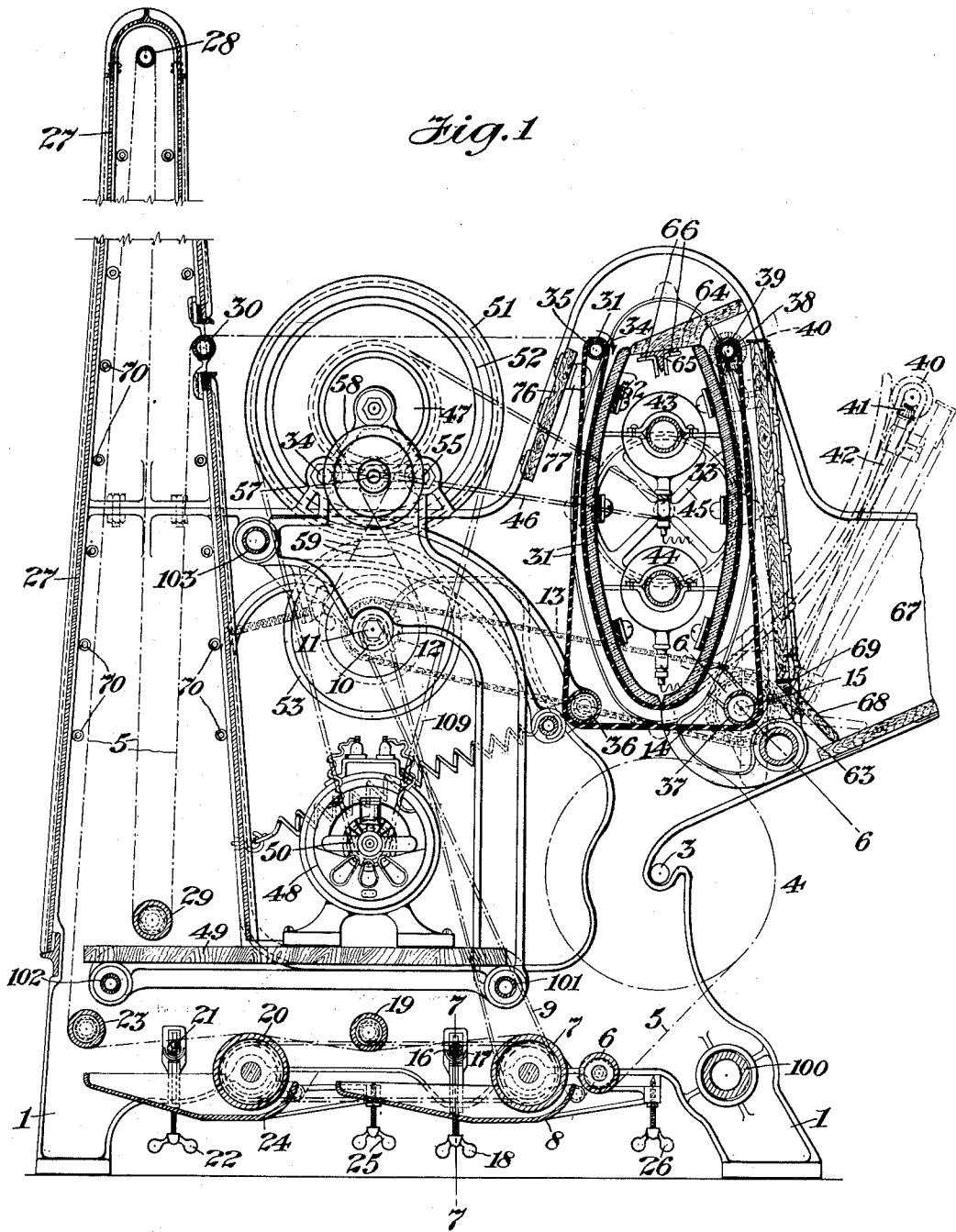


976,164.

Patented Nov. 22, 1910.

