

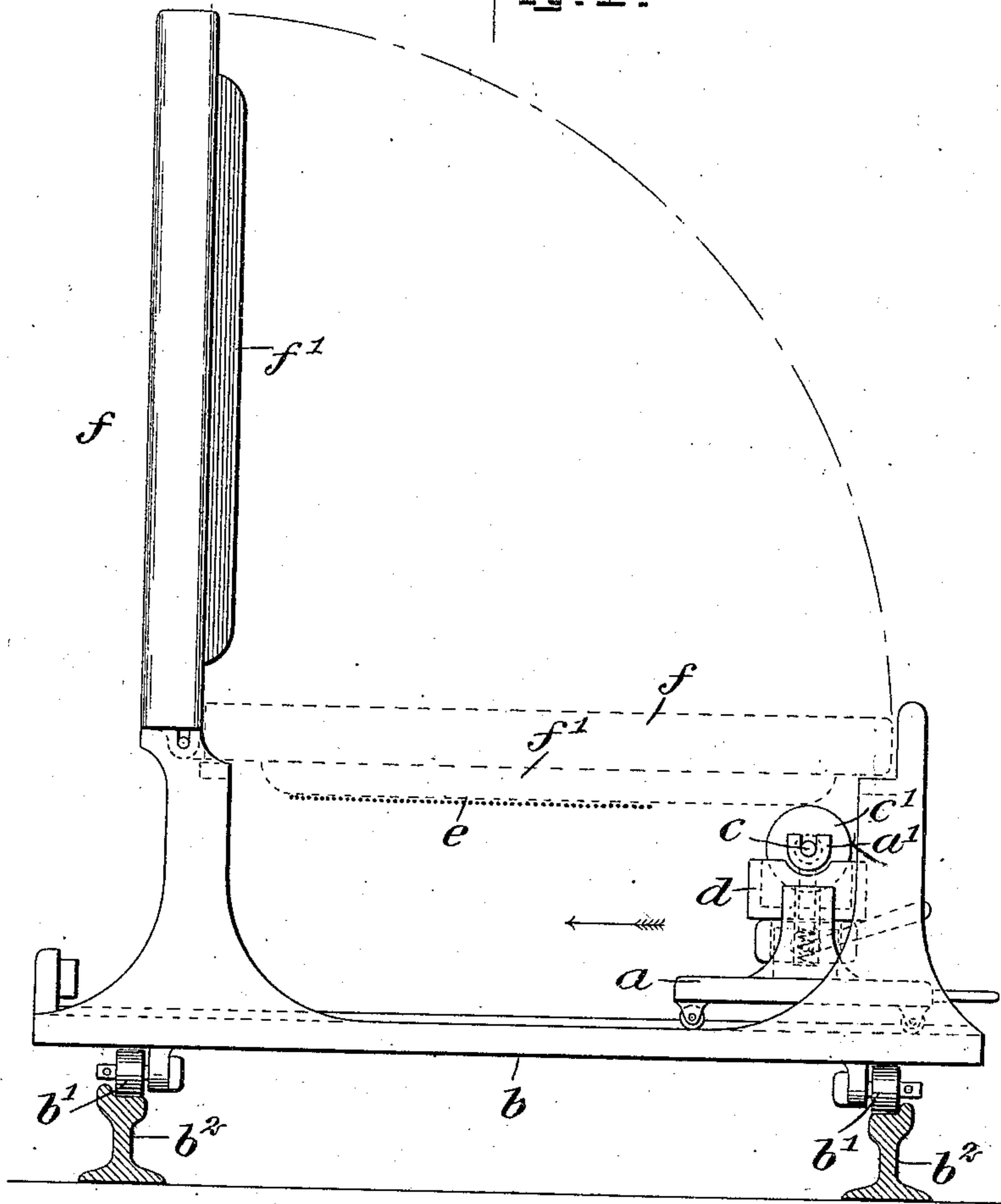
N. COSTIKYAN.
YARN PRINTING MACHINE.
APPLICATION FILED APR. 16, 1908.

928,631.

