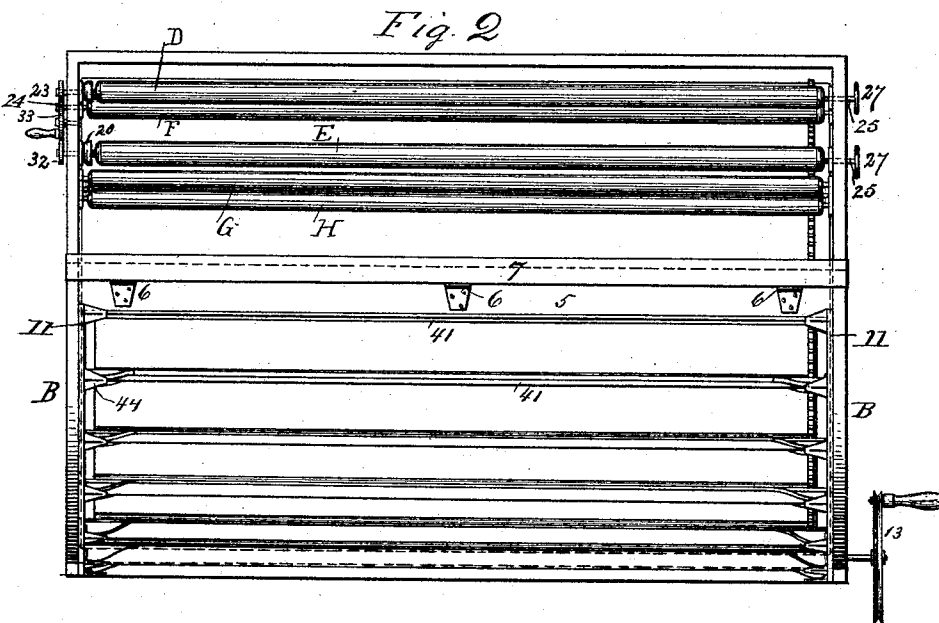
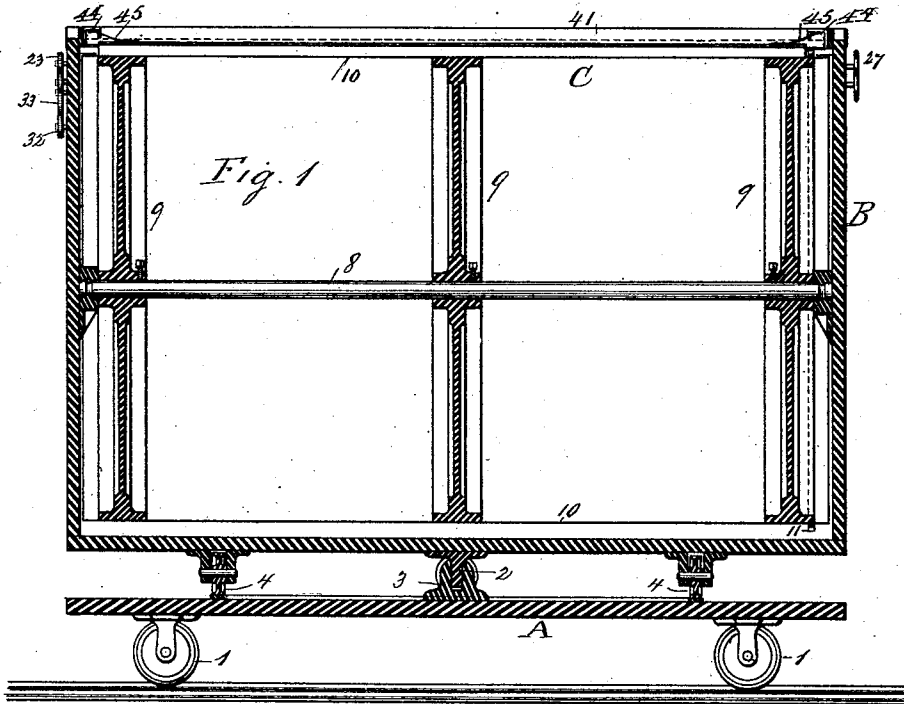


P. HEINZE.
BLUE PRINTING APPARATUS.

No. 469,244.

Patented Feb. 23, 1892.



