H. A. W. WOOD.

MEANS FOR PREVENTING VIBRATION OF PRINTING PRESS CYLINDERS.

APPLICATION FILED JULY 17, 1918.

1,417,652. Patented May 30, 1922.

Fig. 1.

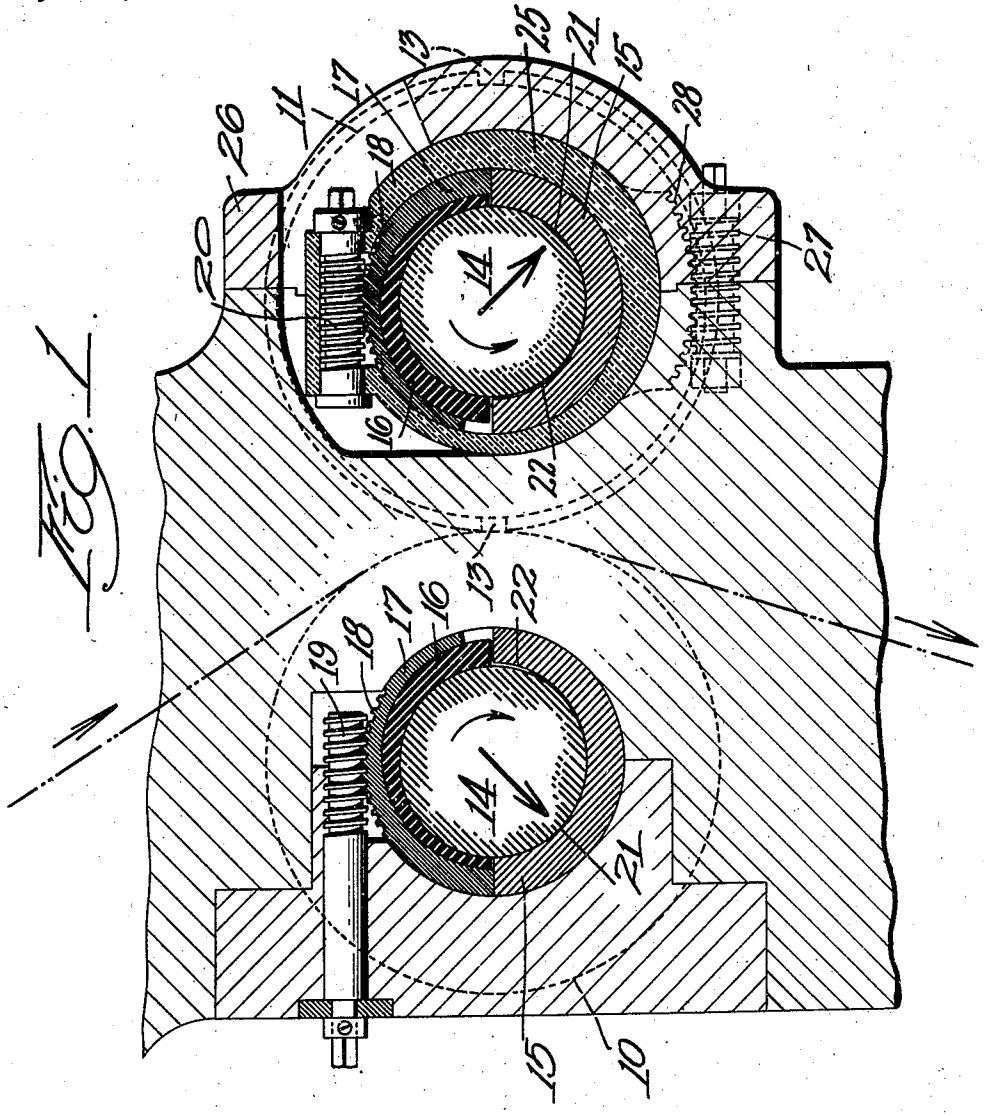
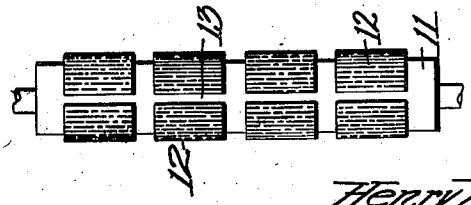


Fig. 2.



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MEANS FOR PREVENTING VIBRATION OF PRINTING-PRESS CYLINDERS.

1,417,652. Specification of Letters Patent. Patented May 30, 1922.