Patented July 20, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

John C. Cheney
Geo. F. Foster

INVENTOR

Nazar Costikyan

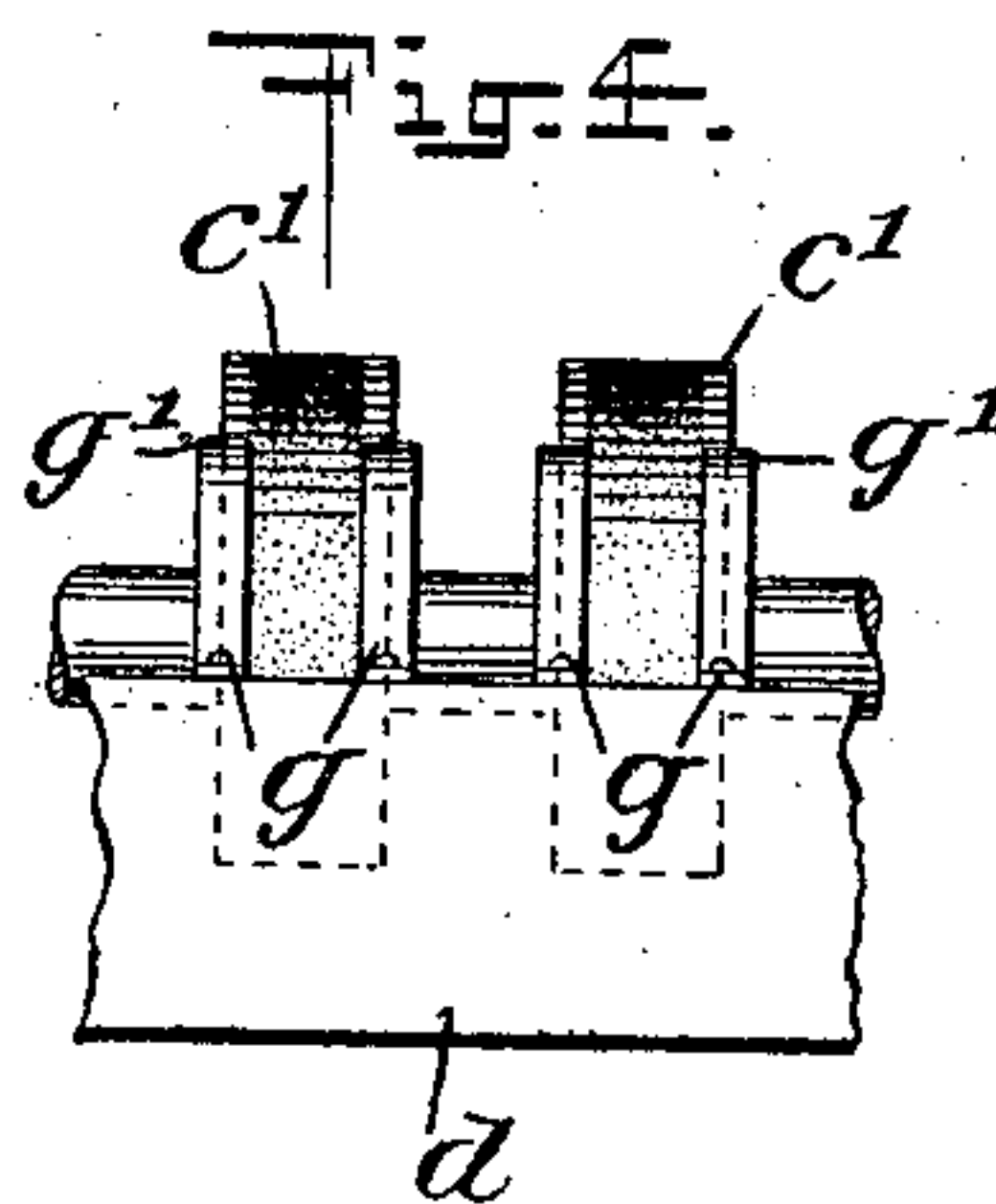
