March 3, 1964 M. K. VISSER 3,122,999

CYLINDER HEATING MEANS FOR ROTARY PRINTING PRESS

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Fig. 1

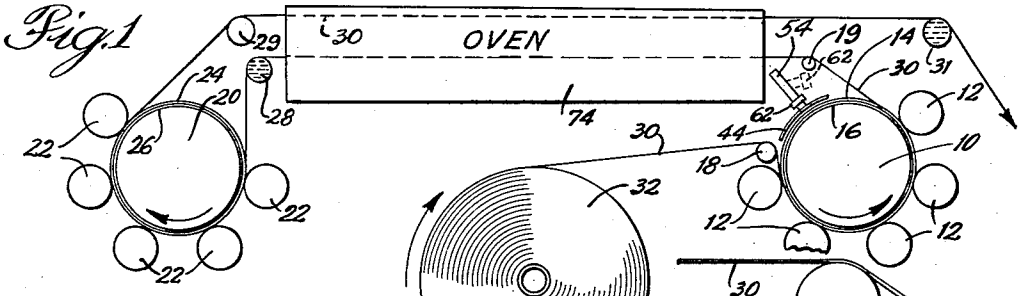


Fig. 2

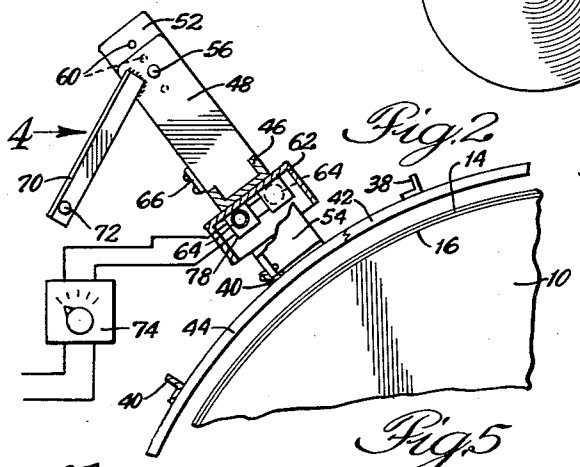


Fig. 3

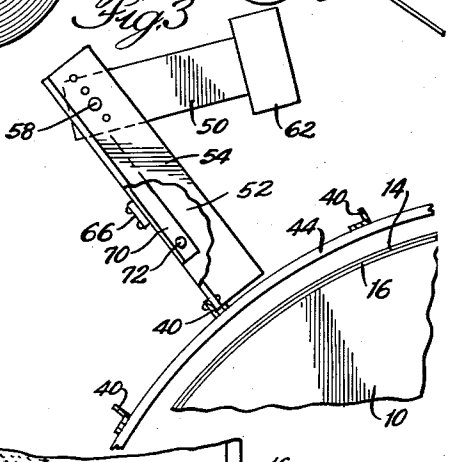


Fig. 5

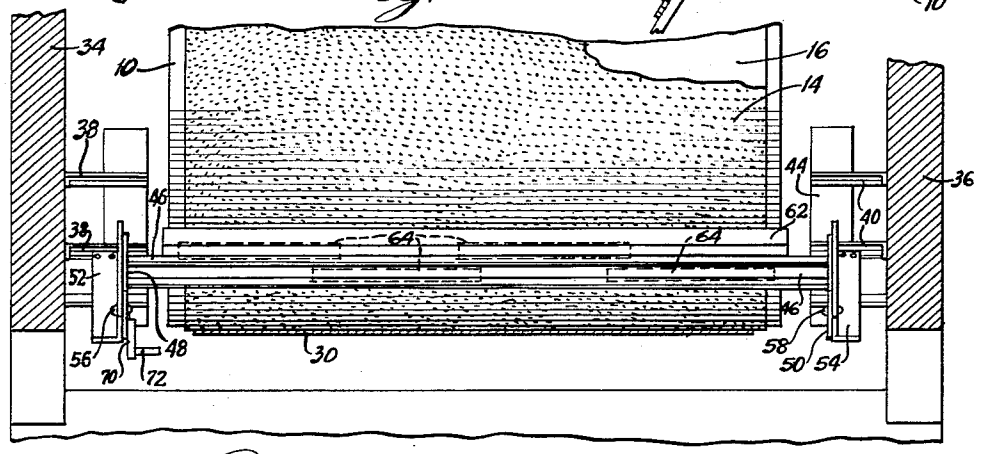
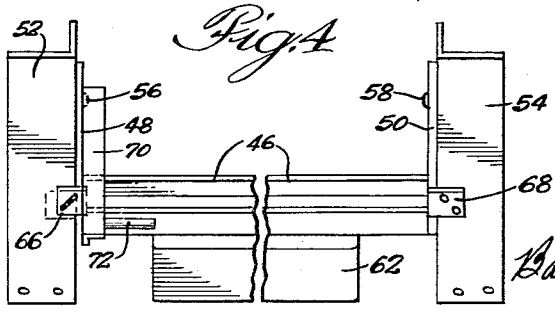


Fig. 4



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CYLINDER HEATING MEANS FOR ROTARY PRINTING PRESS

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This invention relates to a rotary printing press construction of the web-fed type wherein means is provided for heating the packing on the impression cylinder in order to compensate for a cold web initially fed to the impression cylinder from a supply roll, which when cold tends to chill the packing and thus reduce its resiliency.

On most presses there is a gradual loss of impression which necessitates stopping the press after an hour or so run from a cold start in order to insert backing or draw sheets in the form of manila paper or the like under the packing to restore printing impression. Then after a further time run the impression becomes too heavy because of warm up from friction and it is necessary to stop the press in order to remove the backing to thereby readjust the packing for proper printing impression. This has been a persistent, baffling and expensive problem for many years. Secondary problems were caused by the primary problems which is attributed to lack of uniformity in temperature of the packing on the two printing units of a press. It is desirable to have sufficient and uniform resilience of the packing on both units of a printing press the entire period of its running.

One object of the present invention therefore is to provide a simple heating apparatus for the impression cylinder packing of a printing press in the form of electric heat lamps so mounted as to pass heat through the air to the packing on that portion of an impression cylinder between the points of incoming and outgoing web so as not to directly heat the web itself but keep the packing at a predetermined temperature high enough to compensate for a cold web fed to the cylinder. The web is then heated by conduction from the packing and thereby attains a desired operating temperature commensurate with the most efficient functioning of the impression cylinder.

