

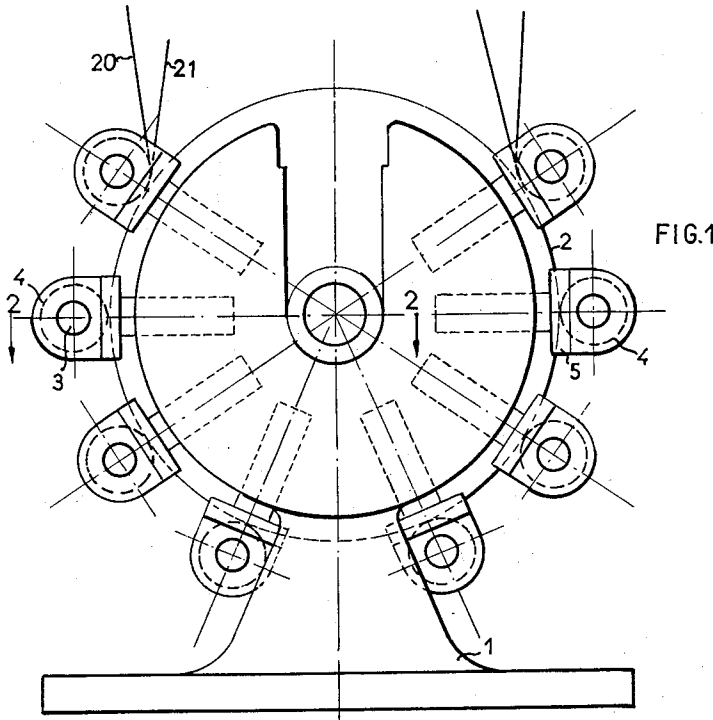
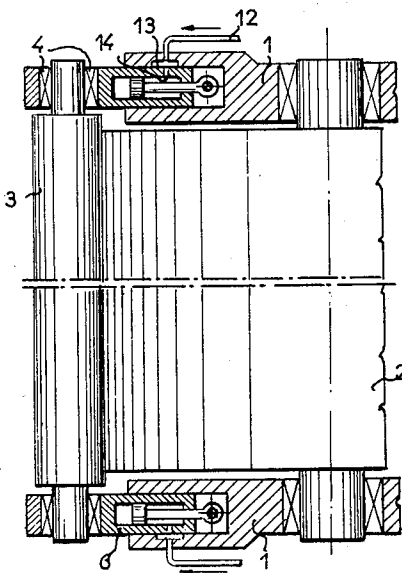
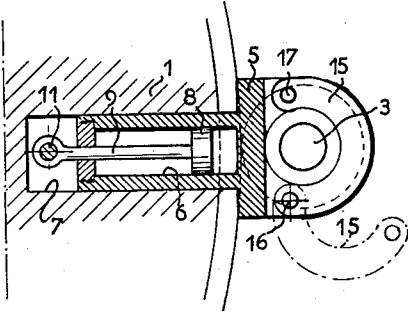
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PRINT ROLL SUPPORT MEANS FOR ROTARY PRINT MACHINES

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PRINT ROLL SUPPORT MEANS FOR ROTARY PRINT MACHINES

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This invention relates to machines for printing fabrics and the like, of the type having print rolls, in rolling engagement against a backing cylinder, to print in one or more colors a sheet material such as a textile fabric.

In most of the known machines of this type, the print rolls are supported, guided and urged towards the backing cylinder by means carried on sub-frames radially located outside said rolls. These sub-frames are cumbersome, fragile and, moreover, they definitely limit the diameter of the print rolls.

An object of the invention is to provide a particular mounting of the print rolls of a machine of the type described, wherein the means for operating the print rolls and yieldably urging them towards the backing cylinder have all their fixed parts located nearer the axis of the machine than the periphery of the backing cylinder, which eliminates ipso facto all the drawbacks of the aforesaid sub-frames.

In particular, this arrangement permits mounting on the machine print rolls whose diameter may vary between wide limits.

In a previously proposed rotary print machine of this type, each print roll is journaled at both ends in the outer ends of two connecting-rod members, the inner end of which is pivotably mounted on the shaft which carries the backing cylinder. This known arrangement is cumbersome and not conveniently adapted to the requirements of a rotary print machine having a great number of print rolls angularly spaced around the backing cylinder.

Another object of the invention is to provide a rotary print machine of the type described, wherein the print rolls are directly mounted in the frame of the machine.

Now, the high pressure required between each print roll and the backing cylinder requires that each print roll bearing be urged towards the backing cylinder by a force of several tons, which implies unitary pressures of, say, 150 kg./cm.² (2,000 p.s.i.) when hydraulic means are used for this purpose, together with safe radial guiding of the rolls on strong sliding members.

If a conventional cylinder-and-piston device were used for urging the print rolls towards the backing cylinder, the cross-section of the piston rod should have to be much smaller than the cross-section of the cylinder, in order to provide a sufficiently large annular area to be acted upon by the pressure fluid. The piston rods, therefore, could not possibly support the heavy weight of the print rolls unless the cylinders be given a prohibitive size.

