COCHRANE, OF NEW YORK, N. Y.

PRINTING PRESS.

1,414,339. Specification of Letters Patent. Patented May 2, 1922.

Application filed November 25, 1918. Serial No. 263,960.

To all whom it may concern:

Be it known that I, CHARLES H. COCHRANE, a citizen of the United States of America, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Printing Presses, of which the following is a specification.

This invention has reference to printing presses, and, particularly, relates to attachments for heating the freshly printed sheets and removing from the latter any static electricity possessed thereby, or by which they become charged in their passage through the printing press or folder.

Among the objects of my invention may be noted the following: to provide means by which the sheets of paper printed may be thoroughly heated so as to dry the ink impression, and also to dissipate the static charges from the sheets; to provide a gas burner attachment for printing presses so constructed that a predetermined amount of heat may be produced, the amount being controlled and regulated by the application of a device or devices directly to the burner; to provide means by which the supply of gas to the burner can be automatically checked when the machine is stopped and which may be automatically supplied during the operation of the machine; to provide controlling means for the supply of gas to the burner by utilizing the movements, agitation or vibration of the machine as a whole or a particular part or parts thereof; to provide means by which the heat can be applied to the sheets as they pass through the press without scorching or unduly heating the sheets; to provide a heat collector over which the sheets may pass having the function of radiating the heat to the sheets and, at the same time, protecting the latter so as to avoid excessive heating; to provide means by which the gas flame from the burner can be localized so as to cause the heat from the burner to be applied to the sheets according to the position of the latter, or the path of movement of the latter, through the machine; to provide means by which the flame from the burner can be variably localized so as to enable the guard or protector to be heated locally or in different places corresponding with the size of the sheets and the path of movement of the sheets through the machine; to provide a combined heat collector and radiator for drying the sheets during their passage through the machine, regardless of the position of the sheet between printing and delivery operations; to provide means by which, during the sheet drying process or operation, the eyes of the operator are shielded from the glare of the burner; to provide an attachment in the form of a heater so constructed as to enable it to be applied to different parts of the press to perform different functions, such as heating the sheet as it is printed, heating the tympan or impression cylinder and sheet alternately, heating the sheets as they are delivered to the receptacle or holder, and heating the sheets after they are delivered to the holder and as they are stacked or piled therein; and to provide certain simple, safe, efficient, economical and effective means for carrying out the objects noted in the foregoing.

With the above objects in view and others which will be detailed during the course of this description, my invention consists in the parts, features, elements and combinations thereof hereinafter described and claimed.

It has been common in the art for many years to attach heaters to cylinder printing presses; but, most of the attachments have been crude and more or less liable to accident, such as setting the paper on fire, as well as to waste the gas and heat. As usually constructed, the heating medium is in the form of an iron pipe with numerous perforations lengthwise thereof, each of which emits a jet or flame when in operation, such pipe-burner being fastened to the front or delivery end of a cylinder press in position where a freshly printed sheet, in the process of delivery, passes in proximity to the flame, either above or below. It has been customary to apply a mixer to the pipe, for mixing air with the ordinary illuminating gas, and provide a flexible pipe or tube for connecting with the regular gas-pipe in the place of installation, an ordinary cock being provided for turning on and off the gas. It has also been proposed to automatically cut off the gas supply of the machine; but, in practice, the devices for this purpose have been defective, insufficient and failed of their purpose, a means proposed consisting of a device for cutting off the gas from the end of the burner so as to save the gas. Such devices have invariably been objectionable,

because they leaked gas. So far as I know, all gas burner attachments for supplying heat to cylinder presses have been placed on the front or delivery end of the press, the end where the sheets are fed in being called the rear end. The heaters have usually been attached to the carriage-delivery type of cylinder presses, so that the sheet passes or slides over the heater in leaving the delivery carriage, while the heater, on its next reciprocation, moves back and forth over the sheet, as it lies on the delivery table. With this arrangement, the sheet gets the benefit of exposure to the heat three times.

