No. 635,326. Patented Oct. 24, 1899.

N. KOPP.

PRINTING MACHINE.

(Application filed Oct. 29, 1898.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

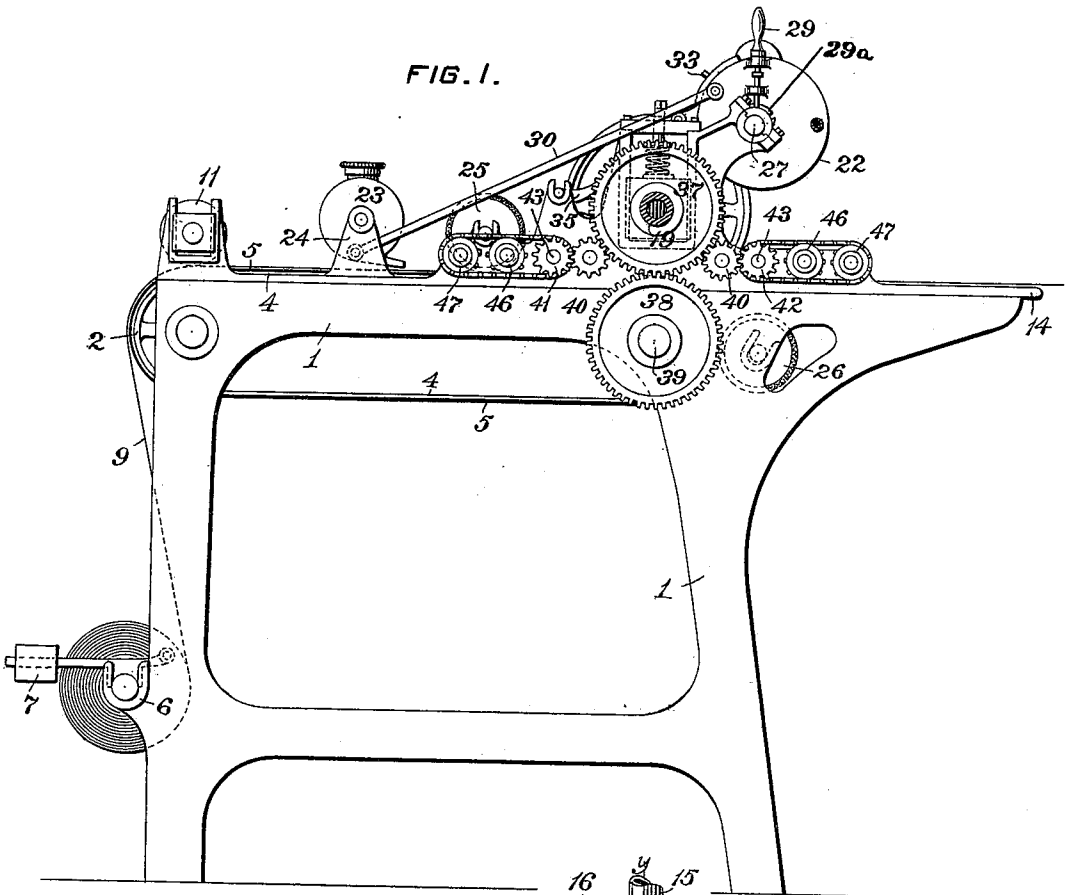
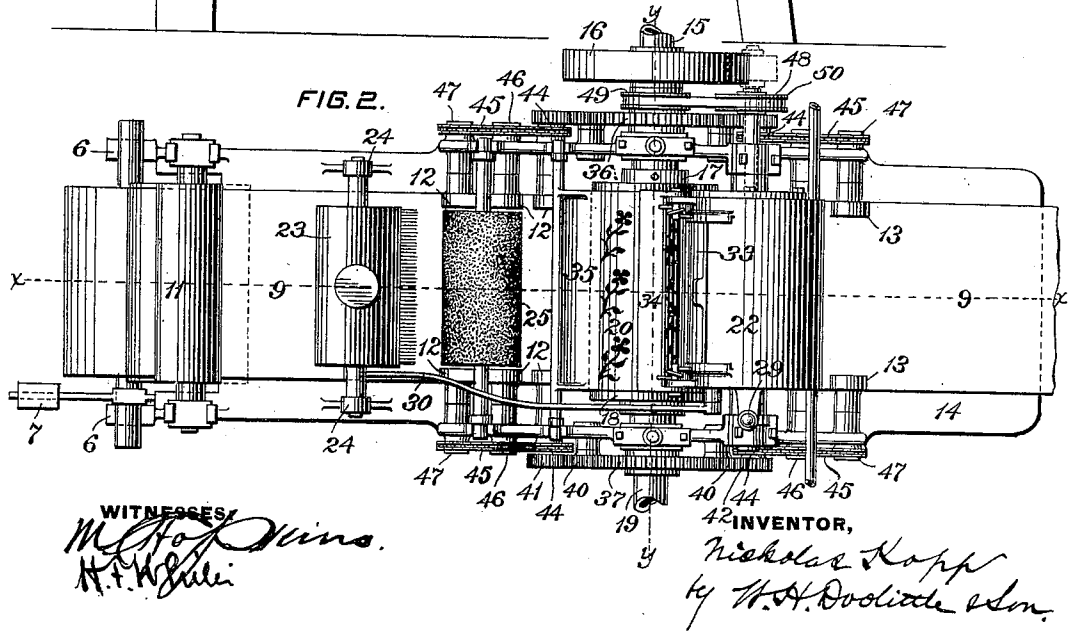