If a solid plunger were used, then it would be necessary to draw it by a vacuum action and the forces obtained would be much too weak.

According to the invention, each print roll is journaled at each end in a supporting hollow structure, slidably mounted for to-and-fro movement in a bore of the machine frame extending substantially in the direction of the axis of the central backing cylinder, said hollow structure being designed as a pressure fluid cylinder containing a fixed piston which is connected to the machine frame,

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the fluid connections being such that said hollow structure is urged by said fluid towards the backing cylinder.

This arrangement permits accommodating a considerable number of print rolls around the backing cylinder without interference, owing to the comparatively small overall dimensions of the pressure fluid devices. Nevertheless, the diameter of the bores in which the reciprocable structures are mounted can be as large as necessary to obtain the desirable rigidity of the print rolls mounting.

Another object of the invention is to connect each piston rod to the machine frame through a calibrated yieldable connection, e.g. a frangible connection, so that any excessive pressure between a print roll and the backing cylinder is precluded and any damage to the machine prevented.

These and other objects of the invention will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic side elevational view of a continuous fabric printing machine according to the invention;

Fig. 2 is a fragmentary horizontal sectional view taken on line 2-2 of Fig. 1, and

Fig. 3 is an enlarged sectional view of a detail of Fig. 1.

The continuous fabric printing machine diagrammatically shown in the drawings comprises a frame 1, in which a backing cylinder 2 is rotatably mounted. Print rolls 3, eight in number in the embodiment illustrated, are pressed against the cylindrical surface of the backing cylinder 2 through the fabric 20 to be printed and an intermediate fabric 21.

Each end of each print roll 3 is journaled in a bearing 4, preferably a needle bearing.

Each bearing 4 is secured on a supporting head 5 rigid with an elongated movable cylinder 6 which is mounted for sliding movement, in a substantially radial direction with respect to the backing cylinder, in a bore 7 provided in the frame 1. A fixed piston 8 is contained in the cylinder 6 and provided with a rod 9 extending through the inner head of the cylinder 6 and connected by its end to the frame 1, for instance by means of a pin 11. A pressure fluid, for instance pressure oil, is introduced between the piston 8 and the inner end of the cylinder 6 through any suitable fluid conducting means well known to the art, such as diagrammatically represented by a pipe 12 opening into a recessed portion 13 of the bore 7. The recessed portion 13 communicates with one side of the cylinder 6 through a port 14 in the lateral wall of said cylinder. Upon pressure oil being sent into the two pipes 12 associated with that pair of bearings which supports a given print roll 3, both corresponding movable cylinders 6 are moved inwardly and firmly apply the said roll 3 against the backing cylinder 2. In order to facilitate removal and mounting of the roll 3, provision is made, in the embodiment represented, of a type of bearing having one half 15 hinged as at 16. A pin 17 permits locking the two halves of any bearing 4 into a complete bearing. In Fig. 3, there is indicated in dot-dash line a bearing 4 represented in open position in which it permits mounting or removing a print roll.

It is desirable that each print roll 3 be provided with separate pressure fluid supply means, so that the pressure may be adjusted to suit the individual requirements of each of said rolls.

It will be readily understood that the particular arrangement of the print rolls supporting means described hereinabove provides a structure which is very simple, sturdy and compact, while permitting easy removal and mounting of the rolls and easy access to the different parts of the machine. Furthermore, this arrangement makes it possible to use rolls of various diameters considerably differing from one another, since there are no outer sub-

frame structures, so that nothing limits the possible protrusion of the print rolls.

It is thus possible, for instance, to substitute $n/2$ rolls of large diameter for the n standard rolls of a conventional machine.

Furthermore, the bearing supports according to the invention are guided by mere cylindrical bores which are much more readily machined with the required degree of accuracy than the conventional slide-ways of the sub-frames of the old designs. Moreover, such cylindrical bores remain efficient as guiding means a longer time than said conventional slide-ways.

In an embodiment, the connection 11 between the piston rod and the frame is so designed as to yield in case of an excessive over-load between the backing cylinder and one or several print rolls, e.g. when an extraneous body happens to pass therebetween. Such a yieldable connection may be resilient or even frangible, such as a safety cotter pin, for instance.

As many changes could be made in the above construction and many widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all the matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In and for a rotary print machine having a frame,

a backing cylinder journaled on said frame and at least one print roll to be pressed against said backing cylinder, a device for supporting each end of said print roll and yieldably urging the same towards the backing cylinder, said device comprising bearing means for journaled said print roll ends, a bore in the machine frame extending in a direction passing in the near vicinity of the backing cylinder axis, a hollow cylinder-like structure carrying said bearing means and slidably mounted in said bore, a fixed piston member to divide the inner space of said cylinder-like structure into an inner and an outer compartment, a rod rigid with said fixed piston passing through the inner head of said hollow structure and secured to the machine frame, a pressure fluid source and means to conduct pressure fluid from said source into said inner compartment through said hollow structure wall.

2. A rotary print machine according to claim 1, wherein said piston rod is secured to the machine frame through a calibrated yieldable connection.

3. A rotary print machine according to claim 2, wherein said yieldable connection comprises a frangible element.

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