Nov. 27, 1923. 1,475,628

A. HANSON, SR

YARN PRINTING MACHINE

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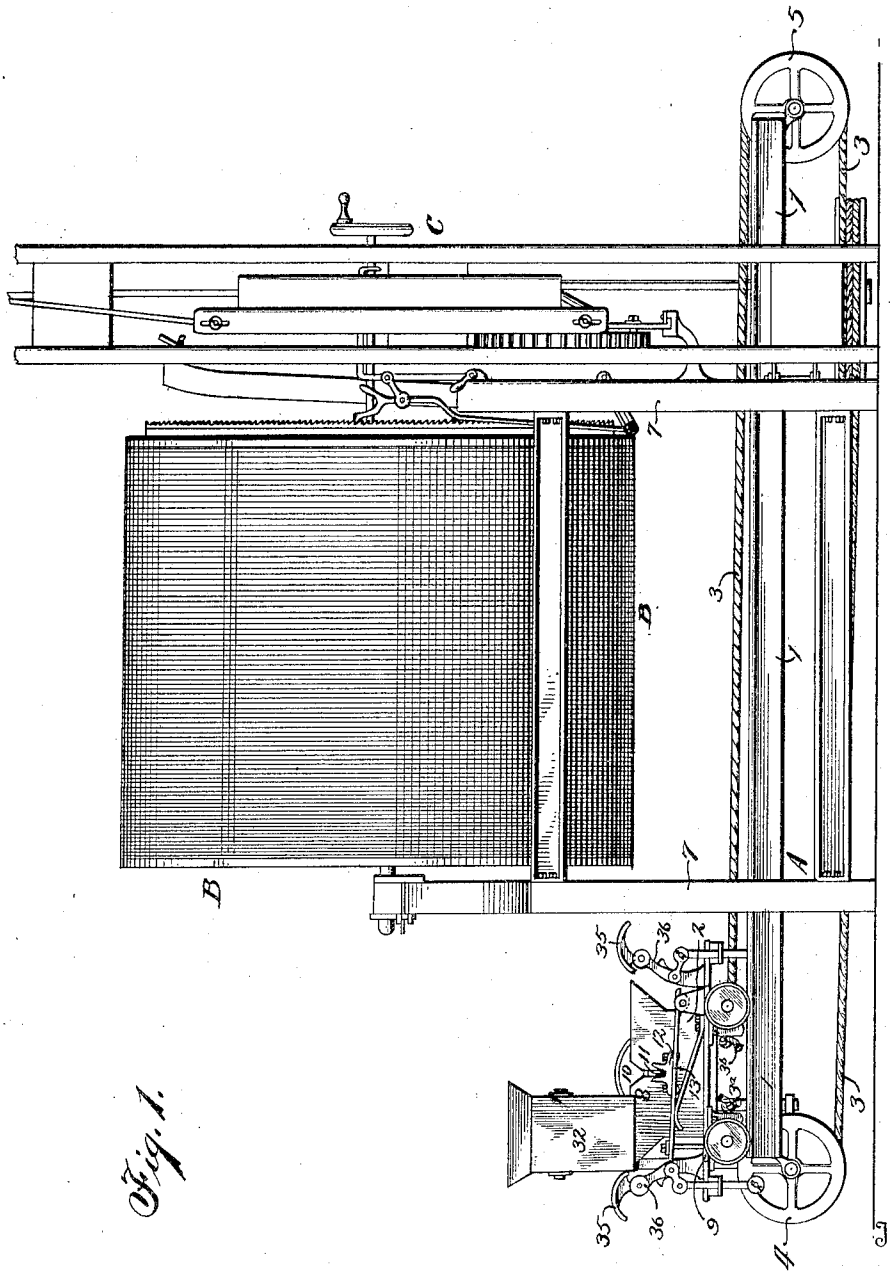

Fig. 1.