FIG. 2.



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Att'ys.

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No. 635,326. Patented Oct. 24, 1899.

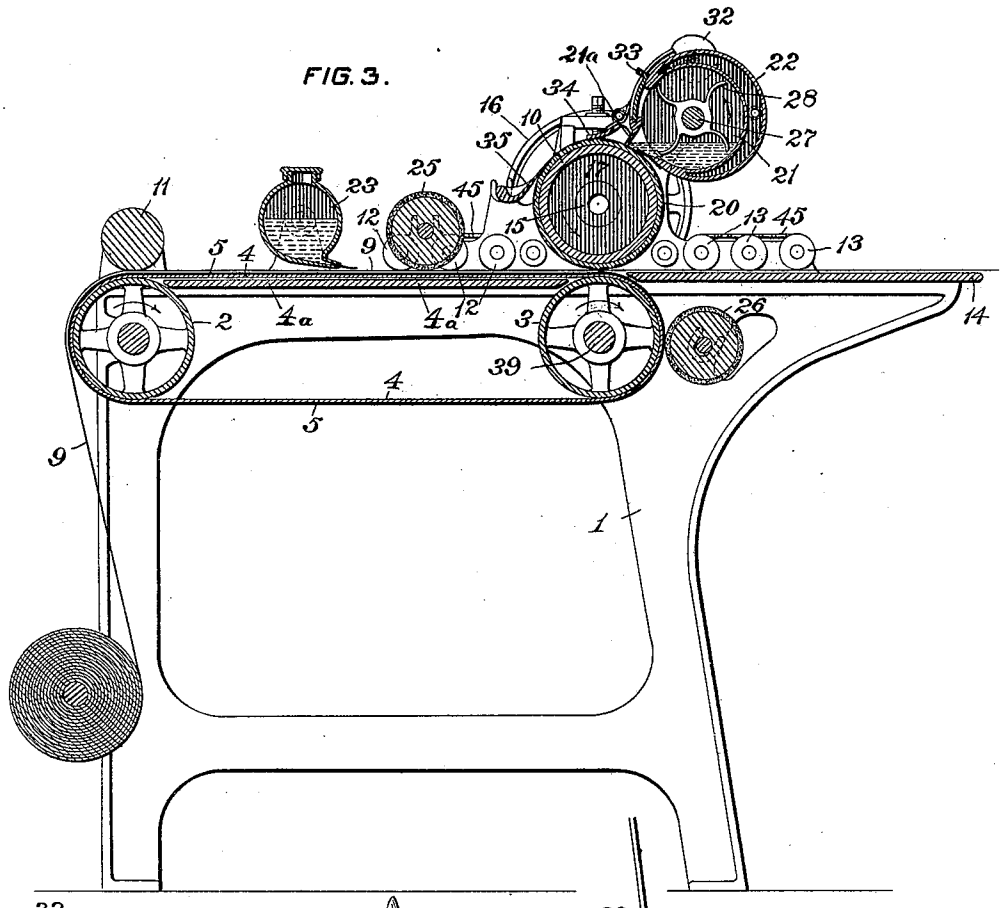
N. KOPP.