In carrying out my invention, I follow the practice noted in the foregoing of placing my heater on the front of the press; but, I secure equally good results from placing my heater at the rear of the press close to the rear of the impression cylinder. Though, in this position, the printed sheet only passes once close to the heater, yet the tympan passes the heater twice for every impression and becomes so thoroughly hot that the printed sheet absorbs, by contact with such tympan, a large degree of heat.

I also secure the advantage of having the feed-board or table warm, the tendency of which is to carry the waste heat from the attachment to the pile of unprinted paper, resulting in removing any static electricity. If an extreme degree of heat is desired, as in printing with a large quantity of ink where a heavy color is required, calling for great drying capacity, this is obtainable by placing one heater on the front of the press and another on the rear. Thus, I am able not only to bring more heat to the drying of a sheet than ever before and to remove every vestige of static electricity, but I am able to conserve the heat, and waste less than ever before, because I hold the heat with a shield where it is wanted, and have two media by which to cut off the gas, as presently described.

In carrying out my invention, I add, to the novel details of construction, three radically new features, viz: A valve, actuated by the motion or vibration of some moving or reciprocating part of the press, which affects the inertia, of a ball-valve on a specially prepared seat, so that the flames of gas or gas jets, are automatically cut off when the press stops, or is run very slowly, and are automatically relighted through a by-pass when the press resumes its normal speed; a hood or shield for the burner with a downturned member to assist in confining the heat for use where it is wanted, and also preventing the paper from coming in contact with the flames or jets, and also protecting the eyes of the pressman or operator from the glare of the burner; and spring clips so formed as to be readily slipped around portions of the burner-pipe so that they may cover and accurately close a number of the gas holes when the heat from them is not needed, as when printing a sheet of less size than the width of the press.

In order that my invention may be clearly understood, I have provided drawings wherein:

Figure 1 is a front elevation of the delivery-carriage of a cylinder press having my automatic valve or controlling means applied thereto, parts being broken away, and the view being broken between its ends, owing to the limitations of the sheet;

Figure 2 is an end elevation of Figure 1 showing the mode of attachment of the valve or controlling means for the burner;

Figure 3 is a top plan view of the delivery-carriage shown in Figure 1;

Figure 4 is a side elevation of portions of a printing press showing my heater applied to heat the tympan, the sheets and the receptacle into which the sheets are delivered;

Figure 5 is an enlarged vertical section of the valve casing, showing details of construction;

Figure 6 is a section on the line 6—6 of Figure 5;

Figure 7 is an enlarged perspective view of the clips adapted to be applied to the pipe-burner;

Figure 8 is a section substantially on the line 8—8, Figure 1; and

Figure 9 is a sectional elevation showing another form of my invention for controlling the automatic supply and cut-off of the gas.

Referring to the drawings, it will be seen that no attempt has been made to illustrate the details of the usual cylindrical printing press to some moving or vibratory part of which my attachment is applied. In Figures 1, 2 and 3, the front bar and burner-pipe of the press delivery-carriage are shown, the numeral 1 indicating the front bar and the numeral 2 the burner-pipe which is provided with a line of closely set apertures 3, through which the gas is emitted and the heating jets are produced. The line of apertures extends substantially the length of the burner-pipe from side to side of the delivery-carriage. The burner-pipe which really forms part of my attachment is secured to the front bar 1 of the delivery-carriage by means of a pair of clamps consisting, as shown in Figures 1, 2 and 3, of a bottom plate 4 and a top plate 5. At one end, the two plates combinedly surround the rod 1 and, at the other end, the two plates combinedly surround the burner-pipe 2. Between the bar 1 and pipe 2, where the plates are brought together in parallelism, a screw 6 holds the two plates together, and, at opposite ends, where the two plates are brought together in parallelism, screws 7 and 8 hold the two plates together. Thus