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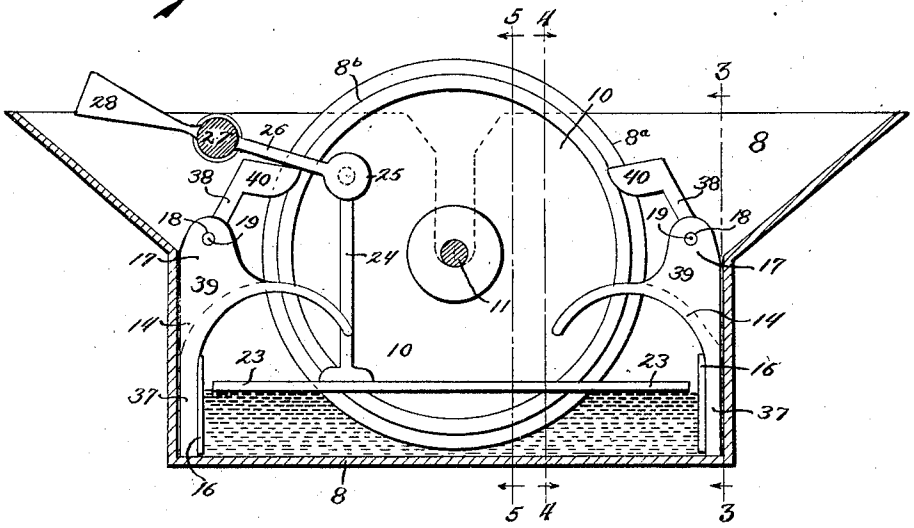
Fig. 2.



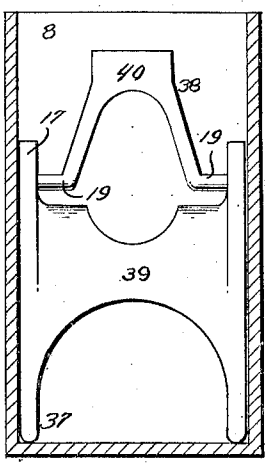


Fig. 3.

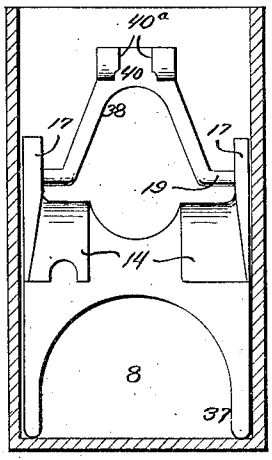


Fig. 4.

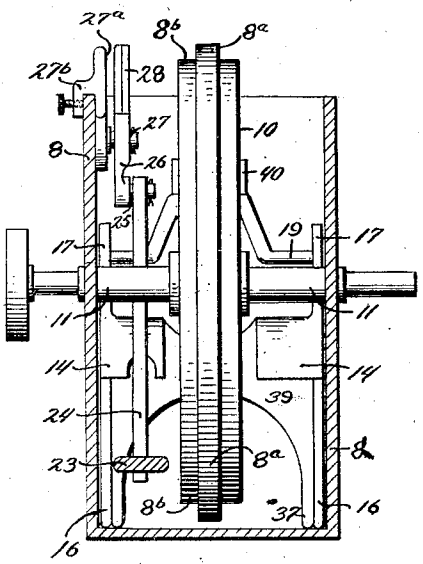


Fig. 5.

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Fig. 6.