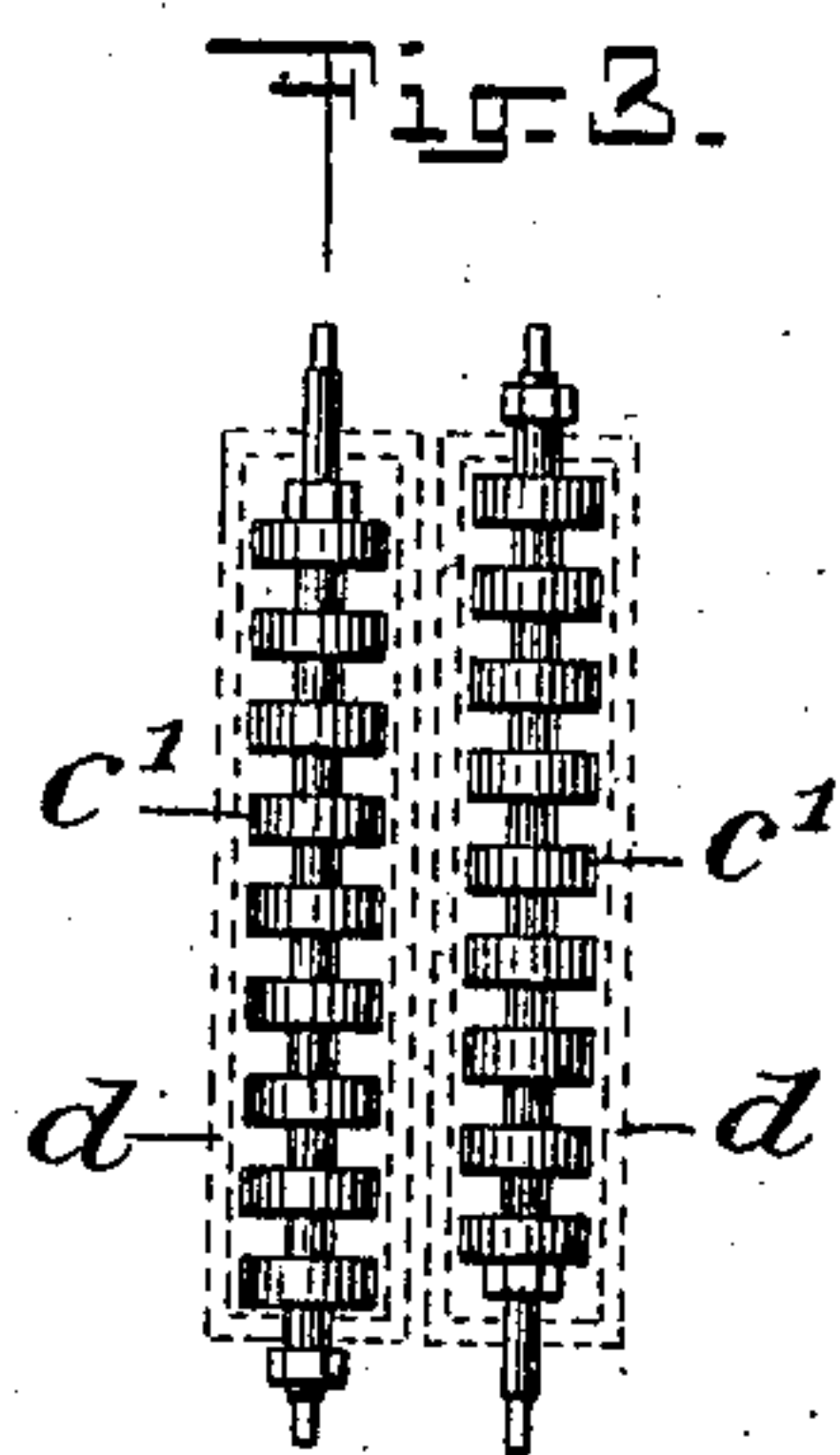
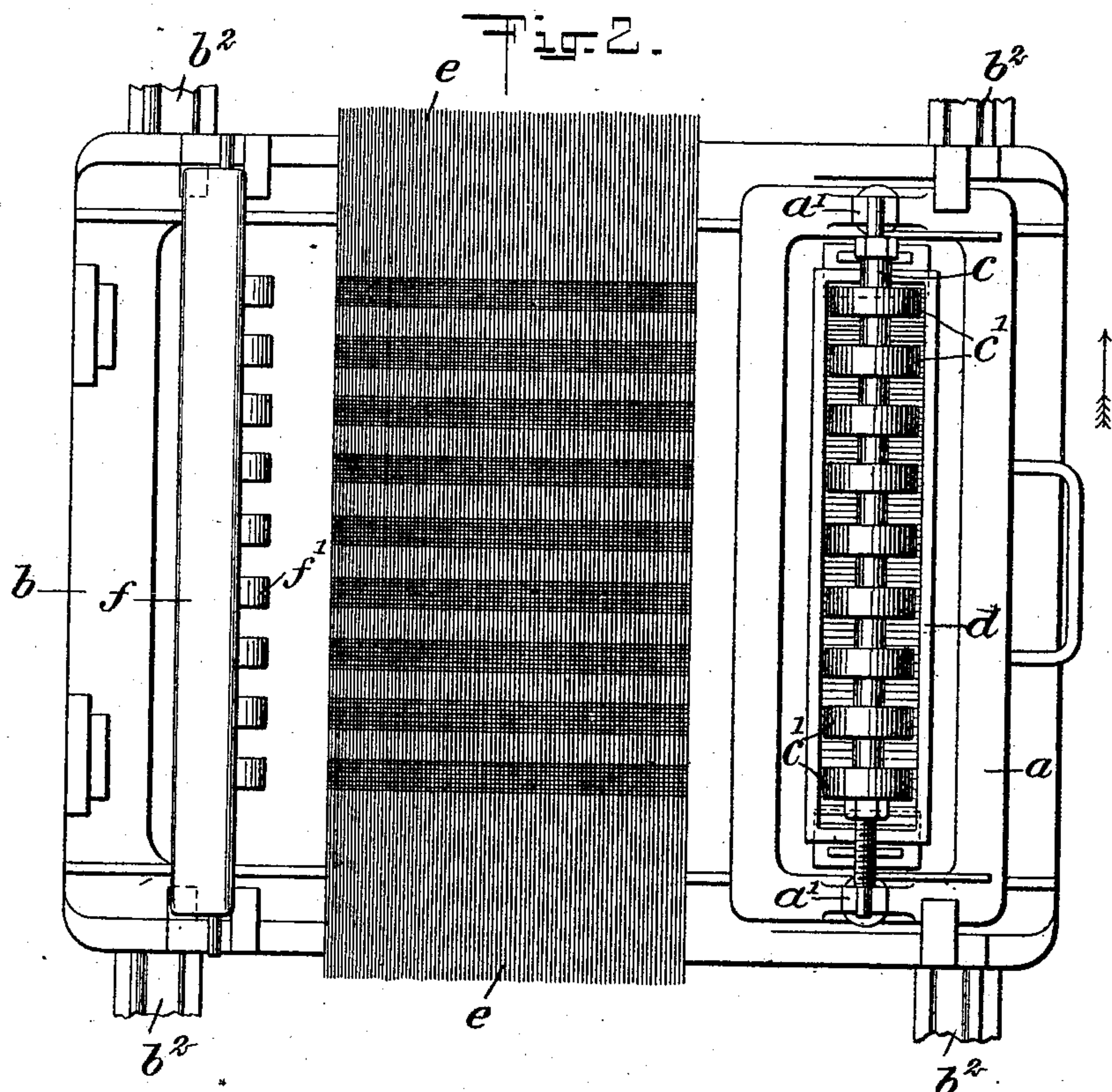
BY *Muir Co*