Another object is to provide efficient infra-red heating means in the form of tubular heat lamps or the like which can be positioned uniformly a few inches from a portion of the impression cylinder over which the web is not passing and which will efficiently heat the packing because of the characteristics of heat lamps which generate infra-red energy of the short-wave type that passes through the air with little absorption as distinguished from radiant heaters, steam radiators and the like which generate longer infra-red waves that are absorbed to a large extent by the intervening air and therefore involve double heat transfer, from the radiator to the air and then from the air to the impression cylinder packing. Furthermore at the lamp high temperatures such as 4000° F. are attained, which are efficient and effective, and may be efficiently controlled since the invisible heat energy is projected directly to the object that is to be heated, in this case the packing of the impression cylinder, and then the cold web is heated by conduction from the packing as it comes in contact therewith.

A further object is to provide a support for my heating means which may conveniently be secured to some part of the printing press frame, and to which the heating means may be pivoted in such manner that it can be swung up out-of-the-way for access to the impression cylinder when necessary to remove fouled webs or for other reasons.

With these and other objects in view, my invention consists in the construction, arrangement and combination of

the various parts of my improved rotary printing press construction, and my heating means therefor, whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in detail on the accompanying drawing, wherein:

FIG. 1 is a diagrammatic view of a printing press installation including my heating means for the packing of one of the impression cylinders of the press.