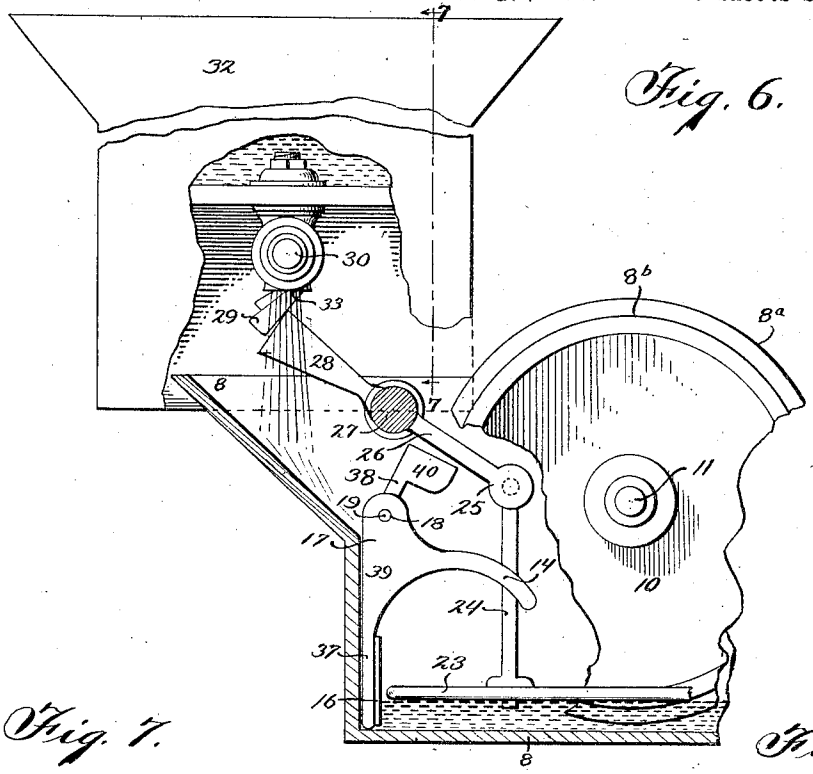


Fig. 7.

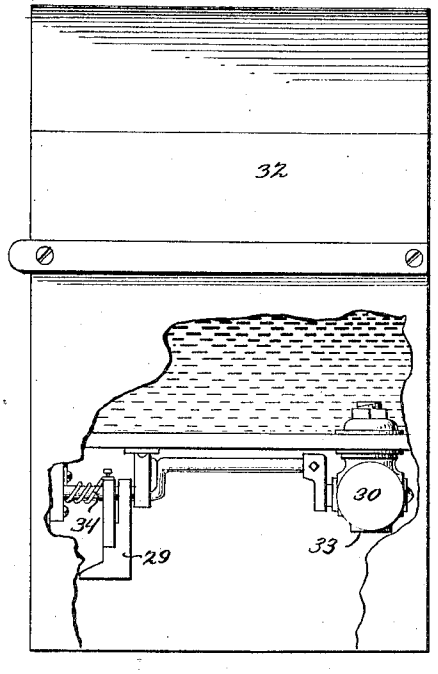
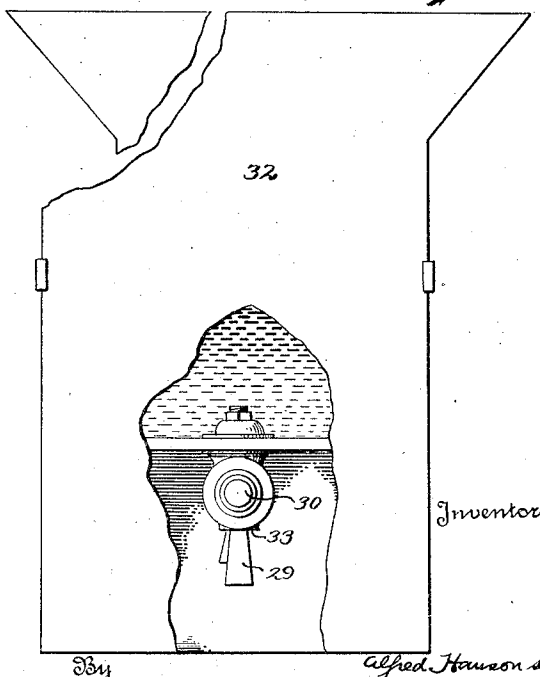


Fig. 8.



Inventor

Alfred Hanson Sr

By H. H. Bliss. Attorney

Patented Nov. 27, 1923. 1,475,628

UNITED STATES PATENT OFFICE.

ALFRED HANSON, SR., OF YONKERS, NEW YORK.

YARN-PRINTING MACHINE.

Application filed March 17, 1920. Serial No. 366,686.

To all whom it may concern:

Be it known that I, ALFRED HANSON, Sr., a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Yarn-Printing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in machines for applying coloring matter to yarn previous to the weaving operation. In a machine of this class, the dye or color fluid is applied to the yarn while the latter is wrapped around a drum. In general, the apparatus comprises a framework supporting a car reciprocated by a power mechanism beneath and longitudinally of the axis of the drum. The car carries a box holding an amount of the coloring fluid, and also supports a printing wheel whose periphery, over one short arc, is constantly dipping into coloring fluid, and, over another short arc, is pressing against the yarn wound on the drum, thus applying the coloring matter.