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UNITED STATES PATENT OFFICE.

NAZAR COSTIKYAN, OF LEICESTER, ENGLAND.

YARN-PRINTING MACHINE.

No. 928,631.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed April 16, 1908. Serial No. 427,315.

To all whom it may concern:

Be it known that I, NAZAR COSTIKYAN, a citizen of the United States, and a resident of Leicester, in the county of Leicester, England, have invented a new and Improved Yarn-Printing Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved yarn printing machine for printing warp yarns, especially carpet or pile yarns, according to a predetermined pattern, and arranged to permit printing at one operation as many knots or spaces as desired and in one or more colors.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is an end elevation of the improvement, the track rail and the yarns to be printed being shown in cross section; Fig. 2 is a plan view of the same; Fig. 3 is a plan view of a modified form of the printing rollers; and Fig. 4 is a side elevation of the means for reducing the printing surface of the printing rollers.

Referring to the drawings, letter *a* represents a carriage or framework adapted as illustrated, to be traversed in the direction of the arrow (Fig. 1) and back again by hand, the carriage having small wheels which run on ways or tracks on a second carriage or framework *b*, provided with bowls on wheels *b'* which run on rails *b²* on the ground, in a direction at right angles to the traverse of the carriage *a*. In spring-supported bearings *a'* in the carriage *a*, is journaled a shaft *c*, or series of shafts, on which or each of which is or are formed or preferably secured a series of printing disks or rollers *c'*, of any desired width which may be uniform or varying to apply color over uniform or varying lengths of yarn according to the result required. The several disks or rollers *c'* may be set at any distance from each other, and if mounted on a single shaft they are held at such distances apart by distance pieces or sleeves of uniform or varying length, each disk or roller being interchangeable with other disks or rollers. The shaft *c* and roller or rollers *c'* may, however, be constructed and arranged

in any other manner to form a plurality of printing surfaces to suit the purpose of my invention, without departing from the spirit or scope thereof.

According to one method of applying the color to the yarn to print the same, I provide a trough or color box *d*, to contain the liquid color or dye, the said trough or box being supported under the shaft *c*, so that the disks or printing surfaces *c'* may enter thereinto and revolve in the color or dye, to take up same and transfer it to the yarn to be dyed. In this instance the trough or color box *d* is supported at each end by blocks adapted to slide vertically in ways in the carriage *a*, to enable same to be moved into the position shown, or to be lowered to place the dye or color clear of the disks, the blocks being moved vertically by eccentrics actuated by a hand lever or levers, one lever serving if the eccentrics are mounted on a common shaft, or any other motion may be adopted for vertically adjusting the color box.

The yarn to be printed is represented at *e*, the same being doubled or carried backward and forward as many times as required to limit the space occupied therefor, and attached at each end to suitable supports to hold the ends of yarn distended, each length or end of yarn preferably passing through a reed near each end support, to maintain the same in an open level condition to present each single length or end of yarn to the printing rollers. At the side of the carriage or framework *b* opposite to that normally occupied by the printing disks *c'*, is hinged or pivoted a table *f*, which is adapted to be turned down and secured in the horizontal position shown in dotted line, to form a support for the yarn which is pressed against the said table by the printing rollers as they are reciprocated across the yarn under said table, the spring support bearings carrying the shaft *c* allowing the rollers or disks thereon to move bodily in a vertical direction, to adjust themselves to the required position to press against the yarn and table *f*.

The table may be provided with a series of projecting surfaces *f'*, for the rollers or disks *c'* to engage with, or it may have a solid face providing more than one set of rollers or disks *c'* be employed.

The yarn *e* held tightly against the underside of the table *f*, is printed in sections by traversing the carriage *a* at right angles under same to and fro as many times as de-

sired, the frictional contact of the rollers or disks with the yarn against the table during each traverse of the carriage, imparting rotary motion thereto, whereby they revolve through the dye liquor or coloring media in the trough or color box, and transfer portions of same to the sections of yarn engaged, such sections or knots being thus dyed or printed as indicated at Fig. 2.

After dyeing or printing one portion of yarn, the carriage *b* is forced endwise in the direction of the arrow (Fig. 2), to bring the printing rollers or disks opposite a fresh portion of warp, which is then similarly dyed or printed, the operations being repeated until the whole length of warp distended between two points has been acted upon. In pushing the carriage *b* forward in the direction of the length of the warp, the table *f* is meanwhile raised and then lowered and secured in position again for the next printing operation.

By reversing the shaft *c* in its bearings, the disks or rollers *c'* may be brought into position linable with the undyed sections of warp to print same if desired, the table *f* being interchangeable with other tables either having an unbroken face or having ribs or projecting surfaces in alinement with the disks. More than one set of printing disks or rollers may be employed at one time, the disks or rollers on one shaft *c* occupying positions intermediate those on the adjacent shaft or shafts *c*, somewhat as illustrated in Fig. 3, each set of rollers applying a different color to the warp and dyeing or printing the whole of each section presented thereto at one time.

The width of each printed portion of yarn is determined by the widths of the several disks or rollers and the distance they are set apart from each other, as for instance, the rollers in one set may be different widths to print narrow and broad sections of yarn as may be required for the design in the woven fabric to be produced.