PRINTING MACHINE.

(Application filed Oct. 29, 1898.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 3.



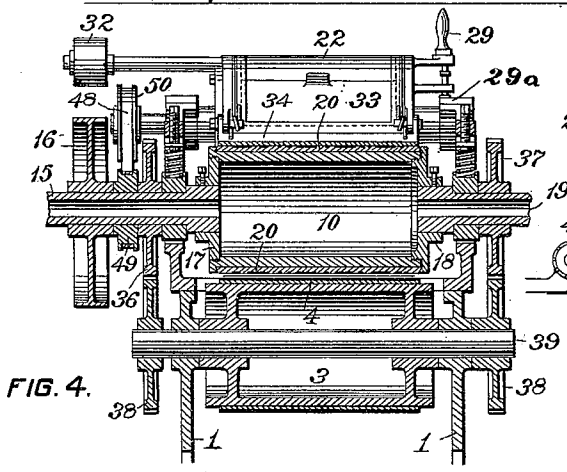


FIG. 4.

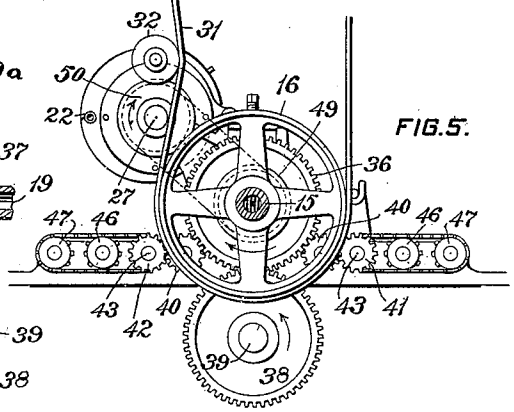


FIG. 5.

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UNITED STATES PATENT OFFICE.

NICHOLAS KOPP, OF CORAOPOLIS, PENNSYLVANIA.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 635,326, dated October 24, 1899.

Application filed October 29, 1898. Serial No. 694,924. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS KOPP, a citizen of the United States, residing at Coraopolis, county of Allegheny, and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Printing-Machines, of which improvement the following is a specification.

This invention relates to improvements in printing-machines, and more particularly to a printing-machine especially adapted for printing on a continuous piece of material, such as paper, cloth, and other similar materials.

This invention is primarily designed for use in connection with the process of decorating glass, earthenware, porcelain, and metallic wares, but may be employed for other purposes.

In the process of ornamenting wares such as above referred to as heretofore practiced designs are cut by hand or etched in substantially the same manner as for lithographic work on a flat surface of copper or stone. The ink or coloring-matter is applied to the copper or stone plate and the surplus ink removed with a knife or "buffer." Its surface is wiped clean and paper or cloth laid on it, after which the material to which the design is to be transferred, together with the plate, is subjected to pressure and the set designs transferred to the paper. Having obtained the desired impression upon the paper, the paper in a damp state is placed on the article to be ornamented and rubbed until the coloring-matter is well fastened to the article. This "printing process" of decorating wares while costing much less than "handwork" decorating is still expensive, owing to the time and labor now necessarily employed in printing the "transfers."

By the employment of my invention much time, labor, and expense are saved in preparing the transfers; and with this end in view my invention consists of a new and improved printing apparatus and in certain new combinations of parts and features of construction, all as hereinafter fully set forth.

In the accompanying drawings, which illustrate an application of my invention, Figure 1 is a side elevational view of a printing-machine constructed in accordance with my invention; Fig. 2, a plan view; Fig. 3, a central vertical sectional view taken on line X X of Fig. 2; Fig. 4, a vertical sectional view on line *y y* of Fig. 2, and Fig. 5 a detailed end view showing means for throwing the driving-belt into and out of operation.

