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PRINTING ROLL AND DRIVING MECHANISM

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2 Claims. (Cl. 101—212)

This invention relates to a printing machine and more particularly to the structure of the printing roll and associated driving mechanism.

Textile printing machines as heretofore made have usually comprised a backing cylinder, around which the fabric passes during the printing operation, and a mandrel carrying the copper intaglio printing roll. The backing cylinder is customarily wound with many layers of fabric, and the printing roll is held against that cylinder under a very high pressure in order to make a good imprint. The mandrel is a long heavy steel shaft to which the copper roll is removably keyed. The mandrel is driven by power mechanism applied to a gear near one end; and adjacent to the printing roll is a driving gear arranged to transmit power to a furnisher or inking roll. For mounting that driving gear on the mandrel, the standard practice has been to mill a slot in the neck of the mandrel and to stake in a feather key. This milling and staking operation weakens the mandrel, and the heavy pressure applied to the printing roll sometimes starts a crack in this slot which eventually develops into a broken mandrel. It has also been proposed to weld a feather key onto the mandrel so as to avoid milling that slot in its surface, but the heat strains set up by the welding operation have likewise resulted in breakage during use.

The mandrel is ordinarily made slightly tapered, and the copper printing roll is driven tightly thereon but is held from turning relative to the mandrel by means of a long key slot within which a key on the inner side of the copper roll is secured. In accordance with the present invention, we propose to utilize this slot in the mandrel for the purpose of securing the driving gear also on the mandrel, and we thus avoid cutting any other slots in the mandrel or otherwise subjecting the same to strains which may cause breakage.

The primary object of this invention is, therefore, to provide a suitable construction which will serve to secure the furnisher roll driving gear to the mandrel without weakening the latter and thus prevent breakage of the mandrel during use. Other objects will be apparent in the following disclosure.

Referring to the drawing which illustrates a preferred embodiment of this invention:

Fig. 1 is a vertical elevation, partly in section, and somewhat diagrammatic in nature, of a portion of a textile printing machine showing the printing roll, the backing cylinder and the

furnisher roll and their related driving connections;

Fig. 2 is an enlarged fragmentary detail showing the manner of securing the furnisher roll driving gear to the mandrel; and

Fig. 3 is a section on the line 3—3 of Fig. 2 looking in the direction of the arrows.

A textile printing machine to which this invention is applied comprises side frames 10 and 11 within which are suitably supported the bearings 12 and 13 for a backing cylinder 14. The bearings are adjustably held in position by adjustment screws 15 and 16 and suitably related parts which form no part of the present invention. These bearings are so constructed and arranged that the backing cylinder 14 is freely rotatable under the driving influence of the printing roll. A removable hollow metal intaglio or other suitable type of printing roll 18 is slidably mounted on and keyed to the steel mandrel 19. The latter is suitably mounted in adjustable bearings 20 and 21 which are supported in the side frames and moved or adjusted by means of screws 22 and 23. By this mechanism, the printing roll may be held under a very high pressure against the backing cylinder while the fabric to be printed is passed between the two. An ink furnisher roll 25 contacts with the periphery of the printing roll 18 and it transmits ink from the reservoir 26 thereto. This inking roll 25 has its supporting arbor 27 suitably mounted in bearings (not shown) and it is rotatably driven by means of a gear 28 on the arbor 27 which suitably meshes with a driving gear 30 on the mandrel 19. The mandrel is driven by means of a gear 32 on its outer end which meshes with a power driven gear 33 suitably supported on the framework.

The present invention relates to the manner of securing the gear 30 to the mandrel 19. As above stated, the copper tube 18 is forced on a tapered surface of the mandrel 19 with a driving fit, and a key extending the entire length of this hollow copper roll is fitted within a key slot 36 cut within that portion of the mandrel over which the copper roll lies. This central part of the mandrel has a somewhat greater diameter than has the portion 38 on which the hub of the gear 30 lies. That reduced portion 38 is not cut to provide any keyway, but the hub of the gear 30 fits freely thereon. However, the gear 30 is provided with a key 40 extending laterally from the hub, and this lateral key 40 is so shaped and located that it will extend into the slot 36 within which the copper printing roll is keyed. In this way, we may utilize the mandrel as heretofore

constructed and without changing any of the other bearings and associated parts or the sizes of the gears and furnisher rolls; and yet we drive that furnisher roll from the mandrel as has been the custom heretofore, but without weakening the mandrel at all because of this driving connection.

It will also be appreciated that the furnisher driving gear 30 and its key connection may be constructed in many other ways to utilize the keyway 36 in the mandrel for securing the gear thereto. This laterally projecting key 40 as illustrated may be cast on the gear or it may be a part welded thereto, or it may comprise screws or pins suitably secured within the gear and projecting laterally or radially into the slot in the mandrel body. It may also be formed as a two part body, one being a ring which is keyed to the mandrel and the other the gear, and the two parts may be suitably secured together as by cap screws or bolts. Many other modifications of this construction may be made, providing the parts are so constructed and arranged that the mandrel is not weakened by the particular construction and method adopted for securing the furnisher driving gear to the mandrel. Hence, the above description and the accompanying drawing are to be considered as illustrating the principles and a preferred embodiment of the invention but without imposing limitations on the invention except as are set forth in the claims appended hereto.

We claim:

1. In a printing machine having a backing

cylinder and an ink furnisher roll, a printing roll unit associated therewith for a printing operation comprising a mandrel, a hollow printing roll removably and slidably mounted on the mandrel, said mandrel having an uninterrupted cylindrical portion outside of and close to the printing roll, a gear for driving the ink furnisher roll mounted for sliding and rotating freely on said portion of the mandrel, the mandrel having a keyway beneath and extending beyond the printing roll but not beneath the gear, a key in the keyway which connects the printing roll to the mandrel, and means on the gear which projects into the exposed portion of said keyway and forms the sole medium for connecting the gear to the mandrel.

2. In a printing machine having a backing cylinder and an ink furnisher roll, a printing roll unit associated therewith for a printing operation comprising a mandrel having a central tapered raised portion and a reduced end portion, a printing roll shaped to fit on said tapered portion, a driving gear on the reduced portion of the mandrel which is mounted for rotating and sliding freely thereon, said mandrel having a keyway beneath the printing roll and extending outwardly to the end of the raised portion, a key in the keyway which connects the printing roll to the mandrel and a keying member projecting laterally from the gear which extends into the open end of said keyway and serves to connect the gear to the mandrel.

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