5 SHEETS—SHEET 1.



WITNESSES
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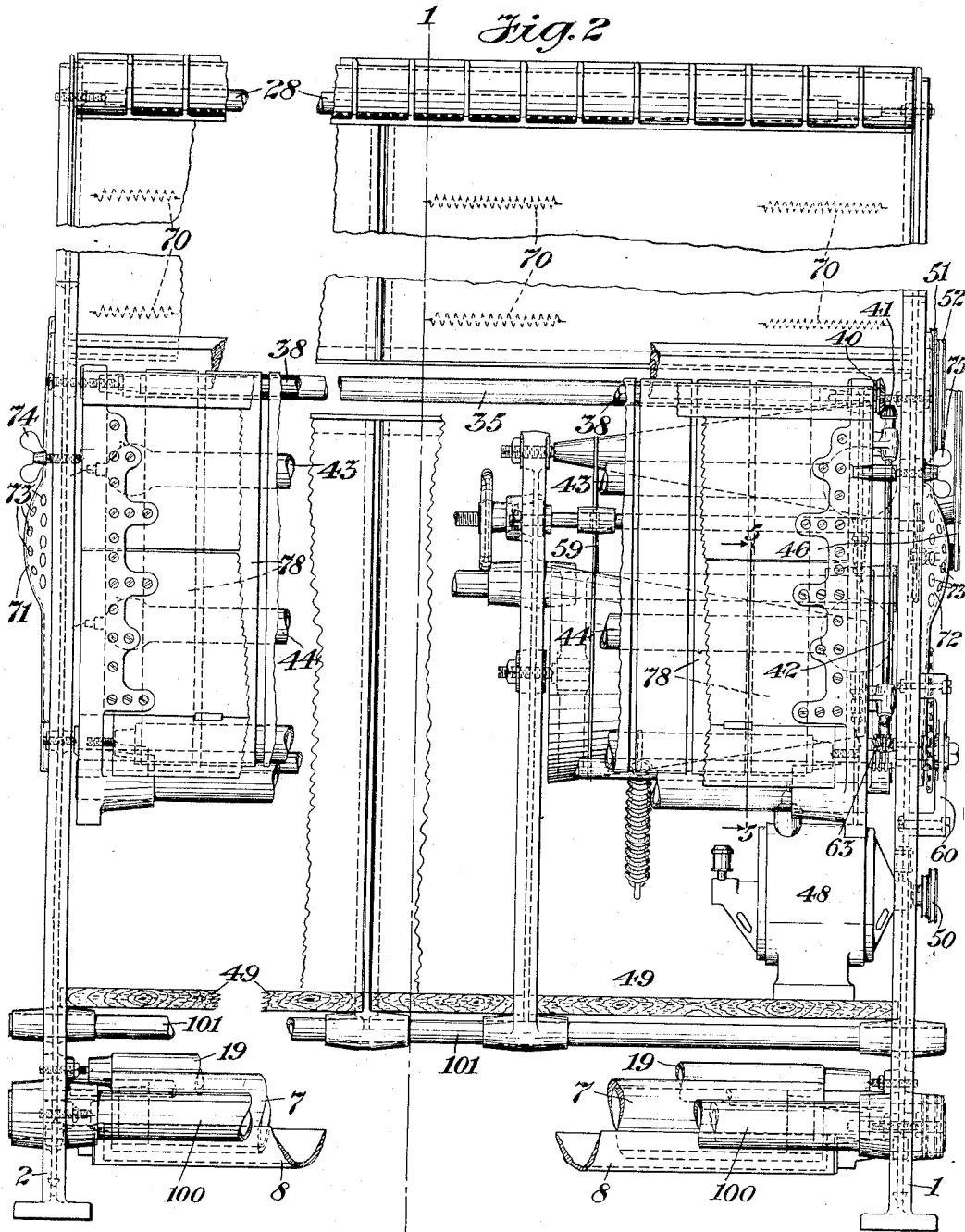
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BLUE PRINTING MACHINERY.
APPLICATION FILED NOV. 23, 1908.