FIG. 2 is an enlarged side elevation of such impression cylinder and adjacent parts of the printing press, together with my heating means shown partially in section.

FIG. 3 is a view similar to FIG. 2 showing the heating means tilted to an out-of-the-way position for access to the impression cylinder.

FIG. 4 is an elevation of my heating means per se viewing FIG. 2 in the direction of the arrow 4 there-adjacent; and

FIG. 5 is a plan view of FIGS. 2 and 4 on a reduced scale.

On the accompanying drawing I show in FIG. 1 the combination of two 5-color printing presses for printing both sides of a web **30**. The first printing press comprises a first-pass impression cylinder **10**, a plurality of printing cylinders **12**, packing **14** on the impression cylinder **10** backed by backing sheets **16**, an in-going guide roller **18** and an out-going guide roller **19**. The second printing press comprises a second-pass impression cylinder **20**, a plurality of printing cylinders **22**, packing **24** on the impression cylinder **20** backed by backing sheets **26**, and in-going and out-going guide rollers **28** and **29** respectively.

The web **30** is fed from a supply roll **32**, over the roller **18**, then around the first impression cylinder **10** to pick up impressions from the printing cylinders **12** on one side of the web, then over the roller **19**, after which it passes through an oven **74** for drying the ink so that the other side of the web can be printed, then over the guide roller **28** which serves also as a cooling or chill roller. Its temperature is regulated by the use of a thermostatic inlet water temperature controller. The chill roller **28** sets the ink and reduces the temperature of the web suitable for printing between the second impression cylinder **20** and its printing cylinders **22**. The web **30** then passes over the guide roller **29** and back through the oven **74** again to dry the printing by the second printing press. The web leaves the oven, passes over a second chill roller **31** and goes to a folder (not shown). The web thus issues from the roller **31** as a web that is completely printed on both sides.

It has been my experience that considerable difficulty and inconvenience as well as waste of time have been involved in the proper printing of the first side of the web **30** by the first-press printing pass cylinders **10** and **12**. During the first few hours of running certain adjustments for the impression cylinder are required, particularly when starting the press after an over night or weekend shut-down. At such time the press is "cold" or at a stabilized temperature substantially the same as room or ambient temperature whereas the best operating temperatures I have found to be between 100° and 110° approximately which is well above room temperature even in the summertime when the press room is not air conditioned. After a few hours operation the friction of the web against the cylinders, and other frictional factors involved, raise the temperature of the press and it may stabilize around 100° or so, but until that temperature is attained I have found it necessary to start the press from a cold start with fewer or thinner backing sheets **16** for proper impression, and then after the press runs for one-half to one hour it begins losing impression so has to be stopped to remove the packing **14** and then place additional or heavier backing sheets **16** thereunder to restore the impression. Again after running for some

time the impression cylinder 10 and the packing 14 warm up from running friction and the impression becomes too heavy. It is then necessary to stop the press, remove some of the backing sheets that were placed on the impression cylinder to restore impression so that the impression can be lightened again when too heavy, and then start and continue to run the press.

I found this necessary in summer as well as winter but more marked in winter especially when the paper is brought in from unheated storage whereupon the problem becomes quite acute. The necessity of changing the backing sheets is then increased and the above steps may need to be repeated more than once.

However on the second-pass impression cylinder 20 the paper web is always warm if not hot. The web comes from the oven or dryer 74 where the ink from the first printing is dried and then travels around the water chilled roller 28 to set the ink before going to the second-pass printing unit. The cooling water in the roller 28 can be regulated so that the web passing over the roller is warm or hot as desired and in accordance with the requirements for greatest efficiency in providing the proper impression and maintaining the same. On the second-pass impression cylinder 20 it has therefore been unnecessary to change the backing sheets 16 as they can be more or less standardized and the packing 24 will be maintained at the proper temperature by the web after passing through the oven and cooler for avoiding either loss of impression or too heavy an impression.