the burner-pipe 2 is supported at its opposite ends upon the delivery-carriage-bar 1, so as to move consonantly with the latter; and, to prevent the burner-pipe 2 from turning relatively to the carriage-bar 1, a screw 9 is passed through the upper plate 5 and tapped into the bar 1, the burner-pipe being thus held in the proper relation to the front of the delivery-carriage, as shown in Figures 1 to 3. To prevent the burner-pipe with its valve attachment turning in the clamping plates 4 and 5, a screw 10 is passed through the upper plate 5 and tapped into the burner-pipe. At one end, the burner-pipe is closed by a screw-cap 11, and, at its other end, has applied thereto an angular coupling 12, to which is secured a mixer 13 of usual or any approved form surmounted by a valve-chamber 14 containing certain features of my invention. Substantially at the point of connection of the valve-chamber with the mixer, a bracket-arm 15 is applied, to which is secured, by a screw or bolt 16, the upper angular clamping plate 17, with which cooperates a lower angular clamping plate 18, the two being adapted to be clamped upon a bar 19 forming part of the press, a screw 20 passing through the lower clamping plate 18 into the upper clamping plate 17 being adapted to secure the two plates together and cause them to engage the bar 19. Thus, the weight of the valve-chamber, mixer and burner-pipe is distributed over different parts of the press.

The valve-chamber, at its top, is supplied with gas through the flexible connection 21, which is extended to, and coupled with, any suitable gas pipe or source of supply provided with an ordinary gas cock, the same not being shown because of ordinary type and forming no part of my invention. The top of the valve-chamber 14 has tapped thereinto, or suitably coupled therewith, a by-pass 22 which, at its lower end, is bent at an angle and terminates in a burner or jet 23 utilized as a pilot and also as a lighting medium for the burner-pipe 2. To hold the pilot 23 properly in cooperative relation to the burner-pipe and the jet apertures 3 thereof, a loop or hook 24 is applied to the adjacent end of the burner-pipe through which the pilot 23 extends. Thus, the vibrations of the machine are unable to flex the by-pass 22 or disturb the relation of the pilot 23 to the burner-pipe 2.

Referring particularly to Figures 1, 5 and 6, it will be seen that the valve-chamber 14 consists of a hollow cylinder closed at its opposite ends by caps 25, 26 screwed thereonto and between which and the respective ends of the cylinder, gaskets 27 are interposed to make a gas-tight joint. The upper cap 25 is provided with a screw-threaded nipple 28, to which the supply pipe 21 is applied, and the lower cap 26 is provided with a connection or suitable coupling 29 with passageway therethrough to the mixer 13. Between its ends the valve-chamber 14 is provided with an inclined diaphragm 30 provided near one margin with a valve opening 31 around a portion of which, on the upper side of the diaphragm, is formed an inclined valve-seat 32, the rise of the incline being toward the adjacent wall of the cylinder which, for reference purposes, is indicated by 33. The extent of the inclined surface 32 is clearly shown in Figure 6, and around the remainder of the aperture 31 a shoulder 34 is formed. Thus a stop is provided at the aperture 31 to prevent the ball-valve 35 from passing beyond the aperture when the apparatus becomes quiescent and the ball 35, by gravity, descends the incline 32 from against the adjacent wall 33 of the cylinder. The ball-valve 35, as shown in the section view of Figure 5, is in its normal operative position to close the aperture 31 when the apparatus is not in operation. Thus, the passage of gas through the valve opening 31 is barred. The area of the inclined surface 32 leading to the valve aperture 31 is such as to enable the ball 35, when the apparatus is in operation, to circle about the wall of the valve-chamber 14 on the diaphragm 30, without at any time entering upon the inclined surface 32, this being when the ball is in contact with the wall of the cylinder. This is clearly illustrated in Figure 6, where the circular path of movement of the ball 35 is indicated by the line 36, and two positions of the ball 35 are illustrated, one at rest upon the valve-seat 32 and against the shoulder 34 so as to close the aperture 31, and the other at rest against the wall of the chamber 14. The first is the position of the ball when the printing press is stationary and the gas controller is not in operation, and the other is the position of the ball when the printing press is in operation and the controller is in operation with the ball unseated and circulating about the chamber against the wall thereof upon the diaphragm along the circular path indicated by the line 36. The arrangement is such that, instantly the printing press comes to a stop or materially slows down, so that the jets from the burner-pipe 2 are not required, the ball-valve 35, by gravity, will roll to the wall point 33 of the chamber 14 and then, by gravity, leave the wall point 33 and roll down the inclined seat 32 against the shoulder 34 and close the passage 31. Thus the passage of the gas from the chamber 14 to the chamber 13 is controlled automatically by, and during the operation of, the printing press or the inactivity of the latter. When the valve is closed in the diaphragm 30, the gas will reach the pilot 23 through the by-pass 22, which will remain