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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 3

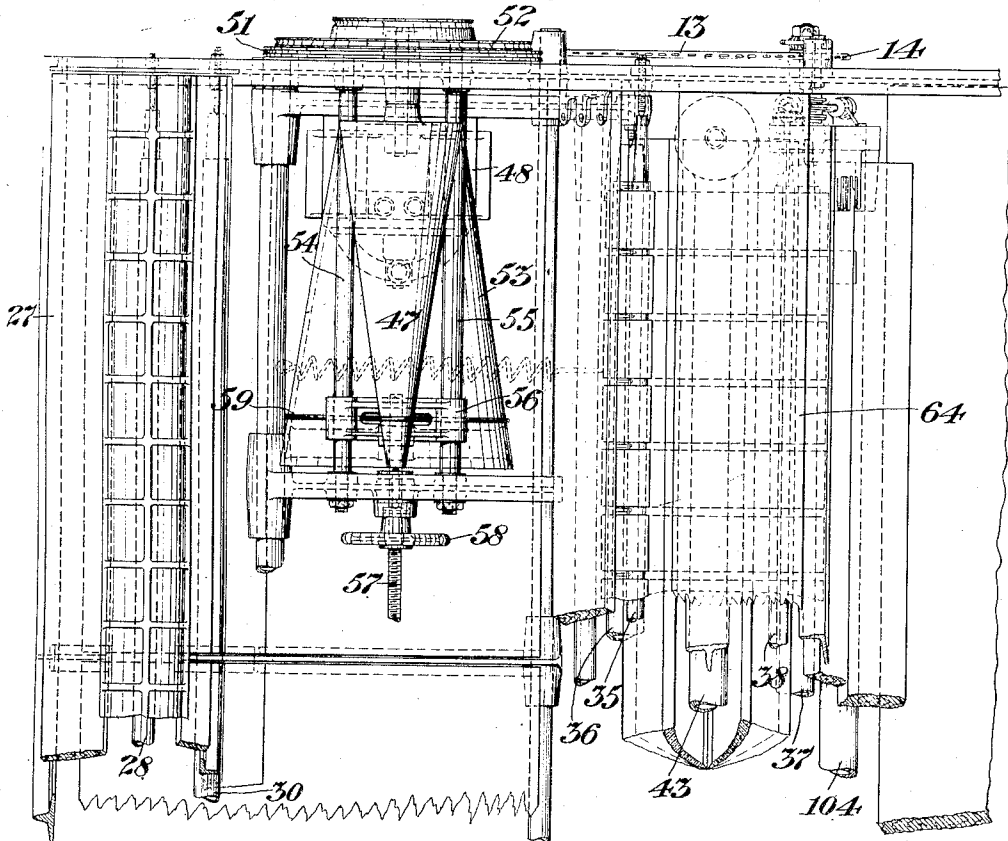
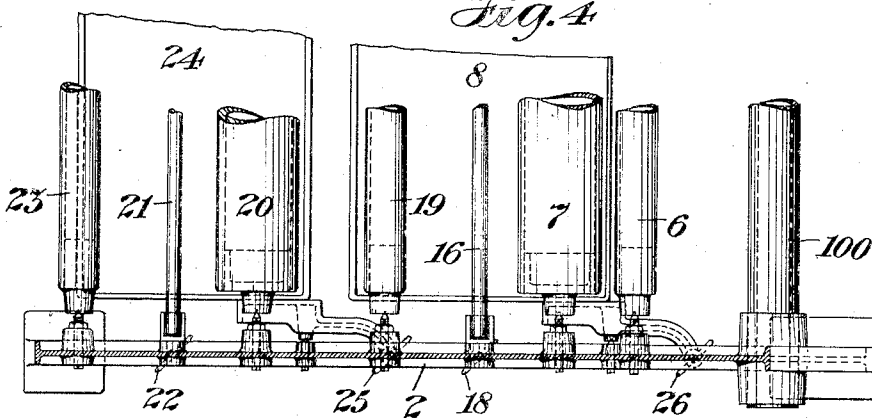