Application filed July 17, 1918. Serial No. 245,344.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Means for Preventing Vibration of Printing-Press Cylinders, of which the following is a specification.

This invention relates to the prevention of "guttering" when printing at high speed on a rotary printing press. This is caused by the fact that when the margin between two plates is being passed, the cylinders are relieved of pressure for a moment. Therefore they spring and the impression cylinder strikes heavily upon the heads of an oncoming series of plates on the other cylinder, provided the plates are arranged symmetrically along the cylinder. The vibration caused by this action produces dark and light bands on the printing, sometimes embosses the printing, and even fractures the web occasionally.

Provisions have been made heretofore to offset this difficulty, but such means as I am familiar with are not sufficient when operating at very high speeds, that is speeds above the maximum now employed practically in newspaper printing plants.

It is the object of this invention to prevent this guttering at all speeds and to do it in a simple and inexpensive manner. These objects I secure by positively preventing the printing cylinders from springing toward each other when the margins pass, as will appear, or away from each other.

Reference is to be had to the accompanying drawings, in which—

Fig. 1 is a sectional view through the journals of a printing couple illustrating one way in which the invention can be carried out, and showing a preferred embodiment of the mechanism therefor, and

Fig. 2 is a view of a printing plate cylinder showing the plates thereon in their usual position.

When the plates along the length of the plate cylinder are set in axial line, all their margins correspond. Thus twice in the revolution of such a cylinder it will be relieved of all printing strain, when it passes over the margin from one set of plates to another. This relief from strain causes damage to the printing at high speeds, owing to the fact that the impression cylinder, when suddenly relieved from strain, springs into the margin and strikes heavily upon the heads of the oncoming series of plates. This throws the cylinder out and sets up a vibration in the cylinder, which does not settle down until the cylinder has traveled several inches from the margin. This vibration shows upon the prints in light and dark bands, varying in "color" with the weight of the blow which the cylinder delivers to the printing, due to its vibration.

Press builders have resorted to the practice of staggering their plate margins. This consists in moving the plates at one side of the press a little forward or back of the position of the plates at the other side of the press, so that the axial margins shall not run continuously the full length of the cylinder.

Thus when the margin at one end of a cylinder is passing the impression point, the other end of the cylinder is under the strain of printing, and so the cylinder is less apt to spring into the margin and set up a vibration.

But as still higer speeds are approached, higher than those which are now usually used, it has been found that staggered plates are not a remedy; that the cylinder will nevertheless spring into a margin, even if it be only half-length, and set up a vibration. Also, the fact that when a half-width web is run the cylinder is not prevented from "dropping" into the margin by any supporting plates, further intensifies the difficulty.

These two facts prevented obtaining acceptable printing at much above the ordinary speeds of today, until I discovered this method whereby I can prevent the cylinders from springing into the margins at all.

I have observed that a little wear in the boxes causes the "guttering." When it is perceived that a sheet of newspaper is but 3/1000 of an inch thick, it is apparent that only a few thousandths of an inch of lost motion occurring in a cylinder bearing will permit the type to bury itself into the sheet, to the extent of embossing it, and sometimes of fracturing it, and that as the intensity of printing depends upon the degree of pressure applied, the printing will be marred by the embossing effect referred to.

Now I have discovered that the correct

solution of the problem lies, not in taking up the lost motion of a box which is an extremely difficult matter to do with accuracy, but in positively holding the cylinder journal constantly in contact with the work-side of its box, so that whatever lost motion there may be at the other side of the journal box the journal is prevented from taking advantage of it. Springs are avoided to get positive action.

By the employment of this invention, I have been enabled to run at speeds two and a half times that of present press speeds without the trouble referred to, and I can run at my full speed a half-width web, and print it as cleanly as a full-width web.

Referring now to the drawings, it will be seen that I have shown the invention as applied to a rotary printing press having an impression cylinder 10 and a plate cylinder 11. On the latter cylinder the plates 12 are shown as arranged in the old way, namely, with their heads in alignment so that there is a longitudinal gutter 13 at the margins thereof. It will be understood, however, that the plates can be staggered as mentioned above, if desired, without departing from this invention.