lighted under all conditions of action and inaction of the printing press.

There are times when the entire row of the burner-jets 3 are not required, as when the work passing through the press is not sufficiently extensive to cover the entire delivery-carriage; but, the burner-pipe has applied thereto a shield 37 secured in position by a plurality of screws 38 and extending substantially the length of the burner-pipe, and over which pass the sheets printed and delivered by the press. The shield 37 extends a considerable distance in front of the burner-pipe 2 and has the depending web or member 39 which shields the eyes of the operator or pressman from the glare of the flame of the jets of the burner,—see Figures 1, 2, 3 and 8. The shield also has the function of corralling and holding the heat, thus bringing about a substantially even distribution of the same and causing the shield to be uniformly heated. It also has the function of directing the heat downwardly for heating purposes presently described with reference to Figure 4. If all the burner-jets or apertures 3 are not required, owing to the area of the sheets operated upon, any number of them may be put out of action by covering the same with one or more spring-clips in the form of semi-cylindrical plates 40, one edge 41 of which is straight and the other edge of which, at its opposite ends, has thumb or finger pieces 42 adapted to be engaged by the pressman when it is desired to remove same from the burner-pipe. A tongue 43 extends from the edge of the spring-clip between the two thumb pieces 42 toward the straight edge 41, enabling the clip to cling snugly and intimately to the cylindrical burner-pipe 2 and thus cause it to close a plurality of the lengthwise extending apertures 3. I prefer to line said clip with asbestos to perfect the gas seal. Application of the clips to the burner-pipe is accomplished by holding the clip in the hollow of the hand and pressing it forcibly, so as to spread its opposite edges apart, upon the burner-pipe. As shown in the sectional view of Figure 8, the overhanging lip 43 enables the clip to cling to the burner, since the said clip is caused thereby to encompass considerably more than one-half the circumference of the burner-pipe. The application of one or more clips to the burner-pipe will enable the gas jets to be cut off to any extent desired corresponding with the nature of the work passing through the press, thus avoiding wastage of gas and overheating the shield along the area thereof which is not in use. Thereby the operation of the machine is rendered economical and the heated area of the shield is confined approximately to the area of the sheets passing through the press. The shield also has the function of holding or gathering the heat, thus enabling the conservation of gas, since, when the shield becomes thoroughly heated, or to the extent required for the purposes, the gas supply through the pipe 21 can be materially reduced or supplied only to the extent found necessary to maintain the proper temperature of the shield.