Fig. 4



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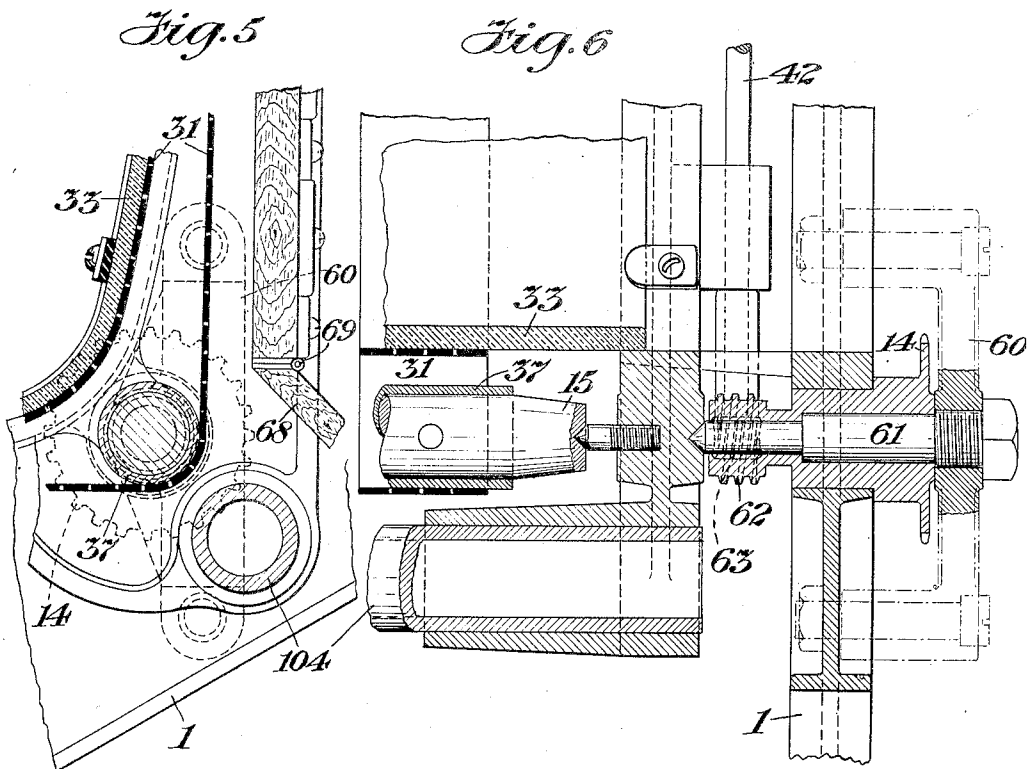
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5 SHEETS—SHEET 4.



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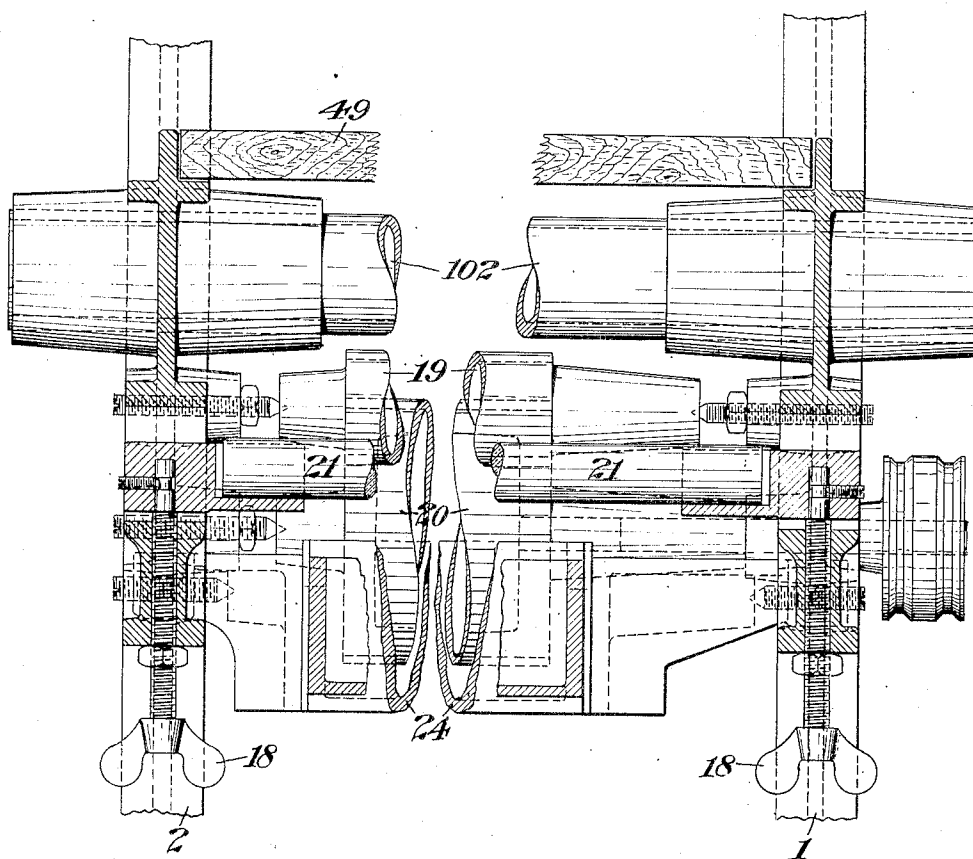
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5 SHEETS—SHEET 5.