One of the objects of the invention is to provide a novel scraping device and a novel mounting therefor for regulating the amount of coloring matter which is carried upward by the periphery of the color wheel after it is immersed in the fluid.

Another object is to provide a novel means and a novel mounting therefor to prevent the liquid in the color box from being thrown up over the end of the box when the car is suddenly stopped or started at the end of its path.

Another object is to provide means to automatically keep the liquid in the box at an approximately predetermined level.

Another object is to provide color distributing and checking devices of such character that the color-carrying box can be constructed of much cheaper material and yet be non-corrosive and refractory relatively to the components of the color fluid.

In the drawings:

Fig. 1 is an elevation of part of a yarn-coloring apparatus, embodying my improvements.

Fig. 2 is a longitudinal section of the color box detached.

Fig. 3 is a section on line 3—3 of Fig. 2, looking toward the center of the box.

Fig. 4 is a section on line 4—4 of Fig. 2, (the wheel being removed) looking toward the end of the box.

Fig. 5 is a section on the line 5—5 of Fig. 2, looking toward the left.

Fig. 6 is a view showing a portion of the color box, and also the tank, some of the parts being broken away.

Fig. 7 is a view, partly in elevation, partly in section, of the stationary tank and its attachments, taken on the line 7—7, of Fig. 6.

Fig. 8 is a detail showing the valve and its actuating arm.

A main frame is indicated by A, upon which is mounted a yarn drum B. With the latter are combined feeding and controlling devices, indicated by C. These parts of the apparatus may be of any well known or preferred character.

They are in common use and impart step-by-step movements to the drum in timed relation with the movements of the reciprocating devices which impart the color to the yarn on the drum in the usual way.

The frame of the machine is provided with horizontal track rails 1, 1 on which travels a wheeled carriage 2. 3 is a cable passing around the sheaves 4 and 5 and having its ends fastened to the carriage 2 at 3*a*, *b*. By means of suitable power devices attached to one or both of the sheave wheels, the carriage is moved back and forth on the tracks 1 beneath the yarn drum B and longitudinally on its axis. Standards, 7, 7 together with suitable cross bars and bracing devices support the drum B and the actuating mechanism associated therewith.

8 is the box for holding the coloring material. It is detachably mounted upon the bed 9 of the car or carriage 2. 10 is the color wheel mounted on the shaft 11, the latter being removably held in bearings 12 on the downwardly yielding springheld frame 13. 35, 35 are rubbers arranged to press against the yarn after it has been colored. 36, 36 indicate the devices by which the rubbers are moved to and from their operative positions.

As the parts described above are well known to those acquainted with the art and form no part of the present invention, a detailed description is not necessary.

At each end of the box 8 there is a device 37 to insure a uniform quantity of coloring material at all points around the periphery of wheel 10, and to also insure that none of

the fluid shall be carried upward and out of the box, either because of sudden stoppage or starting of the latter or because of the rotation of the wheel. Each of the devices 37 comprises two relatively movable elements 38 and 39. The element 39 is a plate-like part adjacent the end wall of the box and formed with two curved baffle plates 14, 14, one on each side of the color wheel 10. The width of each of these plates 14 is slightly less than the distance between the side wall of the box and the adjacent side face of the color wheel. Each of these elements 39 is formed with a central portion curved upwardly and outwardly to supplement the baffle function of the parts 14, 14, and they occupy a predetermined fixed position with respect to the color wheel; they are held against lateral displacement by the side walls of the box 8 and against longitudinal displacement by vertical ribs 16 positioned one on each side, and at each end of the box. The baffle plates 14 are positioned with their concave surfaces facing downward and serve to catch all the color fluid which may be thrown upward against them, and, because of their peculiar conformation, they immediately return the fluid toward the bottom of the box.

