No. 712,076. Patented Oct. 28, 1902.

S. L. G. KNOX & W. O. WAKEFIELD.

BLUE PRINTING MACHINE.

(Application filed Mar. 3, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

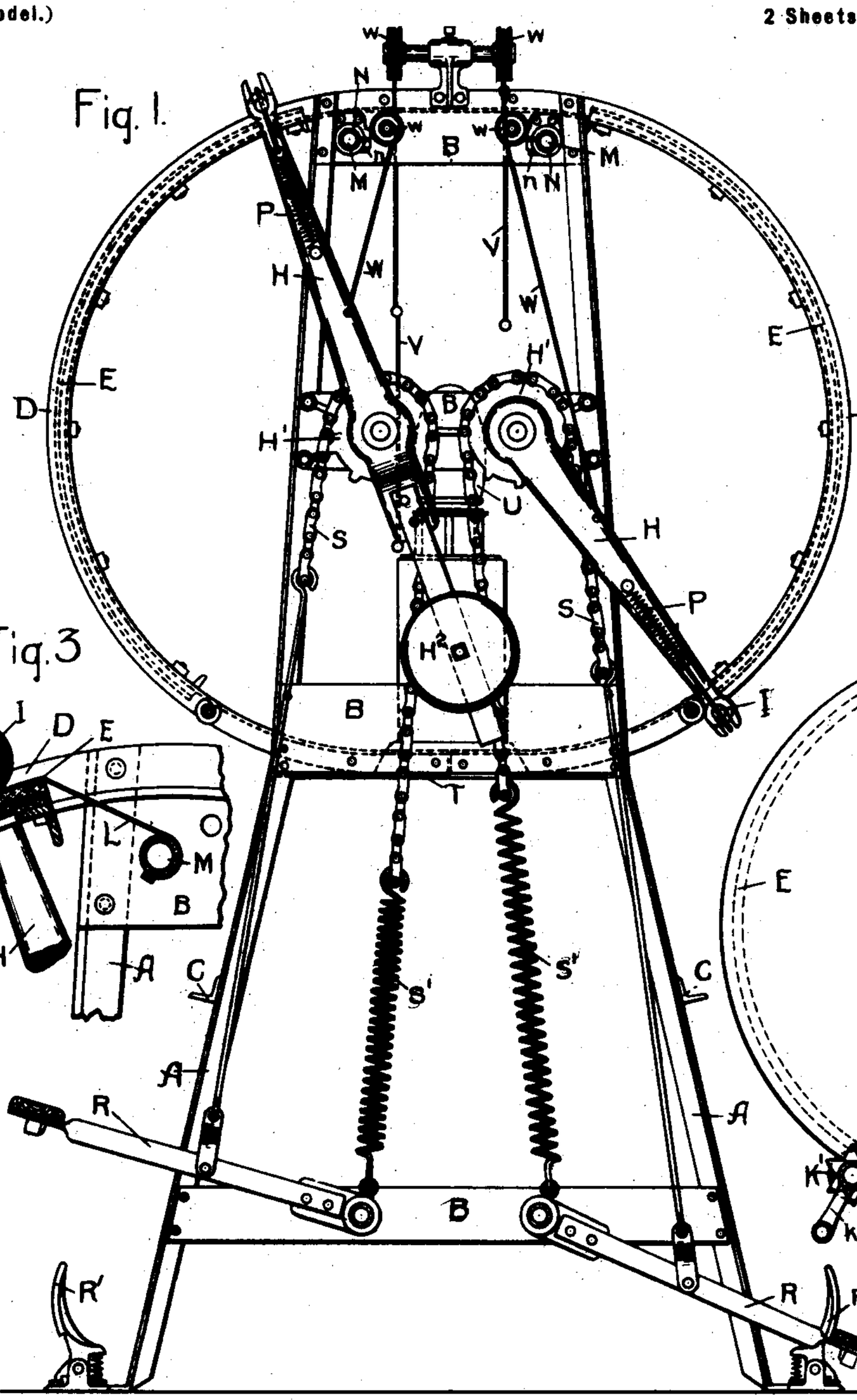
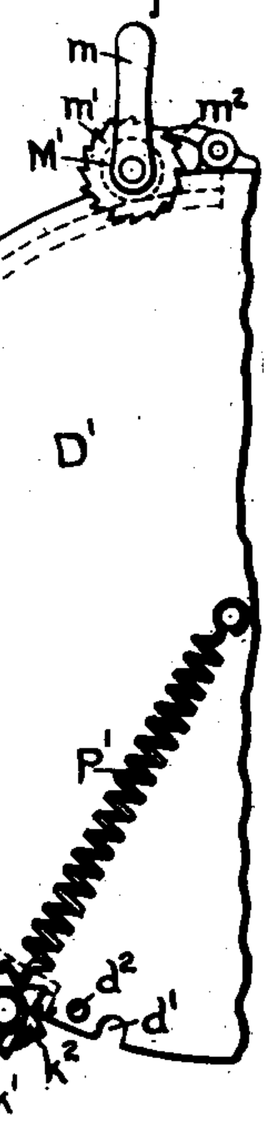