Fig. 7



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BLUE-PRINTING MACHINERY.

976,164.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed November 23, 1908. Serial No. 464,009.

To all whom it may concern:

Be it known that I, MORRIS GOLDSTEIN, a citizen of the United States, and resident of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Blue-Printing Machinery, of which the following is a specification.

My invention relates to improvements in blue printing machinery and its purpose is to provide a machine of this character which will not only produce blue prints successfully but will also prepare for printing the paper which is used in the machine.

It is well known that blue print paper and other prepared papers covered with sensitive coatings for the reproduction of designs, tracings, sketches, negatives, or the like, deteriorate rapidly even under the most favorable conditions, so that it is often necessary to discard such papers before it has been found possible to use them, thereby entailing a considerable loss.

By the present invention I provide means for preparing the paper just prior to its use in the blue printing machine and in this way I save the waste referred to and besides am enabled to utilize the paper at a time when it is most actively sensitive to the impressions which are to be made upon it. The means by which I accomplish this result will be fully described in the present specification and are illustrated in the accompanying drawings, in which:

Figure 1 is a sectional elevation of the machine, the section being taken along the line 1—1 in Fig. 2; Fig. 2 is a front elevation of the machine, some of the parts being broken away to show the interior more clearly; Fig. 3 is a plan; Fig. 4 is a sectional plan of the apparatus constituting the coating device for the paper; Fig. 5 is an enlarged section along the line 5—5 in Fig. 2; Fig. 6 is an enlarged section along the line 6—6 in Fig. 5; and Fig. 7 is a sectional elevation along the line 7—7 in Fig. 1, looking toward the left.

For convenience I shall hereinafter describe the sheets on which the reproductions are made as "printing sheets" and the designs, drawings, sketches, negatives, or the like which are reproduced as "transparencies." It will be understood that the transparencies may themselves be printed on paper or other material which is more or less thick, ranging from oiled paper to heavy

cardboard, but no mistake will be made by referring to them as transparencies, in view of the foregoing explanation.

So far as relates to that part of the present machine where the printing is done, it is one in which the materials of the printing process including the printing sheets and the transparencies are moved along the surface of a transparent body behind which they are exposed to the light from one or more sources of illumination. By varying the speed, printing effects of various depths may be obtained, or the speed may be varied in order to compensate for different thicknesses or densities of the material of the transparencies.

In that part of the machine which has to do with the preparation of the paper by coating it with suitable chemicals, I provide one or more tanks or basins containing the said chemicals in solution, and I pass the paper which is to be coated therewith over rollers which dip into the said tanks or basins and are constantly wetted with the solution. I also provide means for keeping the paper taut and as a final means of preserving the integrity of the paper and preventing slack and undue stretching thereof, I so arrange the feeding devices and rollers over which the paper passes that the major portion of the paper is held in a substantially vertical position, instead of being extended horizontally which would result in a stretching of the paper at points between the supporting rollers. This is an important part of my invention and forms the subject of some of the appended claims.