In the construction shown by the drawings the printing apparatus is supported by the framework 1, in the sides of which are bearings for the shafts carrying the rollers 2 and 3. An endless belt 4, preferably provided on its outer surface with a suitable coating 5 of some soft yielding material, such as felt or rubber, is stretched over the rollers 2 and 3 and is driven thereby. A roll of material which is to receive the impression is located at some convenient place. In the drawings I have shown this roll supported on a shaft having its bearings in hangers 6, cast integral with the legs of the framework; but it is evident that the material may be carried at some other convenient point.

7 is a weight similar to the usual means employed in printing-machines on devices for carrying a roll of paper. The sheet or strip of material 9 is fed to the printing-cylinder 10 by means of the belt 4, roller 11, and a series of short rollers 12, which latter are adapted to come in contact with the edges only of the traveling material in the manner particularly shown by Fig. 2. A series of delivery-rollers 13, similar to the feed-rollers 12, are located on the other side of the printing-cylinder and deliver the printed strip after its passage between the printing-cylinder and the belt to the shelf 14. In the construction shown the belt 4 is the primary means for conveying the material to the printing-cylinder and also acts as an impression-belt and takes the place of an impression-cylinder now so generally employed in printing-machines. The traveling belt runs on or slides over a flat smooth surface, as 4^a, which aids in supporting the belt and prevents the belt from sagging.

Motion is transmitted to the printing-cylinder 10 by means of the hollow shaft 15, on which is rigidly mounted the main driving-pulley 16. The shaft 15 at its inner end is enlarged and is provided with a screw-threaded sliding collar 17, which is adapted to be keyed to the shaft and to revolve therewith. The printing-cylinder is screw-threaded, as

shown, at both ends. One end screws onto the collar 17, and the other end is connected by screw-threads to a collar 18, slidable on a hollow shaft 19. A thin character-bearing shell or plate 20 surrounds the printing-cylinder 10 and is so constructed that it may be securely attached thereto and readily removed therefrom when it is desired to substitute a new shell bearing a different design. The shell or plate is preferably composed of some suitable metal, as steel or copper, and the design is either engraved or etched on its surface. The construction shown permits the printing-cylinder and its shell to be conveniently removed from the machine.

In the process of preparing transfers for use in the decorating of wares such as heretofore mentioned the coloring-matter employed is of such a nature that it must be applied to the engraved or etched portion of the printing-cylinder or its shell in a heated state, and for the purpose of heating the coloring-matter and keeping it at the desired temperature I have provided means for heating the printing-cylinder, the character-bearing shell, and the coloring-matter reservoir 21. One or another of a number of different methods may be employed for heating these parts. Steam may be utilized for this purpose. In the construction illustrated steam is used and is passed to and from the printing-cylinder through the hollow shafts 15 and 19. The reservoir 21 is provided with an outer casing 22, between which and the reservoir-wall steam is passed, thus providing a jacketed reservoir.

Directly over the traveling impression-belt 4 and the material designed to receive the imprint a moistening device 23 is pivotally hung between upright supports 24. This moistening device or liquid-containing receptacle is adapted to wet the paper as it passes under it. In practice water containing a certain amount of soap is used in the vessel 23 for moistening the paper. If it is not desired to wet the paper, the moistener may be easily removed from the machine. For the purpose of preventing the paper and the surface of the traveling belt from becoming too wet I employ absorbing-rollers 25 and 26 The reservoir or receptacle 21, loosely mounted on shaft 27, is in open communication with the printing-cylinder or its shell while the machine is in operation and the coloring-matter continuously applied to the cylinder through a transverse opening in the receptacle. A thin flexible strip 21^a, attached to the reservoir directly above the transverse opening, is for the purpose of spreading the coloring-matter over the printing-cylinder, pressing the same into the engraved lines, and turning the surplus back into the reservoir.