17, 17 are two upward projecting lugs formed integral with the element 39. These lugs are designed to hold the element 38, to be described, and are provided with the transverse hinge apertures 18.

Each element 38 comprises a scraper device 40 adapted to engage with the peripheral surface of the color wheel at points approximately equi-distant from its central vertical line, and a transverse hinge formed of pins 19. The hinge pins are fitted in the apertures 18 in the aforesaid lugs 17. At the end which bears against the color wheel, each scraper is formed with a slot 40^a approximating in width that of the peripheral tongue 8^a of the color wheel. The depth of the slot is somewhat greater than the radial depth of this peripheral surface of the tongue and the bottom of the slot. The bearing edges of the scraper device rest upon and scrape the shoulders 8^b of the color wheel 8 and serve to remove therefrom the fluid which adheres to these shoulders and to the side faces of the tongue 8^a. The operative part of the scraper device 40 is made of comparatively heavy material, and gravity alone is relied upon to hold it in constant contact with the said shoulders and sides. The length of the pins 19 is such that when the lugs 18 are lifted above the top edges of the box, the pins can be inserted into the lugs 17 by first slipping one pin into the aperture 18 in its lug 17, and then continuing this slipping far enough to permit the opposite pin 19 to be brought to align with the aperture in its lug, after which it can be slipped in the opposite direction into the latter. Then the device 37 can, as an entirety, be slipped downward into the box 8 to its operative position; and after the lugs 17 have descended below the top edges of the box walls, the latter prevent the hinge pins 19 from slipping laterally and hold the scraper 38 in its proper central position.

23 is a float of any suitable buoyant material. 24 is an upright secured to it and pivoted at 25 to a lever 26. The latter is, in turn, pivoted at 27 to a bracket 27^a, which is secured by a clamp 27^b to the side wall of the color box 8. The outer end 28 of the trip lever 26 is adapted, under certain circumstances, to engage with a valve-operating lever 29, and thereby open or close a valve 30 to which the lever 29 is connected. 32 is a tank adapted to hold a considerable amount of coloring material, and into the bottom of this tank is fitted the duct carrying said valve 30.

The tank is held by any suitable means at one end of the framework A which supports the printing machine, as an entirety, and is so positioned that when the valve 30 is opened by the lever 29 and tripper 28, the liquid flowing through the valve duct will be discharged into one end of the color box 8. The valve 30 is held normally closed by a spiral spring 34 so that when the car 2 is moving away from the tank 32 and the end of the lever 28 is receding from the valve tripper 28, the valve will be immediately closed and improper discharge of coloring matter will be avoided, after the end of the box has passed from beneath the valve aperture 33.

The float 23, valve 30, and the intermediate actuating devices are so adjusted and related as to maintain, constantly, in the box the amount of fluid which is proper in relation to the baffle plates 14 and the scraper 40. The level of the fluid controlled by the float should be such that, on the one hand, the color wheel will always have a section of its periphery immersed to the predetermined depth, and, on the other hand, the quantity of the fluid picked up by the wheel will not be too great to be properly controlled by the scraper 40 and the baffles 14. And, again, the parts should be so adjusted that the quantity supplied from the stationary tank 32 and maintained constantly in the box will not be so great as to result in the throwing or spurting of fluid upward at times when the box is stopped in its movement in one direction and then quickly reversed.

The color-carrying and printing devices of earlier designs have been supplied intermittingly by manually pouring the fluid from portable vessels. If the pouring was effected while the box and carriage were in

operation, unavoidable spilling by the operative occurred, there was no assurance of uniformity in the quantities introduced and there was, inevitably, a slopping from the box of the color fluid. If the box and carriage be stopped to permit the supplying of more fluid there was much loss of time incident to the stopping and starting again of the apparatus.

All of these disadvantages are obviated when using my mechanism. The automatically acting parts are so adjusted, as above stated, that the material in the box is accurately regulated, and evenly distributed, and the baffle and scraping means are so related to the supply devices that all the parts can be maintained in a practically perfectly clean condition.