The two journals 14 of the respective cylinders are supported by the frame in semi-cylindrical bearings 15. The upper half bearing, instead of being formed in a single piece, is formed of two parts, both of a curved wedge shape; the inner one 16 constituting a bearing proper and providing a circular wedge-shaped shoe; and the outer one 17 acting as a take-up shoe. The take-up shoe 17 is provided with a rack 18 on its surface in each case, and these four racks are operated by screws 19 and 20 respectively designed to turn the shoe for the purpose of keeping the journal against the working side of the bearing. It is to be noted that the upper half 16 of the journal box, constituting the bearing for the top of the journal, holds the journal in each case away from the other printing cylinder. This is for the purpose of preventing the cylinders springing together when the margin 13 passes. The wedge 17 is of course adjusted by its screw so as to hold the bearing member 16 in such position that the journal will bear at all times against the working surface of the bearing 15, and as the wear in these journal boxes develops at the points 21 the upper bearing members 16 will be adjusted rearwardly by the action of the wedge 17 so as to follow up the journals. In this way, wherever the wear may be, it will not show itself in the form of a rebound of the cylinder during the passage of the margin.

The points 21 above mentioned are located at the ends of two arrows on the drawings, which are intended to represent the direction of the resultant of two forces, cylinder gravity and printing pressure. It is not intended here that any definite angle should be stated for this direction, but it is obvious that if the cylinders were run without any impression the pressure on the journal box would be downwardly and the consequent wear would be at the bottom. The printing pressure taken by itself, however, is exerted horizontally so that the wear from that would be at the rear side of the journal box. Assuming that the printing pressure with a full set of plates is about equal to the weight of a solid cylinder, the resultant direction of pressure would be about forty-five degrees outwardly from the lower center line, as indicated by these straight arrows. Therefore, the wedge-shaped bearing member 16 is designed to hold the journal over against the portion of the box marked 21. It is to be noted also that as the wear develops at the point 21, the wedge-shaped bearing 16 will compel the cylinder journal to follow it up. Therefore the lost motion resulting from the wear will never be found at the point 21, but at an opposite point on the lower side of the journal box, as indicated at 22 where the clearance is shown. A large amount of wear at this point will not interfere with the proper operation of the machine because the upper member 16 is pushed over by the wedge 17 so as to prevent the journal seating back in the clearance 22, but the journal is always kept positively in contact with the bearing member 15 at the point 21.

What has been said above applies to both of the cylinders, and it will be understood that both of them should be constructed in this way for securing the best results. It is apparent, however, that as the wear increases each cylinder will be pressed further away from its companion cylinder. This must be remedied, which is provided for by adjusting one of the bearings as a whole toward its companion cylinder. Only one of them need be so adjusted.

For this purpose an impression mechanism is provided in the form of an eccentric box 25 located in a cylindrical cavity in the side frame 26 and carrying the whole system on one side of the press. As this box 25 is eccentric, it can be adjusted by a screw 27 meshing with a rack 28 projecting from its side or bottom. In this way, one of the boxes is adjusted as a whole toward the other to compensate for the adjustments in the opposite direction produced by operating the screws 19 and 20. The screw 27 and the screw 19 are mounted in the frame of the machine, but the screw 20 is attached to and carried by the box 25 and moves with it, of course. In order to provide access to the screw 20, an opening is made in the top of the side frame 26.

I have found in practice, as stated above, that by thus holding the two elements of the couple positively at the same distance apart during the time they pass the margins and during the true printing operation, that is, at the times of minimum and maximum strain, I absolutely prevent the springing of the cylinders toward and from each other, and thus prevent vibration and guttering. This is particularly important in attaining speeds higher than those now in common use, and in fact permits of a very great speeding up of the presses of today. Yet the mechanism, as shown, is comparatively simple. The method of accomplishing the result is not limited to this mechanism, but its principles are so simple that it can be attained in other mechanical ways without departing from the scope of this invention as set forth in the claims.

Therefore I do not wish to be limited in these respects, but what I do claim is—

1. In a rotary printing press, the combination with the printing couple, of means for maintaining the centers of the printing couple continuously at the same distance apart to prevent margin guttering, and means for taking up the wear on the bearings of the journals of the cylinders, whereby the guttering will be prevented independently of the wear of the bearings.

2. In a rotary printing press, the combination with one member of the printing couple having bearings, and journals for said bearings, of means for forcing said member over in its bearings away from the other member of the couple and holding the journals firmly against the sides of its bearings throughout its entire revolution for preventing vibration and guttering due to the wear on the bearing surfaces.

3. In a rotary printing press, the combination with one member of the printing couple having bearings, and journals for said bearings, of means for forcing said member over in its bearings away from the other member of the couple and holding the journals firmly against the sides of its bearings throughout its entire revolution for preventing vibration and guttering due to the wear on the bearing surfaces, and means for adjusting the bearing surfaces to vary the distance between the members of the couple to compensate for the motion of said member when the journals have worn.