Fig. 3

Fig. 4.



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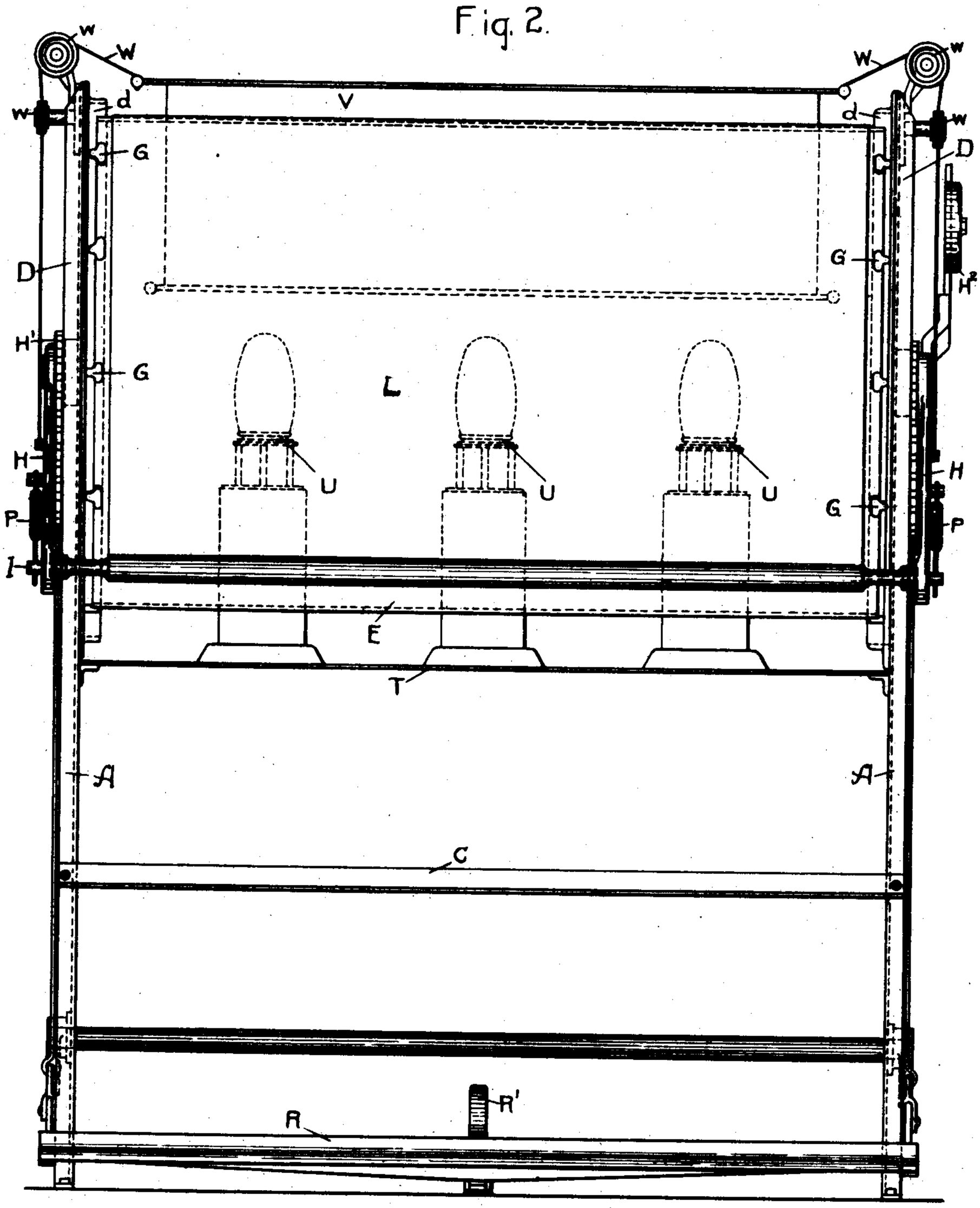
BLUE PRINTING MACHINE.

