Feb. 15, 1944. H. J. LUEHRS 2,341,636

WEB FEED ROLL

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Fig. 1.

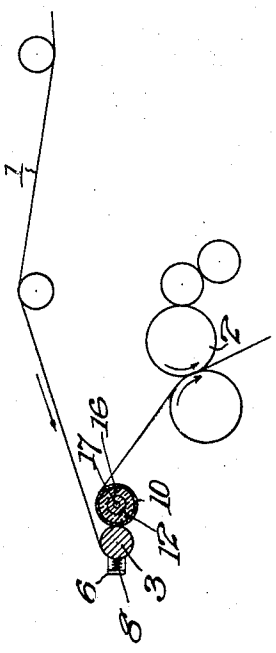
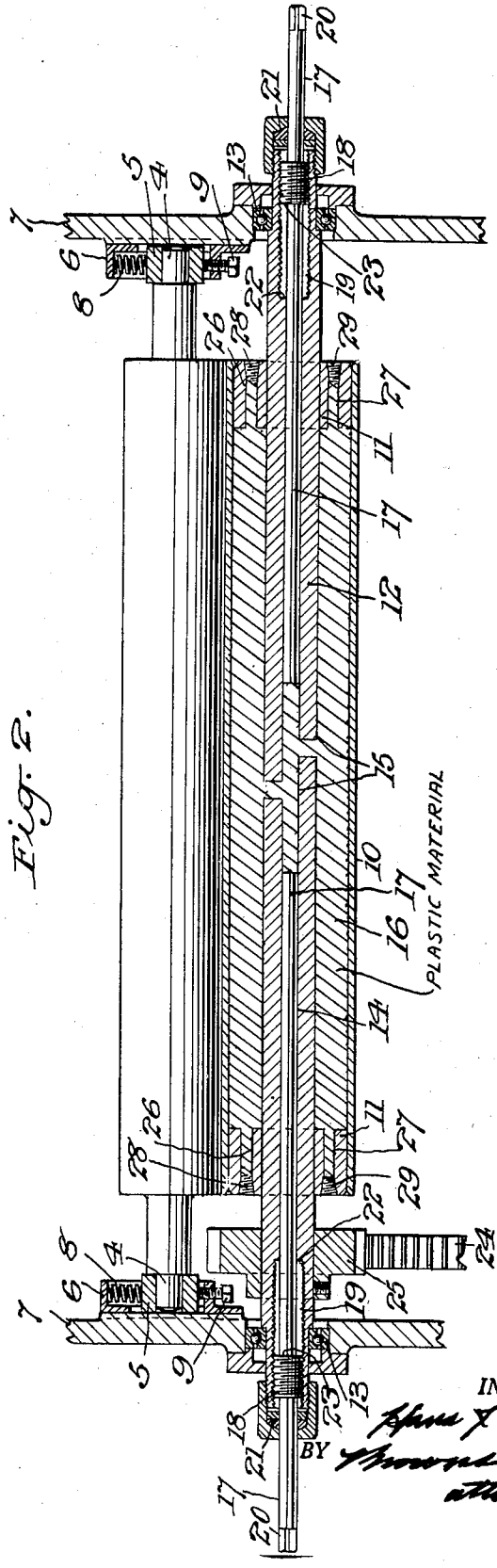


Fig. 2.



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WEB FEED ROLL

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10 Claims. (Cl. 271—2.3)

My invention is directed to means for varying to a slight degree the effective diameter of a web pressure feed roll to obtain the greatest accuracy in the surface speed of the web controlled by said feed roll.

My invention is more particularly directed to a feed roll having an elastic metal shell, said roll being provided with means for changing the pressure within the shell for causing the expansion or contraction of the shell to slightly increase or diminish the effective diameter of the feed roll.

My invention comprises a web pressure feed roll of the above character in which the elastic metal shell is filled with a non-compressible air free plastic material which may be displaced by one or more longitudinally disposed plungers projecting into the plastic material and adjustable for displacing it to a greater or lesser degree to cause the expansion of the shell for slightly increasing the effective diameter of the feed roll to the desired extent.

My invention also comprises a feed roll of the above character having an axially arranged hollow shaft in the bore of which the plastic material displacing plungers are movable, said bore being open to the interior of the shell about midway between the ends of the roll, means being employed for limiting the inward movement of the plungers before the elastic limit of the shell is reached.

My invention also comprises a web pressure feed roll of the above character in which provision is made for filling the roll with the non-compressible plastic material in a liquid form and the provision of means for permitting the escape of all air from within the roll while the roll is being filled.

My invention also comprises a pair of coacting feed rolls, fixedly and yieldingly mounted respectively, in which the fixedly mounted roll includes means for expanding the roll to slightly increase its diameter.

A practical embodiment of my invention is represented in the accompanying drawing, in which

Fig. 1 represents in cross section one of my improved pressure feed rolls in connection with its coacting pressure feed roll and illustrating in diagram the traveling web and a rotary printing unit; and

Fig. 2 represents on a greatly enlarged scale a top plan view, partly in longitudinal central section, of the pair of coacting feed rolls.