For the purpose of thoroughly mixing the coloring-matter within the reservoir 21 and keeping it in the desired condition for application to the printing-cylinder I employ a stirrer or mixer, in this instance comprising blades 28, mounted on and adapted to rotate with the shaft 27. The coloring-matter used is of such a nature that it must be continually agitated in order to prevent the heavy substances settling at the bottom and the oil and other light substances coming to the surface. The means illustrated accomplish this important function very satisfactorily and entirely automatically. When the machine is not in use, the reservoir may be easily revolved a slight distance on its shaft and communication between the reservoir and the cylinder cut off. Instead of loosely mounting the reservoir on a shaft it may be provided with pins or lugs, which are journaled in the frame. A locking device 29, attached to the reservoir-casing, is employed for turning the same. The locking device shown comprises a handle and a shank, the lower end of the latter being adapted to engage with a slotted lug 29^a. A rod 30 connects the reservoir with the moistener 23, and when the reservoir is turned the moistener is also moved. Means for putting the main driving-belt in and out of operation by the movement of the reservoir are particularly shown by Fig. 5 and comprise a roller 32, mounted on the end of a pin attached to the reservoir-casing. A sliding door 33 is shown for closing the reservoir-opening. A device 34 for pressing or squeezing the thick coloring-matter into the engraved or etched portion of the plate is attached to the reservoir. A further function of this presser 34 is to clean the plate of any surplus coloring-matter. Further cleaning means, comprising a knife 35, adapted to bear against the printing-cylinder and to catch any surplus coloring-matter escaping the device 34, is conveniently located below the combined presser and cleaner 34. It is sometimes preferable to employ a cloth or felt cleaner in place of the knife 35, and such means may be readily substituted for the knife.

In the mechanism shown for driving the machine gear-wheels 36 and 37, respectively carried on and rotatable with hollow shafts 15 and 19, mesh with the same-sized gear-wheels 38, carried on both ends of the shaft 39. Idlers 40 are interposed between the gear-wheels 36 and 37 and small gear-wheels 41 and 42. The small gear-wheels 41 and 42 are carried on short shafts 43, each having a small chain-wheel 44. Small chain belts 45, connected to wheels 44, extend over and drive the wheels 46 and 47 and the several small feed-rollers 12 and the delivery-rollers 13. A belt 48, running on pulley-wheel 49, carried on and rotatable with hollow shaft 15, connects said pulley-wheel with pulley 50, mounted on shaft 27. By these means the shaft 27, together with the blades 28 within the reservoir, is rotated.

In the practice of the art of decorating wares by what is known as the "printing process" the most suitable material and the one almost universally used is exceedingly thin paper. The design to be placed on the articles must be transferred from the en-

graved or etched plate onto very thin moistened paper. The coloring material necessarily employed is of such a composition that it must be in a heated state when applied to the engraved portion of the plate, and the transfers must be quite moist when applied to the article which is to be decorated. By the employment of my machine I am enabled to accomplish these results in a very satisfactory manner and with a saving of much labor and expense.

Among the characteristic features of the present invention, all of which are very important in a machine designed to perform the class of work above referred to, are the following: The exceedingly thin paper—usually tissue-paper—employed in making the transfers is subjected to the least possible strain or pull and to almost no strain whatever after it has become wet. Hence the liability of the paper to be torn or destroyed is reduced to a minimum. The machine may be readily started and stopped, and when stopped the supply of coloring-matter to the printing-cylinder and the liquid for dampening the paper are instantly cut off. The coloring-matter is thoroughly mixed and maintained in the desired condition by mechanical means.