In Figure 4, an outline of a cylindrical printing press is given and therein my apparatus of Figures 1, 2 and 3 is shown applied to the front end thereof to the delivery carriage, as heretofore described, a part of the operative mechanism of the carriage being indicated at 44. My heating and controlling mechanism are also shown applied to the rear end of the machine in a slightly modified form in cooperative relation to the tympan or impression cylinder 45 of the press, the circumference of said cylinder being approximately twice the length of a sheet passing around the same for printing, drying and delivery. The frame of the press is generally indicated at 46, the work or feed table at 47, and, for proper identification, the gas supply pipe is indicated at 21, the valve cylinder at 14, the mixer at 13, and the burner-pipe at 2. The form of the shield in this application of my invention is changed in order to enable it to properly cooperate with the tympan or impression cylinder 45. As shown, the shield 48 is substantially V-shaped in cross-section and, preferably, has its opposite ends closed as by webs 49, said shield and burner-pipe being supported by a bracket arm 50 secured in any suitable manner to the same movable part of the press. The open end of the shield 48 is toward the cylinder 45 and is disposed so as to avoid contact therewith and afford a passage for the sheets or work between the same and the edges of the shield. Thus the shield is of such form as to corral the heat emanating from the jets of the burner-pipe 2 and direct the same against a large area of the circumference of the cylinder 45. By this arrangement, and bearing in mind that the printed sheet is considerably less in area than the circumference of the cylinder, the latter is directly heated by radiation of heat from the shield, and the sheet, as it passes the shield, is also directly heated. It will also be understood that the heat, during the operation of the machine, is directed alternately against the surface of the cylinder and the surface of the sheet passing with the cylinder across the mouth of the shield. As the dried sheet is carried around by the cylinder 45, the same is stripped therefrom, in usual manner, and is delivered to the receptacle 51 where the successive sheets are piled or stacked automatically as they leave the carriage. It will also be understood that, by arranging the receptacle 51 directly under the shield and burner in the form shown at the front end

of Figure 4 and in the details of Figures 1, 2 and 3, the heat corralled by the shield 37, 39 will also be directed into the receptacle and directly upon the successive sheets as they are deposited in the receptacle 51 one by one. Hence, each sheet, after it is deposited or delivered to the pile or stack, is again heated, thus quite effectively, in the operation of the press, eliminating the static electricity accumulated thereby and also thoroughly drying the same preventing smearing, smudging and adhering of the successive sheets delivered to, and stacked in, the receptacle 51.

I have also devised an alternating form of construction which I have illustrated in Figure 9. This device operates electrically whereas the former construction is strictly mechanical, but the same forces are employed in operating and controlling both devices, and both perform the same function in substantially the same way.

In its alternative form, a pipe 21^a supplies gas directly to the mixer 13^a, which corresponds to the mixer 13 and interposed in this supply pipe is a cut off valve 14^a, which may be of any suitable form of construction, but, for the purpose of illustration, is here shown as an ordinary rotary plug cock. This valve is controlled by a connecting rod 68, hereinafter described. A suitable pilot light corresponding to the pilot light 23 is fed from a pipe 21^a, through a pipe 22^a and joins said latter pipe intermediate the source of supply and the cut off valve 14^a.

In this form of my invention I employ a structure somewhat similar to that heretofore described. It consists preferably of a cylindrical casing 54 having a partition 53, mounted within the cylinder at an angle to the walls thereof, that is slightly inclined with reference thereto. As mounted it is intended that said partition shall be inclined to bisect a horizontal plane. A section of this partition as 55 is of insulating material and supports two electrical contact points 56 and 57. The chamber is mounted so that these contact points are at the lowest point in the chamber. 58 is a battery and 59 an electro-magnet which is in circuit with said battery and contact points through the wires 60, 61, 62. 52 is a mercurial globule contained within the chamber formed by the cylinder 54 and partition 53. It is free to move within said chamber.

The chamber 54—53 is suitably mounted on some vibratory part of the printing press, substantially as the first form of construction is mounted. The operation is obvious, so long as the press is operating the vibration of the cylinder 54 and partition 53 will cause the mercurial globule 52 to oscillate or rotate within said chamber, centrifugal force causing it to follow the wall of the cylinder, but so long as the press is in motion it is never at rest, but when the motion of the press ceases the globule instantly finds its seat at the lowest point in the chamber where it spans the gap between the contact points 56 and 57 and thus establishes electrical connection to the magnet 59. This magnet being energized draws the armature 67 and operates the rod 68 which in turn closes the valve 14^a located in the pipe 21^a and shuts off the gas supply. As soon as said vibratory movement of the press starts again, the globule leaves its seat and said valve is opened by the spring 66 the tension of which normally helds it open.