Witnesses
Otto Luebkert
Rudolph Lotz

Inventor
Paul Heinze
By his Attorney Wm. Lotz

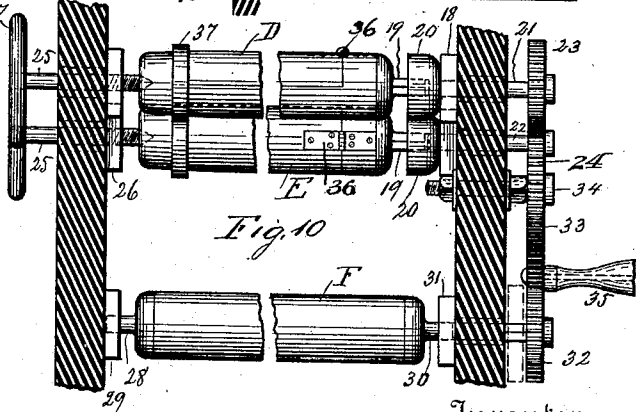
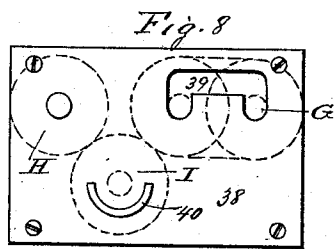
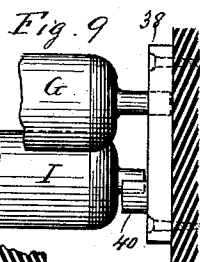
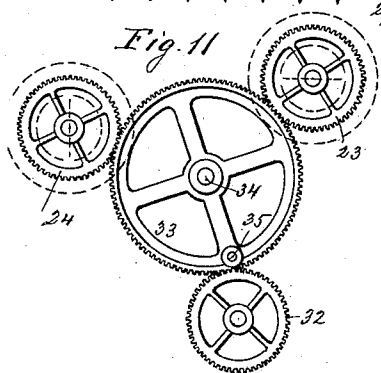
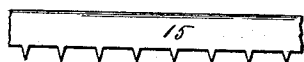
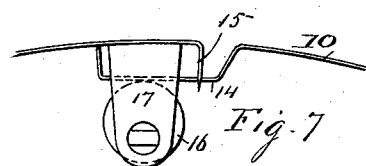
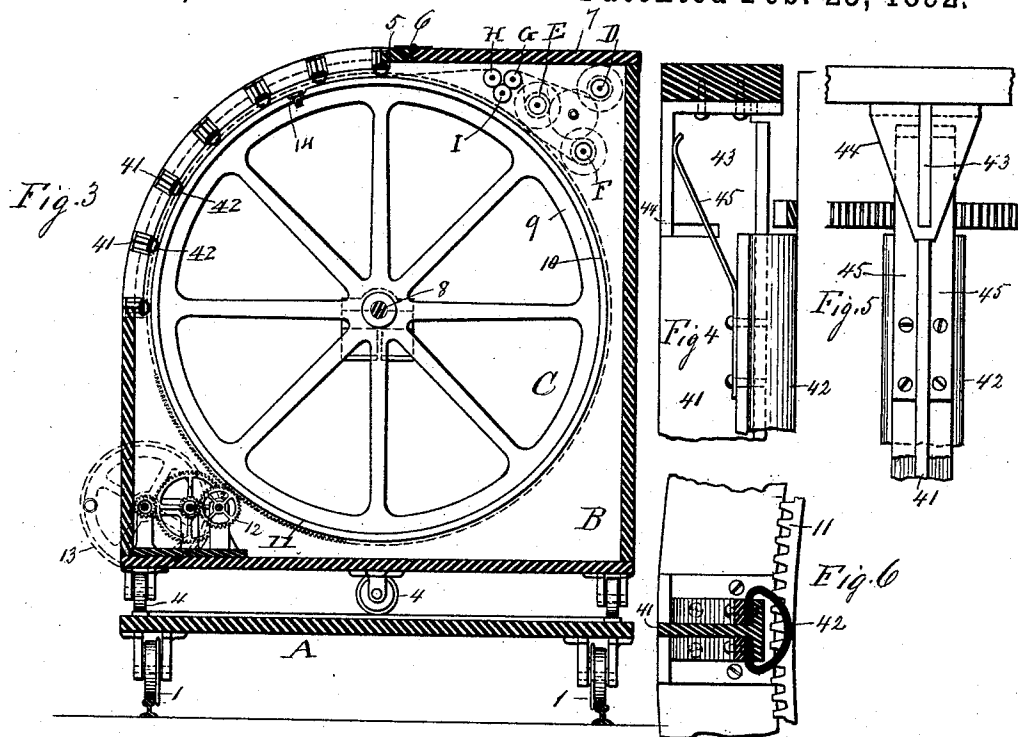
(No Model.)

2 Sheets—Sheet 2.

P. HEINZE.
BLUE PRINTING APPARATUS.

No. 469,244.

Patented Feb. 23, 1892.



Witnesses
Otto Luebkert
Rudolph Lotz

Inventor
Paul Heinze
By his Attorney Wm. Lotz

UNITED STATES PATENT OFFICE.