In operating the machine the material—usually a roll of tissue-paper supported at some convenient place—is conveyed to the printing-cylinder by the traveling belt 4, aided by the rollers 12. After its passage to and beyond the printing-cylinder it is led, as heretofore mentioned, by means of the delivery-rollers 13, to a shelf 14, from whence it is taken and cut into suitable sizes for application to the ware to be decorated. The several parts of the apparatus are driven by the main driving-wheel 16 and the intermediate mechanism, comprising the gearing and belts already described. Attention is particularly called to the fact that practically the only pull or strain the paper is subjected to is that occasioned before the paper reaches the belt 4. The paper during this time is in a dry condition and is many times stronger than after it has been dampened and very little difficulty is encountered in conveying the paper in the dry state. After the paper has been moistened, however, the greatest care must be exercised in order to prevent its being torn during its passage to and beyond the printing-cylinder. The paper after reaching the belt 4 is carried under roller 11, moistener 23, and absorbing-roller 25. The moistening device 23 extends only partly across the width of the paper and is adapted to moisten the paper for a portion of its width only, leaving comparatively dry marginal spaces. These dry spaces along the edges of the paper come in contact with the rollers 12, while the wet portion adheres to the felt-covered surface of the traveling belt and is carried by it with no strain or pull to the printing-cylinder. After passing the printing-cylinder the rollers 13 come in contact and engage only the dry edges and feed the now printed and dampened strip to the shelf 14. The apparatus may be readily shifted into and out of operation, and the means shown for accomplishing these ends comprise the locking device 29 and the roller 32, located on a rod extending from the reservoir-casing. The roller 32 is so situated that it will tighten and loosen the main driving-belt 31, which drives the main wheel 16. Assuming that the machine is in operation and it is desired to stop it, this may be readily done by turning the reservoir 21 a slight distance on its shaft 27 by means of the locking device 29. This movement of the reservoir or receptacle 21 moves the roller 32 away from the driving-belt 31, loosens the belt, and stops the revolution of wheel 16. The intermediate driving mechanism is also stopped. When the reservoir is turned, as set forth, the supply of coloring-matter to the printing-cylinder is cut off. The moistening device, which is connected with the reservoir 21 by rod 30, is swung upward and the supply of liquid to the paper stopped. With this construction both the supply of coloring-matter and the liquid for moistening the paper are instantly stopped. The material to receive the imprint is left on the machine, and the operation of printing may be resumed at any time by simply turning the reservoir 21, thus bringing the roller 32 in contact with the main driving-belt and the moistening device back into position for feeding the liquid to the material.

What I claim, and desire to secure by Letters Patent, is—

1. In a printing-machine, the combination with a printing-cylinder, of a traveling belt, a receptacle for coloring-matter having an outlet in communication with the printing-cylinder while the machine is in operation, means to rotate said receptacle and thereby carry the outlet out of communication with the printing-cylinder and a stirrer or mixer within the receptacle, substantially as described.

2. In a printing-machine, the combination, with a printing-cylinder of a traveling belt, a moistening device, a receptacle for coloring-matter loosely mounted on a shaft, means for turning the receptacle on its shaft, and means connecting the moistening device with the said receptacle, substantially as set forth.

3. In a printing-machine, the combination, with a printing-cylinder, of a traveling belt, a moistening device, a reservoir for coloring-matter loosely mounted on a shaft, means for turning the reservoir on its shaft, means connecting the moistening device with the reservoir, and means attached to the reservoir for starting and stopping the machine, substantially as set forth.

4. In a printing-machine, the combination, with a printing-cylinder, of a belt for conveying the material to the printing-cylinder, a reservoir for coloring-matter, a moistening device extending partly across the belt and the material which is to receive the impres-

sion and adapted to wet the material for a portion of its width only, means for removing surplus moisture from the material, and rollers adapted to come in contact with the edges of the said material substantially as set forth.

5. In a printing-machine, the combination, with a heatable printing-cylinder, of hollow shafts in communication with the cylinder, slidable collars on said shafts engaging with the printing-cylinder, a character-bearing shell carried on the cylinder, a conveyer-belt, a moistening device, a heatable receptacle for coloring-matter loosely mounted on a shaft and provided with a stirrer, means for turning the receptacle on its shaft, means connecting the moistening device with the receptacle, and means attached to the receptacle for starting and stopping the machine, substantially as described.

6. In a machine of the class described, a belt adapted to convey a strip of material to be printed on, a printing-cylinder, a moistening device for said strip intermediate the printing-cylinder and the point of feed of the strip on the belt, substantially as described.

7. In a machine of the class described, the combination, with means for conveying a continuous strip of material, of a moistening device adapted to moisten only part of the transverse surface of the material, feeding and delivering means engaging the dry portions of the material, and printing means for said strip, substantially as set forth.

In testimony whereof I have hereunto set my hand.

NICHOLAS KOPP.

Witnesses:
THOMAS EWING, Jr.,
EDWIN ALLEN.