The traveling web is denoted by 1 and a printing unit by 2. The yieldingly mounted web pressure feed roll is denoted by 3, which roll has its journals 4 mounted in yielding bearings 5 carried by mountings 6 secured to the side frames 7. Coil springs 8 interposed between the mountings 6 and the bearings 5 serve as the means to yieldingly press the feed roll 3 toward its coacting web pressure feed roll. Adjustable set screws 9 carried by the mountings 6 engage the bearings 5 to limit the movement of the feed roll 3 toward its coacting feed roll.

The fixedly mounted web pressure feed roll is shown as comprising an elastic metal shell 10 having closed ends formed by collars 11 on a hollow shaft 12, the outer ends of which shaft form journals which are rotatably mounted in fixed bearings 13 in the side frames 7. The bore 14 of this hollow shaft is open to the interior of the shell 10 as by holes 15 located about midway between the ends of the roll.

The means for expanding the shell to slightly increase the diameter of the roll are herein shown as comprising the following elements.

The feed roll is completely filled with a non-compressible air free plastic material 16, of grease, paraffin, or other suitable solid material. Longitudinally adjustable plungers 17 closely fit the bore 14 of the shaft 12, their inner ends being normally separated upon opposite sides of the holes 15. These plungers are provided with exteriorly screw-threaded portions 18 which engage interiorly screw-threaded portions 19 in the bore of the hollow shaft 12. These plungers may be longitudinally adjusted by providing their exterior ends with angular portions 20 for receiving a wrench or other suitable tool for turning them. The plungers may be provided with packing boxes 21 engaging the shaft 12, if found necessary.

To limit the inward movements of the plungers 17, shoulders 22 are provided at the inner ends of the interiorly screw-threaded portions 19 in the bore of the shaft 12, which shoulders are arranged to engage shoulders 23 at the inner ends of the exteriorly screw-threaded portions 18 of the said plungers 17.

The fixedly mounted pressure feed roll may be driven through the gears 24 and 25. This fixedly mounted web feed roll is shown as provided with means for permitting insertion of the non-compressible plastic material, preferably in its liquid form, and the escape of air, it being essential that all air be removed from the roll when it is filled with the said plastic material. In the present instance, for convenience, each end 11 of the roll is provided with a plugged filling hole 26 and a plugged air escape hole 27 so that the roll may be filled from either end. Suitable screw plugs 28

and 29 may be provided for these holes 26 and 27.

In operation, if it be desired to slightly increase the diameter of the feed roll, one or both of the plungers 17 may be turned to move further into the non-compressible plastic material 16 to displace the material outwardly from the bore of the hollow shaft through the holes 15 to expand the shell and thereby slightly increase the effective diameter of the roll. It should be understood that this shell should not be expanded to a point beyond its elastic limit, so that when it is desired to decrease the diameter of the roll by the partial withdrawal of the plungers the tendency of the shell to return to its normal condition will cause the plastic solid material 16 to be forced back into the bore of the hollow shaft between the inner ends of the said plungers.

By providing an expansible feed roll of the character herein set forth it will be seen that the diameter of the feed roll may be varied to points up to the elastic limit of the shell, to slightly vary the speed of the web for any purpose desired, such, for instance, as for controlling its register through the different printing units of a printing press.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but what I claim is:

1. A web feed roll comprising an elastic metal shell having closed ends, a filling of non-compressible plastic material for the shell, and means movable within the shell and operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

2. A web feed roll comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell, said shell being mounted on said shaft, a filling of non-compressible plastic material for the shell and shaft, and means within the shaft operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

3. A web feed roll comprising an elastic metal shell having closed ends, a filling of non-compressible air free plastic material for the shell, and means movable within the shell and operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

4. A web feed roll comprising an elastic metal shell having closed ends, a filling of non-compressible plastic material for the shell, and means movable within the shell and operable to displace the filling for expanding the shell to slightly increase the diameter of the roll, said roll being provided with means permitting insertion of the filling and escape of air.

5. A web feed roll comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shell being mounted on said shaft, a filling of non-compressible plastic material for the shell and shaft, and a longitudinally adjustable plunger in the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

6. A web feed roll comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shell being mounted on said shaft, a filling of non-compressible plastic material for the shell and shaft, a longitudinally adjustable plunger in the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll, and means for limiting the inward movement of the plunger.

7. A web feed roll comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shell being mounted on said shaft, a filling of non-compressible plastic material for the shell and shaft, and longitudinally adjustable plungers in the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

8. A web feed roll comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shell being mounted on said shaft, a filling of non-compressible plastic material for the shell and shaft, longitudinally adjustable plungers in the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll, and means for limiting the inward movements of the plungers.

9. A pair of coacting pressure web feed rolls, stationary bearings for one of the rolls and yielding bearings for the other roll, the roll having the stationary bearings comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shaft forming journals for the roll, a filling of non-compressible plastic material for the shell and shaft, and longitudinally adjustable plungers extending from points exterior to the roll into the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll.

10. A pair of coacting pressure web feed rolls, stationary bearings for one of the rolls and yielding bearings for the other roll, the roll having the stationary bearings comprising an elastic metal shell having closed ends, a hollow shaft having its bore open to the interior of the shell about midway between its ends, said shaft forming journals for the roll, a filling of non-compressible plastic material for the shell and shaft, longitudinally adjustable plungers extending from points exterior to the roll into the bore of the shaft, operable to displace the filling for expanding the shell to slightly increase the diameter of the roll, and means for limiting the inward movements of the plungers.

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