4. In a rotary printing press, the combination with one of the cylinders of a printing couple, of means for maintaining said cylinder in one definite position throughout its rotation independently of the pressure to which any point on its circumference is subjected, said means being adjustable to take up wear.

5. In a rotary printing press, the combination with one of the cylinders of a printing couple, of adjustable means for forcing the journal of said cylinder backwardly away from the other cylinder to maintain said cylinder in one definite position throughout its rotation independently of the pressure to which it is subjected, said means being also adjustable to maintain firm contact on both sides of the journal after the bearing is worn.

6. In a rotary printing press, the combination with a printing couple consisting of impression and plate cylinders having journals, of boxes for said journals, and means cooperating with said boxes for forcing said cylinders against the working sides of their boxes which receive the wear and holding them positively in that position to prevent their springing toward each other.

7. In a rotary printing press, the combination with a printing cylinder having journals, of boxes for said journals, each of said boxes comprising a semi-cylindrical lower bearing member for supporting the bottom of its journal, an upper bearing member for engaging and steadying the top of said journal, and means for adjusting the upper member laterally.

8. In a rotary printing press, the combination with a printing cylinder having journals, of boxes for said journals, each of said boxes comprising a semi-cylindrical bearing member for engaging one side of its journal, an opposite bearing member for engaging and steadying the other side of said journal, and means for adjusting one member in a radial direction along the edge of the other bearing member.

9. In a rotary printing press, the combination with a printing cylinder having journals, of boxes for said journals, one of said boxes comprising a semi-cylindrical lower member for supporting the bottom of its journal, an upper member of semi-cylindrical wedge shape, and a similarly shaped but oppositely located wedge.

10. In a rotary printing press, the combination with a printing cylinder having journals, of boxes for said journals, one of said boxes comprising a semi-cylindrical lower member for supporting the bottom of its journal, an upper member of semi-cylindrical wedge shape and a similarly shaped but oppositely located wedge, and means for moving the wedge circumferentially to take up any wear and keep the journal against the rear or wearing face of the lower half of the box.

11. In a rotary printing press, the combination with one of the cylinders of a printing couple having a journal, of a box for said journal comprising two half members, one movable independently of the other in a lateral direction, the movable half having an eccentric cylindrical outer surface, a semi-circular wedge fitting said outer surface and having a rack on the outer circum-

ference thereof, and an adjusting screw for operating the rack and adjusting said half of the box to positively keep the journal in contact with one surface of the other half of the box and prevent vibration.

12. In a rotary printing press, the combination with one of the cylinders of a printing couple having a journal, of a box for said journal comprising a lower half for receiving the journal and an upper half movable independently of the lower half in a lateral direction, the upper half having an eccentric cylindrical outer surface, a semi-circular wedge fitting said outer surface and fitting the interior of the outer box and having a rack on the outer circumference thereof, an adjusting screw for operating the rack and adjusting the upper half of the box, an outer box for receiving the two semi-cylindrical members and having an eccentric outer surface and an inner surface concentric with the journal, means for supporting the outer box, and means for swinging said outer box in its support to move the journal bodily in a lateral direction.

13. In a rotary printing press, the combination with one of the cylinders of a printing couple having a journal, of an outer box having an eccentric outer surface and an inner surface concentric with the journal, a lower half bearing member for receiving the journal and an upper half bearing member movable independently of the lower half in a lateral direction, both located in said box, the upper half having an eccentric cylinderical outer surface, a semi-circular wedge fitting said outer surface and fitting the interior of the box and having a rack on the outer circumference thereof, an adjusting screw for operating the rack and adjusting the upper half of the box, means for supporting the outer box, and means for swinging said outer box in its support to move the journal bodily in a lateral direction opposite to that in which the journal is moved by said wedge.

14. In a rotary printing press, the combination with a printing couple consisting of impression and plate cylinders having journals, of boxes for said journals, means cooperating with said boxes for forcing said cylinders apart to take up the wear, an eccentric box in which one of said boxes is located, and means for turning said eccentric box to move its journal inwardly to compensate for the adjustment of both of the first-named boxes.

15. In a rotary printing press, the combination of one of the cylinders of a printing couple having bearings for its journals, with blocks within the bearings adjustable to keep each journal firmly against the opposite working surface of its box, irrespective of the pressure to which any point on the circumference of the cylinder is subjected.

In testimony whereof I have hereunto affixed my signature.

HENRY A. WISE WOOD.