(Application filed Mar. 3, 1902.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.



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SAMUEL L. G. KNOX AND WILLIAM O. WAKEFIELD, OF SCHENECTADY, NEW YORK.

BLUE-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 712,076, dated October 28, 1902.

Application filed March 3, 1902. Serial No. 96,376. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL L. G. KNOX and WILLIAM O. WAKEFIELD, citizens of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Blue-Printing Machines, (Case No. 2,334,) of which the following is a specification.

This invention relates to mechanism for making blue-prints expeditiously, and especially those of large size.

In the ordinary flat printing-frame care must be exercised to back up the paper evenly and tightly in order to obtain sharp lines and a satisfactory job. In the case of large drawings this requires considerable skill; and the object of our invention is to provide apparatus by means of which good prints of any size within the limits of the apparatus can be easily made by unskilled persons without any danger of failure. Moreover, the flat frames of large size are heavy and awkward to handle, the springs on the removable back are stiff and hard to manipulate, and the operation of loading and unloading is slow and tiresome.

Our apparatus has no heavy parts to be handled and can be quickly manipulated, so that the amount of work turned out is very much greater than by the old methods, even when a slow-printing and cheaper paper is used.

The apparatus comprises a stationary cylindrical segment, of glass or other transparent or translucent material, arranged with its axis horizontal and its chord preferably upright and substantially concentric with one or more electric lamps or other source of light, a screen which can be interposed between the lamps and the segment to protect the eyes of the attendant, a backing of cloth or the like wound on a roller and adapted to be drawn over the outer surface of the segment, and means for tightly straining the backing when so drawn. The tracing or drawing to be copied is laid against the outer surface of the glass segment. The blue-print paper is placed outside of it, and then the backing is drawn tightly over both. The screen is automatically withdrawn when the backing is drawn over the work. As an additional improvement we build the machine double, each half constituting a complete printing apparatus in itself.

In the accompanying drawings, Figure 1 is an end elevation of such a machine. Fig. 2 is a side elevation thereof. Fig. 3 is a detail sectional view showing the backing and its roller on a larger scale, and Fig. 4 is a partial end view of a modification.

The frame of the machine is preferably composed of light angle-iron legs A, connected by strips of sheet metal B and cross-bars C. From each side of each end frame projects a semicircular frame D, and each pair of such frames on the same side of the machine supports a cylindrical segment E, of glass or the like, with its axis horizontal. Felt or other soft packing F is interposed between the glass and the flange *d*, on which it rests. Clips G hold the glass in place, being preferably cushioned by pieces of felt *f*.

At each end of the machine and concentric with the glass segment is pivoted an arm H, which projects beyond the outer surface of the glass and is preferably slotted to receive the end of a rod I, concentric with which is a tubular roller K, connected with said rod by an internal helical spring *k*. On the roller is wound a sheet L, of canvas or other suitable fabric or material, the edge of which is secured to a take-up roller M, journaled in bearings at the top of the machine near one edge of the segment. Means are provided for locking the take-up roller, such as split bearings N, secured to the frame and provided with clamping-screws *n*. When the arms are moved downward, the sheet L will be unwound from the roller K and drawn taut over the glass by reason of the increased tension of the spring *k* as the roller is rotated. Any suitable device for keeping the sheet taut may be substituted for the spring. The roller is held tightly against the glass by a spring P on each arm exerting an inward radial tension on the ends of the rod I. In order to actuate the arms simultaneously, a treadle R is provided pivoted to the frame of the machine and connected with chains S, running over sprocket-wheels H′ on the hubs of the arms. The other end of each chain is attached to a spring S′, which keeps the arms

and the treadle normally raised, as shown at the left side of Fig. 1. Depressing the treadle pulls down the arms simultaneously, and a pivoted spring-catch R′ engages with and holds the treadle when down. One arm in each pair may have a counterweight H^2, if desired, though this is not essential.

A shelf T extends between the end frames and supports one or more lamps U, preferably inverted arc-lamps. They are arranged between the axes of the two glass segments, and the space between the segments at the top and bottom insures a good circulation of air to keep the glass cool. As the glare of the lamps would be harmful to the eyes of the attendant and might interfere with his arranging the work properly, a screen V is provided, which is automatically interposed in front of the lamps when the roller K is raised. This is simply accomplished by suspending the screen by cords W, which run over pulleys *w* to the arms H, so that the screen is lifted when the arms are depressed, and vice versa.