Hence it will be seen that in both constructions the operative member, the ball in the first instance, and the globule in the second, are subject to two forces, i. e. the force of gravity and a vibratory force sufficient to overcome said force of gravity. I have so constituted the mechanism that when the ball or globule is violently displaced by an external vibratory force applied thereto such as that indicated the valve is opened, whereas when such force is removed or discontinued and the ball or globule falls into the power of gravity the valve is closed. It will be obvious that this order may be reversed.

I have referred to the casing 14 and 54 as mounted on some part of the printing press, any place where such casing would partake of the vibratory movement generated by the press would serve the purpose. It is of the first importance in the operation of such a device as that described that the gas flame should be extinguished the instant that the machine comes to rest, for with the stopping of the machine the movement of the printed sheet or tympan adjacent the flame also rests, hence if the flame continues to burn the heat will quickly generate combustion with all the incident dangers, but so long as the sheet and tympan are moving rapidly through the heated zone no such danger exists. For this reason I have arranged my valve so that the instant the vibratory movement of the machine ceases or ceases sufficiently to throw the ball or globule into the power of gravity, the gas is instanly cut off, and the danger incident to a continuous flame removed.

From the foregoing description, it will be seen that I have provided a controlling means for automatically checking the supply of gas to the burner, and that I have utilized the action and inaction of the printing press to bring about the functions desired. Thus I have provided a gas supply controlling means, either mechanically or electrically operated, operating upon a fundamentally new principle, and performing all its functions or not, according to whether

the press is in operation. Furthermore, I have provided means by which the heat from the burner may be utilized in several different ways and in several different parts of the press, and all with reference to the path of travel of the sheet being printed and delivered. In this connection, it will also be seen that I have utilized the heat from the burner to directly heat the printed sheet, and directly heat the tympan or impression cylinder, as well as directly heat the sheet during delivery, and also while it is being stacked in the receptacle. I have also provided a means by which gas can be economized, delivered or not delivered, the jets controlled or entirely eliminated, so far as their functions are concerned, and the eyes of the operator are shielded from the glare of the jets.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a printing press, means for heating some part of the press, means for supplying fuel to the heating means, and fuel controlling means, operable by the vibratory movement of the press, to permit the feed of fuel while the press is in motion and operable by the force of gravity to arrest the supply of fuel while the press is at rest.

2. In a printing press, means for heating the sheets passing therethrough including a burner, means for supplying gas to the burner, and means for controlling the supply of gas to the burner, the elements of such means controlled at all stages of the movement of the press by the movement or vibration of the press to maintain the supply open, but when such movement ceases and the press is at rest such elements operating to cut off or limit such supply of fuel.

3. In a printing press, means for heating some part of the press, means for supplying fuel to the heating means, and fuel controlling means, operable by the vibratory movement of the press to permit the feed of fuel when the press is operating at normal speed and operable to arrest the supply of fuel when the speed of operation of the press is appreciably diminished or the press stopped.

4. In a printing press, means for heating some part of the press, means for supplying fuel to the heating means, and fuel controlling means, operable by the vibratory movement of the press to permit the feed of fuel when the press is operating at normal speed and operable by the force of gravity to arrest the supply of fuel when the speed of operation of the press is appreciably diminished or the press stopped.

5. In a printing press, means for heating a part of the press, means for heating another part of the press, and means, operable by vibration imparted thereto by the press, to control said heating means.

6. A printing press, and a gas supply therefor as described in combination with a valve adapted to control said gas supply, said valve operating normally under the power of gravity and abnormally by power imparted thereto by the movement of the press, said valve being mounted in relation to the press so as to partake of the movement of the press when in operation such movement operating to open the valve, but when said movement ceases and the press is at rest then the valve falls under the power of gravity and this force causes the valve to close.