Referring to the drawings, 1 and 2 are the main standards constituting the frame of the apparatus. These parts are connected by cross-ties, 100, 101, 102, 103 and 104. In the frame 1, 2 is mounted a shaft, 3, carrying a reel or roller, 4, on which is wound a wide sheet of paper, 5, extending across the machine and often having a width of forty-two or fifty-four inches. It is, of course, understood that machines may be built which are adapted to feed paper of any width for the purposes of the present invention. The paper is drawn off the reel 4 by means which will be described later on. For the present, it is only necessary to say that the paper is passed under the roller, 6, suitably mounted within the frame and is thence

passed over another roller, 7, which at its lower part dips into a tank or basin, 8, containing in solution the proper chemicals for coating the paper with a surface adapted to receive blue print impressions. The roller 7 is kept in rotation by means of a belt, 9, which at its opposite end surrounds a pulley, 10, mounted on a shaft, 11, carrying a sprocket wheel, 12, adapted to engage with a sprocket chain, 13, driven by a sprocket wheel, 14, on a shaft, 15. The means for driving the shaft 15 will be described presently.

Manifestly, the roller 7, being rotated by the belt 9, will present to the paper 5 a surface constantly wetted by the chemical solution taken from the tank or basin 8. Accordingly, when the paper passes over the said roller its surface becomes itself wetted by the same chemical solution and is thus in a preliminary way prepared for the purpose of the apparatus as a whole. Beyond the roller 7 is arranged a solid glass rod or bar, 16, held within a bracket, 17, and adjustable up and down by means of a thumbscrew, 18. The purpose of this glass rod is to serve as a scraper for removing the excess of chemical from the surface of the paper and this is facilitated by the action of a roller, 19, which presses the paper down upon the scraper. I usually pass the paper over a second roller, 20, similar to the roller 7 and having a similar effect upon the paper; that is, the effect of coating one surface thereof with the proper chemical solution. Beyond this roller is another scraper, 21, similarly adjustable by means of a thumbscrew, 22, and I also provide a roller, 23, for pressing the paper down upon the scraper 21, as before. The roller 20 dips into the pan or basin, 24, similarly to the tank or basin 8. It will be seen that the pans or tanks themselves may be adjusted vertically by means of thumbscrews, 25, 26.

Beyond the roller 23 the paper is carried up and down through a housing, 27, being moved near the top thereof over a roller, 28, and near the bottom thereof under a roller, 29, and traveling again over a roller, 30, at approximately the middle of the housing. By the arrangement thus indicated it will be seen that the paper is positively held from collapse by being supported mainly in an approximately vertical position instead of being laid out horizontally and supported by rollers at considerable distances from each other. The paper is thus always held taut and there is no undue stretching at any one point which might interfere with the proper feeding of the paper to the point where it is to be used.

At the roller 30 the paper passes out of the housing 27 and is led over to a belt, 31, and passed between the said belt and one side, 32, of a curved transparent piece, pref-

erably of glass, which is supported in such relation to a similar piece, 33, as to form with it the U-shape already referred to. The belt 31 is caused to travel in the direction of the arrow, 34, around the major portion of the U-shaped transparent chamber, the said belt being supported on suitable rollers, 35, 36, 37, and 38, the latter of which rollers receives motion in the proper direction from a shaft, 39, which carries a bevel gear, 40, engaging with a corresponding bevel, 41, on an approximately vertical shaft, 42. The belt is thus moved in the direction indicated by the arrow 34 and it carries with it the paper constituting the printing sheets. Within the U-shaped chamber are supported lamps, 43, 44, which may be any suitable types of lamp, and which are preferably mercury vapor lamps of the Cooper Hewitt type. The lamps are kept cool by means of a fan, 45, operated by means of a belt, 46, connected with the main driving cone, 47.

The driving mechanism will now be described. The source of power is a motor, 48, supported on a base or bottom, 49, which is itself held up by the frame pieces 1 and 2 from the driving belt 50 of the motor, 48. A belt, 109, passes to one or the other of the belt pulleys, 51 and 52, on the outer end of the main driving cone 47. Below this cone is a reverse cone, 53, mounted on the shaft 11 already described. Between the two cones are arranged two horizontal rods 54, 55, on which a belt guide, 56, is adapted to slide under the influence of a screw, 57, operated by a hand wheel or other device, 58. The belt, 59, which connects the two cones 47 and 53 passes through an opening in the belt guide 56 and is adapted to be moved along the cone whenever the said belt guide is pushed in or out by the action of the screw 57. In this way an adjustment of the speed of rotation of the mechanism is obtained, as will be readily understood. As already stated, a belt 46 passing over the cone 47 communicates motion to the fan 45. It is also evident that the belt 59 communicates motion to the shaft 11 on which is mounted the sprocket wheel 12, the sprocket chain 13, engaging with the said sprocket wheel 12 is driven thereby and communicates its motion to a sprocket wheel 14 on the shaft 15.