PAUL HEINZE, OF CHICAGO, ILLINOIS.

BLUE-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 469,244, dated February 23, 1892.

Application filed December 10, 1890. Serial No. 374,251. (No model.)

To all whom it may concern:

Be it known that I, PAUL HEINZE, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Blue-Printing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This my invention relates to an improvement in apparatus for producing by photography copies from tracings of drawings generally called "blue prints;" and it is the object of this my invention to provide an apparatus by which drawings of any length can be copied by the blue-printing process; and with that object in view my invention consists of the novel devices and combinations of devices hereinafter described and specifically claimed.

15 In the accompanying drawings, Figure 1 represents a longitudinal vertical section through the center of my machine; Fig. 2, a plan view, and Fig. 3 a transverse vertical section of the same. Figs. 4, 5, and 6 are details of the elastic stretchers and smoothers; Fig. 7, an edge view of the paper and fastener. Fig. 8 is an elevation of the bearing-plate for the tension-rollers; and Fig. 9, an edge view of the same, with ends of the rollers in connection therewith. Fig. 10 is an end view of the paper and canvas carrying rollers, and Fig. 11 a side elevation showing the connecting-gears for co-operative movement of such rollers.

20 Corresponding letters and numerals of reference in the several figures of the drawings designate like parts.

25 A denotes a transverse table supported on flanged wheels 1, riding upon rails, and upon this table is placed the box B, adapted to turn thereon, the same being held on a central position by a pivot-pin 2, secured under the center of such box B and engaging a socket 3, secured upon table A and being supported on four or more wheels 4, pivoted in suitable brackets secured under the edges of such box B and riding upon a circular track on table A.

30 The box B has a parallopipedon shape, with one corner segmentally open. The bottom

ends and sides of this box are rigidly connected, and a longitudinal strip 5 is also rigidly secured over about the middle of the box, to which by hinges 6 is pivotally secured a lid 7, that closes the square portion of the top of the box. Between suitable bearings in the ends of the box is pivoted the shaft 8, having mounted thereon three (more or less) skeleton wheels 9, carrying the cylindrical shell 10, made of sheet metal, the whole combined forming the drum or spool C. This drum or spool C upon one end has mounted the toothed ring 11, meshing with a pinion 12 in one of the lower corners of box B, which pinion 12, by a train of gear-wheels, is connected with a crank wheel or pulley 13, by which slowly to rotate such drum or spool C; but in place of spur-gearing, as herein shown, worm-gearing may be substituted. In its peripheral face the shell 10 has formed a longitudinal recess 14. Perforated and overlapping this recess is provided an extension-plate of such shell having a radially-pointing comb-shaped edge 15, engaging the perforations in recess 14, for punching and holding the edges of the flexible sheets to be wound upon drum or spool C, this punching and locking operation being brought about by an eccentric roller 16, pivoted between ears 17, secured to the under side of the extension and pressing under the recessed portion 14 of the shell, the same to be operated from one end of the drum or spool C.

Between the ends of box B, in the upper corner thereof, are pivoted three spools D, E, and F, the spools D and E to be removable by having a square gudgeon 19 at one end and engaging a square socket in the coupling-head 20 of short shafts 21 and 22, extended through gland-shaped bearings 18 in the end of the box B, upon each of which shafts is mounted a pinion 23 and 24, while in their opposite ends said spools have conical sockets to engage the pointed ends of screws 25 tapped through plates 26, and each having mounted upon its end a hand-wheel 27. The roller F has a gudgeon 28, pivoted in bearing 29, and a gudgeon 30 projected through gland-shaped bearing 31, and being squared on its exteriorly-projecting end for a pinion 32 that can be laterally shifted. The pinions 23, 24, and 32 mesh with a spur-wheel 33, loosely mounted

upon a stud 34, and having a hand-crank 35, by which to rotate the same and thereby to turn the spools D, E, and F.

The spools D and E are split through their middle from one end to near their other end, where by a hinge 36 the two sections are pivotally connected for inserting the end of the tracing in one and the end of the chemically-prepared paper in the other between such sections and holding the same by placing a rubber ring 37 over the opening end of each roller. The tracing, as well as the prepared paper, after being thus secured, is wound upon these rollers previous to inserting the same into the machine. Against roller F is permanently secured the edge of a sheet of fabric also wound upon such roller.