7. In combination with a printing press, wherein gas is employed for the purposes of heating and demagnetizing, a gas burner, means for feeding gas to the burner, and valvular means embodying a mobile element controlled by the movement of the machine for regulating the flow of gas to the burner.

8. In combination with the reciprocating carriage of a printing press, a burner applied thereto, and means for supplying gas to the burner including a valve operable by vibratory movement imparted thereto by the press, for allowing the flow of gas while the press is running at normal speed and for automatically cutting off the flow of gas when the press stops or runs slowly.

9. In combination, in a printing press and with a movable part thereof, a burner for supplying heat to some part of the press, means for supplying gas to the burner including a valve for controlling said supply, and means, operable by vibratory movement imparted thereto by the press whereby, when the machine is in operation, the valve is unseated and when the machine slows down or is stopped the valve is seated.

10. In combination with a printing press and a movable part thereof, a burner, means for supplying gas to the burner, and means whereby the supply of gas is controlled including a valve mechanism, a part of which is subject to centrifugal action by movement imparted thereto during the operation of the press.

11. A printing press having a heater mounted thereon, means combined with the heater for corralling the heat and delivering the same directly to the sheet, and means, operable by vibratory movement imparted thereto by the press, for controlling the supply of the heat.

12. A printing press embodying an impression cylinder, means for alternately supplying heat to said cylinder and to a sheet thereon, and means for automatically controlling the operations of the heat applying means.

13. In a printing press, a burner tube, means for supplying gas to the burner tube, and valvular means held open by vibratory movement imparted thereto by the press when the press is operating to allow the feed

of gas to the burner tube, and automatically closed by gravity to shut off the feed of gas, when the press is brought to rest.

14. In combination with a printing press having a delivery-carriage at one end and an impression device approximately at the other, a heater arranged in cooperative relation to the delivery device, a heater arranged in cooperative relation to the impression device, and means for automatically controlling the supply of gas to the heaters.

15. In combination with a printing press having a delivery-carriage at one end and an impression means at the other end, and means for heating the sheets at both the impression means and delivery means.

16. In combination with a printing press having a delivery-carriage at one end and an impression means at the other end, and means for heating the sheets at both the impression means and delivery means, said means being mounted upon movable or vibratory parts of the press.

17. In combination with a cylinder printing press and the rotary tympan thereof, a gas heater, and means for associating the heater with the tympan whereby to alternately directly heat the latter and the sheet carried thereby.

18. A heating device for a printing press comprising a burner, a valved gas chamber, and a mixer, means for supplying gas to the chamber, and an automatically operated valve in the chamber adapted to be opened for the passage of gas therethrough to the mixer by the vibration of the press when the press is set in operation.

19. In combination with a printing press having a movable part, a burner secured to the said movable part, a valve for supplying gas to the burner comprising a chamber having a passage therethrough perpendicular to the path of movement of the movable part, and means for automatically closing the passage when the movement of the movable part is either slowed down or stopped.

20. In a printing press, wherein gas is employed to heat a part thereof, a gas chamber interposed in the supply conduit, the walls of the chamber being cylindrical with a partition therein mounted at an angle to such walls, the chamber mounted in such relation to the press as to partake of the vibratory movement thereof, a port in said partition and a ball adapted to close said port when the press is at rest and the ball in the power of gravity, the port arranged out of the path of the rotation of the ball and having an inclined path leading from such path of rotation to the seat of the port, said port being located adjacent the lowest point of the chamber.

21. In combination with a printing press, wherein gas is employed for the purposes of heating and demagnetizing, a gas burner, means for supplying gas to the burner, and valvular means embodying a globular member for controlling the flow of gas to the burner.

Signed by me at New York city, N. Y., this 21st day of November, 1918.

CHARLES H. COCHRANE.

Witnesses:
FLORENCE ATEN IVES,
S. H. OLIKER.