Nov. 4, 1941. L. B. CASE 2,261,339

PRINTING MACHINE

Filed Sept. 12, 1939

Fig. 1.

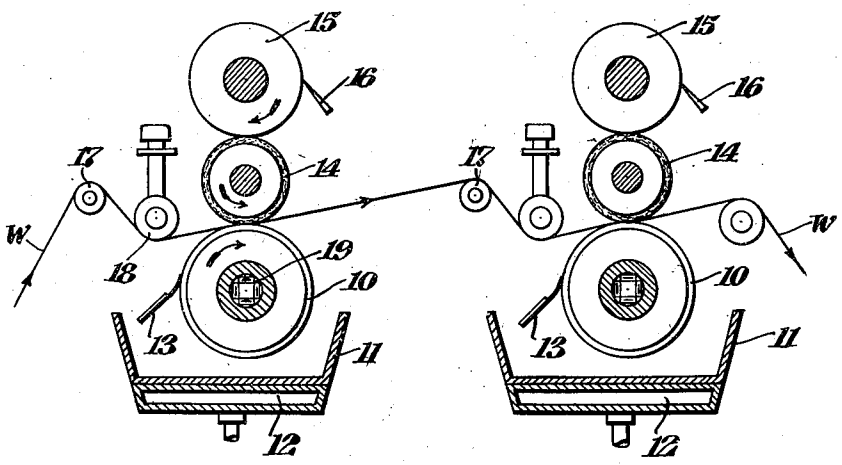


Fig. 2.

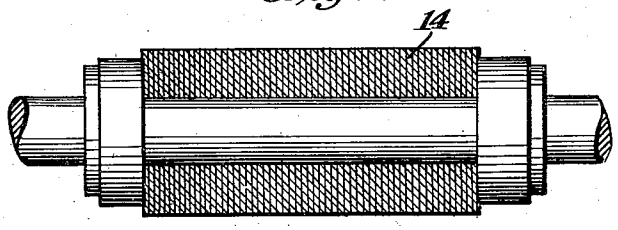
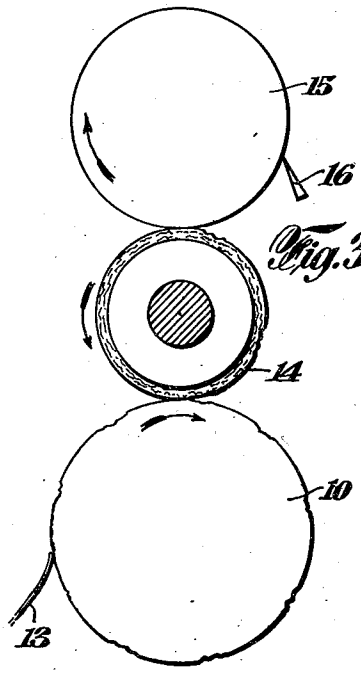


Fig. 3.



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PRINTING MACHINE

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2 Claims. (Cl. 101—152)

This invention relates to printing machines and more especially to printing machines using hot melt ink, that is, ink solid at normal temperature and liquid at elevated temperature.

In printing machines using soluble ink, no provision is made for regulating the temperature of the printing cylinder and a rubber surface impression cylinder is commonly used. However, the use of hot melt ink requires that the temperature of the printing cylinder be maintained above the solidification temperature of the hot melt ink, such temperature being above that at which rubber may be satisfactorily used as the impression surface.

An object of this invention is a printing machine equipped with an impression cylinder which is unaffected by the temperature to which it is subjected in operation of the machine with hot melt ink.

According to this invention, the impression cylinder comprises a roll of compressed fibrous material. The structure and composition of the roll is such that its surface is suitable as an impression surface and its operation as an impression surface is unaffected by the temperature to which it is subjected in printing with hot melt ink. The surface of the impression cylinder is continuously conditioned by means of a smooth surface metal roll having rolling contact with the impression cylinder surface and applying pressure thereto.