The box is imperforate, not having any apertures through its walls to receive the hinge pins of the scraper 40, or for any other purpose. On the other hand, the several parts, it will be seen, are so made and related that they can be separated or can be put into position, and there held operatively, without requiring the forming of any apertures through the box walls. The scraping and baffling device 37, regardless of its being made in several parts, can be detached, or inserted into position by a vertical slipping movement without requiring the removal or insertion of pins, screws, or the like. And this enables me to construct the box of materials that were not heretofore available. The color material used contains components which prohibit the use of cheap metals if there are any points where the metal is exposed to contact with such components, rusting or the like being caused wherever there is such contact. And such exposure of metal necessarily occurs where perforations are formed in the walls for the seating of hinges, pivots, pins, screws or the like. Hence these coloring boxes have heretofore been made of non-metallic substances such as hard rubber, which resist the action of these components; but the use of rubber largely increases the expense. By constructing and relating the scraping and checking devices in such way as to avoid the forming of apertures or perforations in the walls of the box, I am enabled to make it of cheap metal as I have to merely cover it at all fluid contacting points with a surface of refractory, earthy or the like material.

At present I prefer to make it of thin enameled metal. Such material has been prohibited heretofore as the work to be done required also the scraping devices, checking plates and the like, and the latter devices have in earlier boxes, required the forming of apertures, as above described, through the walls to receive hinges, pivot rods, or screws; and if such walls were made of metal, rusting and deteriorating thereof would unavoidably occur at the points exposed by the drilling or cutting of apertures or perforations.

The employing of the enameled metal reduces the cost to approximately one-half that which is incident to the use of rubber for the boxes.

Moreover, the boxes require frequent cleaning, both for removing foreign materials that accumulate, and also because of the necessity of changing from one coloring matter to another. And such cleansing can be readily effected because of the smooth vitreous enameled surfaces formed on the metal walls.

The enameling can be readily applied in such way that although the scraper and the scraper supports are largely in contact with the walls of the box, the metal surfaces beneath the enamel are protected from exposure through cracking or wearing away of the enamel, and the metal at the lower end parts of the slots which serve as bearings for the shaft 11, can be similarly protected.

What I claim is:

1. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, a vertically swinging scraper in the box, and a holder for the scraper resting loosely on the bottom of the box and removable therewith from the box, vertically, independently of the box walls.

2. In a yarn printing mechanism the combination with the yarn holder, the printing wheel, and the carriage therefor, of a color box, a scraper for the wheel, a supporting holder for the scraper normally retained loosely within the box and supported by the walls thereof in fixed operative position relatively to the wheel, and removable from said position without requiring the removal of fixed attachments.

3. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, a wheel scraper in the box, a loosely mounted vertically removable holder for the scraper, the latter being vertically movable independently of the holder and also bodily movable vertically therewith.

4. In a yarn printing mechanism the combination with the yarn holder, the printing wheel and the carriage therefor, of a color-carrying box with imperforate walls, a scraper in the box for the wheel, a hinge element supporting the scraper and permitting it to swing vertically, and hinge-supporting means within the box normally held loosely by the walls thereof in operative position and bodily movable relatively to the wheel independently of said walls.

5. In a yarn printing mechanism, the com-

bination with the yarn holder, the printing wheel, and the carriage therefor, of a color box having end walls with parts which are inclined to the vertical, and side walls loosely supporting said wheel, all of said walls being imperforate, a scraper in the box for the wheel, a hinge for the scraper upon which it swings in the vertical planes of the said inclined parts, and means in the box for holding the hinge in a predetermined horizontal plane, said means being supported loosely by the walls of the box and removable therefrom.

6. In a yarn printing mechanism the combination with the yarn holder, the printing wheel, and the carriage therefor, of a color box, a vertically swinging wheel scraper in the box, and a holder for the scraper supported loosely in the box by the walls thereof and removable vertically independently of any fixed attachment means passing through said walls.

7. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, a wheel scraper in the box, and a holder for the scraper resting loosely on the bottom of the box.

8. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, baffle devices positioned loosely in the corners of the box and held therein against longitudinal movement.

9. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, baffle devices in and resting loosely on the bottom of the box, and a wheel scraper mounted on the baffle devices and adapted to be vertically moved therewith from the box.

10. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, the gravity-held baffle device resting loosely on the bottom of the box and formed with a hinge element, and a wheel scraper on the baffle device and connected to said hinge element.

11. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, means for bodily moving the carriage and box, a stationary holder for coloring material, and devices actuated by the box-moving means for causing the quantity of coloring material in the color box to remain at an approximately fixed level.

12. In a yarn printing mechanism, the combination with the yarn holder, the reciprocating carriage and the printing wheel, of a color box, means for moving the carriage and the box, stationary devices for holding and supplying coloring material to the box, means actuated by the body of fluid in the box to automatically control the flow of material from the stationary holder to the box.

13. In a yarn printing mechanism, the combination with the yarn holder, the printing wheel and the color box, of means for supporting and moving the box, of a holder supplemental to the box for coloring material and stationary relatively thereto, devices for controlling the flow of material from the holder to the box, means on the box for actuating the control devices, and means actuated by the body of fluid in the box to throw the control devices and actuating means on the box into and out of operative engagement.

14. In a yarn printing mechanism, the combination with a yarn holder, of a traveling color box, a printing wheel, means for moving the color box, a wheel scraper in the box, a color holder positioned adjacent the path of travel of the box and adapted to automatically supply color intermittently to said box, and means actuated by the body of fluid in the box to automatically control the level thereof relatively to the wheel.

15. In a yarn printing mechanism, the combination with the yarn holder, the printing wheel and the color box, of reciprocating means for the box, the wheel scraping and fluid-retaining devices in the box, the holder supplemental to the box, said holder being independent of the box and positioned adjacent the path of travel thereof, the automatically acting supply devices, and means actuated by the body of fluid in the box to automatically control the level of the fluid therein relatively to the fluid retaining and scraping devices.

16. In a yarn printing mechanism, the combination with the yarn holder, the printing wheel and the color box, of the fluid-supplying holder supplemental to the box and stationary relatively thereto, the supply controlling devices, and devices carried by the box positioned in lines of travel other than the travel lines of the printing wheel, to actuate the supply controller.

17. In a yarn printing mechanism, the combination with a yarn holder, of a traveling color box, a printing wheel, means for moving the color box, a wheel scraper in the box, a color holder positioned adjacent the path of travel of the box and adapted to automatically supply color intermittently to said box, and means to automatically control the level thereof relative to the wheel.

18. In a yarn printing mechanism, the combination with a yarn holder, of a traveling color-car including a reservoir containing a working level of color-dye therein, means for applying the dye to the yarn on said holder, and means for automatically

and intermittently adding quantities of dye to said reservoir to maintain a desired amount thereof in the reservoir.

19. In a yarn printing mechanism, the combination with a yarn holder, of a traveling color-car including a reservoir containing a working level of color-dye therein, means for applying the dye to the yarn on said holder, and means for automatically and intermittently adding quantities of dye to said reservoir to maintain a desired amount thereof in the reservoir, said last mentioned means being positioned adjacent the path of travel of said car.

20. In a yarn printing mechanism, the combination with a yarn holder, of a traveling reservoir containing a working level of color-dye therein, means for applying the dye to the yarn on said holder, means positioned adjacent the path of travel of said reservoir adapted to add quantities of dye to maintain a desired level in said reservoir, and means for automatically and intermittently causing said last mentioned means to supply fluid to said reservoir.

21. In a yarn printing mechanism, the combination with a yarn holder, of a traveling reservoir containing a working level of color-dye therein, means for applying the dye to the yarn on said holder, means positioned adjacent the path of travel of said reservoir adapted to add quantities of dye to maintain a desired level in said reservoir, and means on said reservoir for automatically and intermittently causing said last mentioned means to supply fluid to said reservoir.

22. In a yarn printing mechanism, the combination of a yarn holder, a color-car carrying a reservoir for color-dye, means for applying dye from said car to yarn on said holder, means for imparting to said car a back and forth movement, and means positioned adjacent one end of the path of travel of said car adapted to raise the level of the dye in said reservoir, and automatic means for intermittently supplying additional dye to said reservoir.

In testimony whereof, I affix my signature.

ALFRED HANSON, Sr.