Forward of spools D, E, and F are placed three cylindrical rollers G, H, and I, the rollers G and H with their journals being pivoted in bearing-plates 38, secured against the inward faces of box B, and for the journals of roller G, being provided in each plate 38, two bearing-sockets on the same horizontal line and connected by a slot 39, so as to shift this roller G from one bearing to the other. The third roller I by its gravity is to produce tension to the tracing and chemically-prepared paper-sheets which first are passed over roller G, then under roller I, and finally again over roller H, and therefore this roller I is held in suspension by such sheets, but is prevented from dropping entirely by semicircular guards 40, forming parts of plates 38. The double-bearing sockets for roller G, connected by slot 39, are for the purpose of shifting such roller G, for allowing the roller I to drop between, and then to place the roller G in its forward bearings, as shown by Fig. 8. The forward ends of the tracing and the chemically-prepared paper after passing over roller G, under roller I, and over roller H, as well as the end of the fabric wound upon spool F, are all secured in the recess 14 of drum or spool C, to be wound thereon simultaneously with the rotation of such drum or spool C.

The segmental opening of the box B, through which the chemically-prepared paper is to be exposed to the rays of the sun is spanned longitudinally by a series of T-bars 41, each having secured over its T-head a rubber loop 42, made by splitting a rubber tube or hose, the edges of these rubber loops being secured between the head flanges of the T-bars and metal bars by rivets. These loops 42, pressing upon the tracing-paper and canvas while being drawn from under, will serve for stretching and smoothing the sheets to be in close contact. The web of each bar 41, near its end, is vertically slitted, thus forming a tongue 43, that engages a slot in an angular bracket 44, which brackets are secured in proper position against the end walls of box B, each two placed opposite forming the guides for one of the bars 41, and to each end of such a bar 41 are secured two leaf-springs 45, pressing with their ends under the brack-

ets 44 for pushing the bars 41 toward the drum or spool C, and for yieldingly to accommodate themselves to the increasing diameter of the drum or spool C as the paper and fabric are wound thereupon.

The *modus operandi* is as follows, to wit: The whole machine, being moved upon rails into a dark room, the lid 7 is opened and the rollers D and E are removed, when, with rotating wheel 33, by crank 35, the sheet of fabric is wound upon spool F. Now after the end edge of the sheet of tracing-cloth upon which the drawing to be copied has been drawn with Indian ink, has been secured in spool D, it is wound thereupon, and after the end edge of the chemically-prepared or sized sheet of paper that is to be of equal dimensions with the tracing has been secured in spool E and has been wound thereupon, the outer ends of both these sheets are passed over the rollers G and H, the roller G having previously been placed in its rearward-bearing sockets, and then the ends of the sheets wound upon spools D and E, and the end of the fabric wound upon spool F, are all secured in the recess 14 of drum or spool C. Next the roller I, that had been previously removed, is placed upon the tracing and sized paper between rollers G and H, and then the roller G is shifted again to its forward position, and now the lid 7 is closed and the machine is moved into the light room and in position for the rays of light to enter the segmental openings between bars 41 of the box B and through the tracing to strike the sized surface of the chemically-prepared sheet, that now becomes the printing-surface for the photographic image of the drawing. Now with slowly rotating the drum or spool C by turning wheel or pulley 13, either by hand or by any suitable motor, new surfaces of the sheets are continuously exposed, while the surfaces completed disappear in the box B, where with each turn they are covered by the fabric unwound from spool F until the entire length of the sheets has been thus exposed uniformly. After thus completed the machine is moved back again into the dark room, and there, by rotating wheel 33, the several sheets and the fabric are separated by being wound again upon their respective spools D, E, and F, and then after releasing their ends from the recess 14 of drum or spool C again the spools D and E are removed and the photographically-printed paper is unrolled and submerged in a developer for permanently fixing its surfaces and bringing out the lines produced by the shades from the lines of the tracing.

What I claim is—

1. In a machine for the purpose described, the combination, with removable spools, one holding the tracing and the other the sensitive paper, of a spool or drum C, provided with a clamp or holder 14 and with gearing for rotating such drum, and longitudinal bars 41, each carrying a rubber loop 42 and with open spaces between such bars, the whole be-

ing arranged within a box, substantially as set forth, to operate as specified.

2. In a machine for the purpose described, the combination, with drum or spool C, provided with clamp or holder 14 and with suitable gearing for rotating such drum, of spools D and E for holding the tracing and sensitive paper, and tension-rollers G and H and I, all arranged within a box, substantially as set forth, to operate as specified.

3. In a machine for the purpose described, the combination, with drum or spool C, provided with clamp or holder 14 and with gearing for rotating such drum, of spools D and

E for holding the tracing and sensitive paper, tension-rollers G and H and I, and longitudinal bars 41, each carrying a rubber loop 42, and with open spaces between such bars, the whole being arranged within a box and constructed substantially in the manner set forth, to operate as specified.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL HEINZE.

Witnesses:

WILLIAM H. LOTZ,
OTTO LUEBKERT.