Although it is preferable to have the printing rollers movable under the yarn, the yarn could be held over a table below the printing rollers, the latter being supplied with the dye or color from an overhead trough or color box, and the table *f* and parts to which the yarn is secured could also be traversed over the printing rollers, or one might be traversed in one direction and the other in an opposite direction at each printing operation. If the disks or rollers on the shaft *c* are required to print different colors, the trough or color box would be divided into sections and each section supplied with a different color or dye for transference by the respective rollers or disks to the yarn, or a separate color box could be employed for each roller or neighboring rollers printing the same color.

A drying chamber or cylinder of any ordi-

nary type may be provided for drying the yarn as it is printed, said chamber or cylinder being suitably located on the apparatus close to the warp, so that as it is brought into proximity to the last dyed portions the heat radiating therefrom will dry the dye or color laid on the warp. I have not shown such a cylinder on the drawing as it can be variously applied and may be of any known construction.

The frame or carriage *a* and the carriage *b* can be conveniently actuated by hand, or they could be actuated by power, if required.

Instead of the yarn to be printed being held by fixed connections at each end as described, it may be wound on a beam and by unwinding it from said beam and winding it onto another beam, successive portions of the yarn would be brought opposite the printing rollers. In this case the carriage *b* could be dispensed with and a fixed framework employed to support the table *f* and the carriage *a*.

If the color applied to the yarn by the rollers should run or spread and thus dye the yarn over spaces exceeding the width of the rollers, I apply to the apparatus means for removing the color or dye from the edges of the rollers, said means comprising a plate or plates of any suitable metal or material which may be secured to or pivoted on the trough *d* or carriage *a*, so as to engage or be engaged with the edges of the rollers and form scrapers to remove the dye carried up out of the trough by the rollers from the edges thereof. I have shown one example of this at Fig. 4, where *g* represents plates secured to opposite sides of the trough and having extensions *g'* and *g'* thereon, suitably shaped to fit against the edges and sides of the rollers, upon which they press lightly and thereby scrape off or remove the color from the portions so engaged, whereby the width of color transferred to the yarn will be less than the width of the roller and the spreading of the color along the fibers will therefore not exceed the full width of the rollers. Instead of fixed plates, pivoted fingers or plates could be used for the same purpose, these being easily moved out of the way when not wanted. The engaging surfaces of the fingers or projections could be covered with india rubber or other suitable material if desired.

By means of the apparatus described, I am enabled to print each single yarn separately as in drum printing machines, but instead of printing one knot only at a time I can print any desired number of knots at one operation.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A printing machine for printing yarn

stretched in a plane, comprising a carriage movable in the direction of the length of the yarn, a second carriage movable transversely on the said first-named carriage, 5 printing means on the said second carriage for printing the said yarn, and a table hinged on the said first-named carriage and adapted to form a sustaining surface for the yarn on the side opposite the one engaged by the said 10 printing means.

2. In a printing machine for printing yarn stretched in a plane, a carriage movable transversely of the yarn, spring supported bearings on the carriage, shafts journaled in 15 the bearings, rollers or disks on the shafts, a color box in which the disks move, means for removing the color from the edges of the rollers or disks, a hinged table adapted to be positioned against the yarn, and a carriage 20 movable longitudinal of the yarn upon which the first carriage is mounted.

3. A printing machine for printing yarn stretched in a plane, comprising a carriage, means for permitting said carriage to move 25 transversely of the yarn, means for permitting said carriage to move longitudinally of

the yarn, a color trough supported on the carriage, cams for supporting the color trough, levers connected with the cams whereby to 30 operate the cams to raise and lower the carriage, and a plurality of spaced printing rollers rotatably mounted in the trough.

4. A printing machine for printing yarn stretched in a plane, comprising a carriage, means for permitting said carriage to move 35 transversely of the yarn, means for permitting said carriage to move longitudinally of the yarn, a color trough supported on the carriage, cams for supporting the color trough, levers connected with the cams 40 whereby to operate the cams to raise or lower the carriage, a plurality of spaced printing rollers rotatably mounted in the trough, and means for limiting the amount of color on the edges of the said rollers. 45

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NAZAR COSTIKYAN.

Witnesses:

THEO. G. HOSTER,
JOHN P. DAVIS.