To eliminate the inconveniences referred to in connection with the first-pass impression cylinder 10, I found that a certain heating arrangement for its packing 14 was feasible and I will now describe my heating means therefor.

Referring to FIG. 5, printing press side frames 34 and 36 are illustrated between which the impression cylinder 10 revolves. Supporting brackets 38 and 40 extend from the side frames 34 and 36 in one form of printing press and support cover guards 42 and 44 respectively. These supporting brackets 38 and 40 are suitable for mounting a channel-shaped heat lamp support 46 in such manner as to be movable to an out-of-the-way position when required. For this purpose, the support 46 is secured at its ends to arms 48 and 50 which are pivoted at 56 and 58 respectively to pivot brackets 52 and 54. The pivot brackets 48 and 50 are shown as angle shaped and are secured at their lower ends to one of the supporting brackets 38 and one of the supporting brackets 40 respectively.

A reflector 62 is carried by the heat lamp support 46 and a plurality of heat lamps 64 are mounted therein. These heat lamps may be for instance the so-called "quartz tubular" type in which a heating filament is mounted within a relatively small transparent tube of quartz. It will be noted that the reflector 62 is positioned a few inches from and directed toward the impression cylinder 10 and its packing 14, and the position of the reflector is between the in-going and out-going guide rollers 18 and 19 (see FIG. 1) so that heat rays pass directly to the packing 14 without such heat passing directly to the web 30. Thus the web is indirectly heated by contact with the heated packing. The heat lamps are turned off whenever the press stops to avoid igniting the web 30.

The normal operating position of the heat lamps is as illustrated in FIGS. 2, 4 and 5, and is maintained by the force of gravity pivoting the arms 48 and 50 against the stops 66 and 68. The plurality of openings 60 for the pivots 56 permit some adjustment of the heat lamps toward or away from the packing in order to locate them at the most advantageous position. Since the packing 14 to be heated is on the cylinder 10 it presents a heating area opposite the reflector 62 which may be uniformly heated by a number of the tubular type heat lamps 64 having their mounted ends overlapped as shown

dotted in FIG. 5. The tubes run parallel to the heating surface referred to and thus each running inch of heating means passes substantially the same heat such as that produced by 100 watts of electrical energy to the packing 14 to uniformly heat it, and to effectively heat it even though its surface speed is relatively high.

At times it is necessary to gain access to the impression cylinder 10 for removing jammed web or for repairs, and in that case the heat lamps can be tipped up to the position shown in FIG. 3. For this purpose a lever 70 extends from the arm 48 and has a handle 72. The lever 70 may be swung from the position shown in FIG. 2 to the position shown in FIG. 3. The stop plate 66 can be moved out of the way to the dotted position shown in FIG. 4, and after the lever 70 is moved to the FIG. 3 position can be slid back to the solid line position to serve as a stop for the lever to hold the lamps in the position shown. The plate 66 is mounted on the pivot bracket 52 by means of inclined slot and pin connections as shown in FIG. 4 for this purpose and may be frictionally held in either position dotted or solid as illustrated. When the reflector 62 is in the position of FIG. 3 it also facilitates replacement of the heat lamps 64 which are usually provided with terminals at their ends coacting with brackets 78 supported by the reflector 62 as shown in FIG. 2.

I have found that heat applied to the packing 14 of the first-pass printing cylinder 10 by the heating means which I disclose is very efficiently absorbed by the packing without any pre-warming period required. The heat lamps maintain a substantially constant temperature for the packing which operates best in the temperature range of 100° to 110° F. for certain types of packing formed of rubber or neoprene with woven cotton or nylon backing next to the backing sheets 60. Some of these packings have minute glass beads cemented to their outer surface and some do not. There are other types of packing that are also benefitted by the application of heat and require different temperatures for most efficient operation, mostly in the field of greater resilience, to produce satisfactory impressions without loss of impression due to operating at too low a temperature.