The shaft 42 described above, receives its motion from the sprocket wheel 14 as clearly shown in Fig. 6. This sprocket wheel is mounted within a frame, 60, bolted to the main frame of the machine and is mounted on a stud, 61, which on its inner end passes through a worm gear, 62, forming piece with the sprocket wheel 14. On the bottom of the shaft 42, as shown in Fig. 2, is a worm wheel, 63, which engages with the worm gear, 62. Thus by the action of the sprocket

chain 13 which derives its motion from the shaft 11, the upright shaft 42 is operated for moving the belt 31 as already described.

Coming now to the details not heretofore mentioned, it will be seen that above the mouth of the U-shaped chamber formed by the glass pieces 32 and 33, is supported a guide or platform, 64, which is adapted to receive the transparencies and guide them into place between the printing sheets 5 and the glass of the illuminating chamber. This guide or platform is supported at its ends by T-shaped irons, 65, lying in L brackets, 66, 66, as shown in Fig. 1. The platform is preferably of wood and is so represented in the drawings. At its underside and near its outer edge the platform is curved in shape so as to throw out the printed sheets and the transparencies as they emerge from the space between the belt and the wall of the illuminating chamber and give them a tendency to turn downward into a receptacle, 67, where they are gathered up at will. To admit of getting at the inside of the chamber for inserting the lamps or cleaning the lamps, as the case may be, a part of the frame is made movable upon the cross piece 104 as a pivot. Fig. 1 shows in broken lines this part of the frame moved outward for the purpose indicated. To provide means for closing the receptacle 67 I use an inclined piece, 68, and in order that this may not be in the way when a portion of the frame is moved outward as above described, I hinge said piece at 69 so that it will fold up out of the way when the described action takes place.

The chamber within the housing 27 serves not only the function given to it but may be used as a drying chamber and for this purpose I provide within the said chamber electrical resistances, 70, 70, in suitable number as shown in Figs. 1 and 2. These resistances are traversed by an electric current the source of which is not here shown and they heat the chamber within the housing 27 and thereby dry the sheet 5 after it is covered with the chemical coating necessary for the reproduction of the transparencies.

At the opposite sides of the machine I show casings, 71, 72, provided with perforations, 73, 73. These casings can be removed or turned down on the pivot whenever it is desired to insert new lamps in place or to attend to lamps already in position. When covering the ends of the lamps the perforations serve as means of ventilation, the air passing in at one side through the chamber and out at the other side. The casings are fixed in place by thumb screws, 74 and 75, as shown.

The part shown at 76 is a board or other support running along the face of the belt and carrying lugs, or guides, 77, for separating the sections, 78, 78, thereof from one another so as to prevent their overrunning.

I claim as my invention:

1. In a blue printing machine, a U-shaped chamber comprising two bent portions forming the U and meeting at the bend thereof, a pivot on which one of said bent portions is mounted, the said pivot permitting the said bent portion to swing outward for access to the interior of the chamber.

2. The combination in a single machine, of a driving shaft, a transparent chamber, electric lamps therein for illuminating the interior of the chamber, a perforated casing at each end of the chamber, a fan operated by the driving shaft for cooling the chamber, a belt surrounding the chamber, intermediate mechanism between the driving shaft and the belt for operating the latter, and means for preparing blue print paper, said means being operated by the driving shaft, the said belt cooperating with the walls of the transparent chamber for feeding the said paper through the space between the belt and the wall of the illuminated transparent chamber.

Signed at New York, in the county of New York, and State of New York, this 18th day of November A. D. 1908.

MORRIS GOLDSTEIN.

Witnesses:

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