Other objects, novel features and advantages of this invention will become apparent from the following specification and accompanying drawing, wherein:

Fig. 1 is a sectional view of an apparatus embodying the invention;

Fig. 2 is a longitudinal sectional view of the impression cylinder, and

Fig. 3 is a diagrammatic elevational view of the printing cylinder, impression cylinder and conditioning cylinder.

In the drawing is illustrated schematically a printing machine equipped with a plurality of engraved printing cylinders, only two of which are shown. The printing cylinders are all of the same size and means are provided for driving said cylinders all at the same speed. Also, means are provided for supplying heat to the interior of the printing cylinders for maintaining the surfaces thereof at a predetermined temperature, depending upon the composition of the hot melt ink used.

Each printing cylinder 10 is partially enclosed by a pan 11 containing hot melt ink and heating means 12 are provided for maintaining the ink at proper temperature. A doctor 13 is associated with each printing cylinder 10 for removing excess ink therefrom. An impression cylinder 14 is associated with each printing cylinder 10 and is driven in synchronism with the printing cylinder by suitable means, not shown. The impression cylinder comprises a roll of compressed fibrous material, the surface of which has all the attributes required for an impression surface.

A smooth faced metal roller 15 is associated with each impression cylinder 14 and is driven in synchronism therewith by suitable means. The roller 15 has rolling contact with the impression cylinder 14 and is so arranged as to apply pressure thereto for the purpose of continuously conditioning the surface of the roller 14 to maintain it suitable for use as an impression surface. A scraper or doctor 16 engages the roll 15 for scraping from it any fibrous or other material which may adhere to it from contact with the impression cylinder 14.

A pair of rollers 17 and 18 are provided for guiding the web 12 between the printing and impression cylinders and for maintaining the web under proper tension. Means are provided for effecting adjustment of the roll 18 so as to vary the area of contact of the web with the printing cylinder 10, thereby determining the extent to which the web is heated during the printing operation.

Any suitable form of heating means may be used for maintaining the printing cylinder at the proper temperature and such means is herein illustrated as a set of electrical resistance units 19 extending lengthwise of the cylinder 10. Also, while the pan heating means 12 is shown as a hot water or steam jacket, other types of heating means may be used.

Preferably, the roller 14 is composed of paper in the form of a large number of annular sheets encircling a steel shaft. In forming the roll, the paper sheets are subjected to a very high degree of compression so as to form them into substantially a solid mass of proper density and hardness. The paper mass is maintained under compression by means of steel retaining heads mounted on the shaft. While such type roll is preferred, other types of fibre rolls may be used.

The quality of fibre used in the paper sheets determines the surface character of the roll and the temperature at which the roll may operate. The paper sheets may, therefore, contain various

percentages of felt, various grades of cotton or even asbestos fibre.

Means, not shown, are provided for regulating the heat supplied to the ink heating means 12 and to the cylinders 10 and are effective to maintain each cylinder 10 of the machine at the same temperature as each remaining cylinder irrespective of the number of cylinders that there may be in the machine. Such means preferably consists of thermostats properly placed to be responsive to the temperature of the ink and the peripheral temperature of the cylinder in combination with means controlled by the thermostat for regulating the heat supply means. The cylinders are maintained at the same temperature to insure that they expand to the same extent and that they have equal circumferences during operation of the machine. Were the cylinders to be at different temperatures they would have unequal circumferences due to unequal expansion and would have different peripheral speeds, thereby prevent proper registration of successive impressions on the paper and effecting either rupture or wrinkling of the paper.

I claim:

1. In a hot melt ink printing machine, a heated printing cylinder, an impression cylinder composed of compressed fibrous material, a smooth face metal roll having rolling contact with said impression cylinder and applying pressure thereto, and a doctor co-operating with said roll for removing fibrous material therefrom.

2. In a hot melt ink printing machine, a heated printing cylinder, an impression cylinder composed of a plurality of highly compressed annular sheets of fibrous material, a smooth face metal roll having rolling contact with said impression cylinder and applying pressure thereto, and a doctor co-operating with said roll for removing fibrous material therefrom.

LYNN B. CASE.