I have found the lamps 64 keep the packing 14 on the first-pass printing unit at a relatively uniform temperature and maintain the temperature in a range comparable to the packing 24 of the second-pass printing unit. Room temperature and paper roll temperature influence the temperature of the packing 14. In warm weather room temperature seems to influence packing temperature more than paper roll temperature whereas the reverse seems to be true in cold weather. I have found it advantageous to use the heat lamps 64 in warm weather as well as cool weather because of the substantially uniform temperature that can be held and thus any adjustment in the thickness of the backing 16, once the proper thickness has been determined, is entirely eliminated, thus saving time and web that would have to be discarded because of improper impression.

In connection with the second-pass printing unit and its impression roller 20 and printing rollers 22 the desirable temperature range between 100° and 110° can be maintained by the proper setting of the thermostat for the chill roller 28, the web 30 issuing from its lower pass through the oven 74 at a temperature well above the desirable temperature for passage of the web between the cylinders 20 and 22. The oven 74 itself produces temperatures as high as 600° F. but as long as the web 30 passes through the oven at high speed it does not become ignited. It attains a temperature however well above 110° and therefore requires the cooling roller 28 to reduce the temperature to that suitable for printing the second side of the web. The chill roller 31 may then be used if desired to reduce the temperature of the web 30 issuing from its upper pass through the oven 74.

With cold paper the first unit packing is primarily in-

fluenced by the web temperature and secondly by room temperature. Rubber is affected by heat, being more resilient when warm than when cold. Of course there are different degrees of resiliency depending on the composition of the packing, and rubber that is too resilient is not suitable. Packing must maintain uniform overall thickness and have a short recovery time after compression (on high speed presses about one-tenth second). It is therefore important to match the two (14 and 24) packing temperatures and I have found that the application of heat as herein disclosed does this in an economical, time-saving and convenient manner. Quality printing in both the first-press and second-press units is consequently attainable even when the temperature of the roll 32 is low.

An adjustable interval timer 75 (see FIG. 2) may be used to alternately turn the lamps 64 on and off over various periods of time to regulate the temperature in hot weather but usually are not needed in cold weather. The timer 74 is of the type having on and off intervals adjustable in relation to each other and may also have adjustment of cycling frequency. By bringing the packing temperature up to that for best printing the problem of loss of impression on starting a press after an extended shut-down is entirely eliminated and no down time is required to change backing sheets.

Some changes may be made in the construction and arrangement of the parts of my improved rotary printing press construction and the steps of my method may be varied to some extent without departing from the real spirit and purpose of my invention. It is accordingly my intention to cover by my claims any modified forms of structure, use of mechanical equivalents or use of mechanically equivalent steps of my method which may reasonably be included within their scope.

I claim as my invention:

1. In a rotary printing press construction, the combination with a first-pass impression cylinder and printing cylinders associated therewith, a second-pass impression cylinder and printing cylinders associated therewith and drying means for a web from said first-pass impression cylinder to said second-pass impression cylinder, said first-pass impression cylinder having packing thereon adapted to coact with the in-going portion of the web at one point on the circumference of said cylinder, with the out-going portion of said web at another point on said circumference and with said web on a circumferential portion of said packing between said points, heating means for the remaining portion of said packing not traversed by said web, said heating means being arranged parallel to and spaced from a corresponding portion of said first-pass impression cylinder, means to direct heat from said heating means directly toward said corresponding portion, thereby to stabilize temperature, web shrinkage and resiliency at said first-pass impression cylinder with respect to the same at said second-pass impression cylinder, and means for mounting said heating means on the frame of the printing press.

2. A rotary printing press construction according to claim 1 in which said last means includes pivoting means to permit said heating means to assume an inoperative out-of-the-way position.

3. A printing press construction in accordance with claim 2 wherein said pivoting means is adjustable toward and away from said first-pass impression cylinder.

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