In the modification shown in Fig. 4 there are no arms; but the springs P′ are longer, being pivoted at the axis of the glass segment. The roller K′ has no internal spring, but rotates in contact with the curved edge of the frame D′, being provided with a handle *k′* for turning it. The backing is simply rolled on the roller, its upper end being secured to a take-up roller M′, provided with a handle *m*, ratchet-wheel *m′*, and detent m^2. At the lower end of its movement the roller K′ is pulled into a notch *d′* in the frame to keep it down. The star-wheel k^2 on the roller engages with a pin d^2 adjacent with the notch, so that when the handle *k′* is turned it will force the roller out of the notch. This form of the machine while simpler than the other is not so efficient, since it requires one hand to operate the roller. As the operator usually needs both hands to keep the tracing and paper smooth, the treadle is an important feature, enabling him to pull down the backing without letting go of the work.

This apparatus is found in practice to permit very rapid handling of the work, the putting in and taking out requiring only a few seconds. One operator can thus attend to several machines and turn out a large number of prints. The horizontal position of the glass segments facilitates the application and removal of the work and assists in keeping it flat and smooth. The sheet of fabric which constitutes the backing exerts a strong radial pressure against the outer surface of the glass segment and not only holds the work in place, but smooths down all folds and wrinkles and brings the copying-paper into close contact with every portion of the tracing or other drawing. This automatic smoothing action of the tightly-drawn fabric is an important result and greatly improves the quality of the prints.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of the segment, a sheet of fabric secured near one edge of the segment, and a roller on which said sheet is wound, adapted to pass over the outer surface of the segment.

2. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of the segment, a sheet of fabric secured near one edge of the segment, a roller on which said sheet is wound, adapted to pass over the outer surface of the segment, and springs for keeping said roller close against said surface.

3. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of the segment, a sheet of fabric adapted to be drawn over the outer surface of the segment, means for taking up one edge of said fabric, and a roller to which the other edge is secured, said roller being adapted to pass over the outer surface of the segment.

4. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of the segment, a sheet of fabric secured near one edge of the segment, a roller on which said sheet is wound, adapted to pass over the outer surface of the segment, and means for keeping said sheet taut as it is unwound from the roller.

5. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of the segment, a sheet of fabric secured near one edge of the segment, a roller on which said sheet is wound, adapted to pass over the outer surface of the segment, and a spring which is put under tension as the sheet is unwound from the roller.

6. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of said segment, a sheet of fabric secured near one edge of the segment, a tubular roller on which said sheet is wound, and a spring inside the roller for keeping the sheet taut when it is unwound.

7. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of said segment, means for securing the work to the outer surface of the segment, and a screen to cut off the light when the work is being adjusted in place.

8. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of said segment, means for securing the work to the outer surface of the segment, a screen to cut off the light when the work is being adjusted in place, and means for withdrawing said

screen simultaneously with the act of securing the work.

9. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, a source of light near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, and arms pivoted at the axis of the segment and carrying said roller.

10. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, and means for keeping the arms normally at the beginning of their stroke, with the sheet rolled up.

11. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more stationary electric lamps near the axis of the segment, a sheet of fabric secured near one edge of the segment, a roller on which said sheet is wound, adapted to pass over the outer surface of the segment, and a treadle for actuating said roller.

12. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of the segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, and a treadle for actuating said arms.

13. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, a treadle for actuating said arms in one direction, and means for returning them when the treadle is released.

14. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, a treadle for actuating said arms in one direction, a catch for retaining it when operated, and means for returning said arms when the treadle is released.

15. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, a movable screen between the lamps and the segment, and connections between said screen and said arms whereby said screen will be withdrawn when the sheet is unwound.

16. A blue-printing apparatus, comprising a horizontal stationary cylindrical segment of glass, one or more electric lamps near the axis of said segment, a sheet of fabric for securing the work to the outer surface of the segment, a roller on which said sheet is wound, arms pivoted at the axis of the segment and carrying said roller, sprocket-wheels on the hubs of said arms, chains passing over said wheels, a treadle connected with one end of said chains, and springs connected with the other ends thereof.

In witness whereof we have hereunto set our hands this 27th day of February, 1902.

SAMUEL L. G. KNOX.
WILLIAM O. WAKEFIELD.

Witnesses:
BENJAMIN B. HULL,
HELEN OXFORD.