No. 670,349. Patented Mar. 19, 1901.

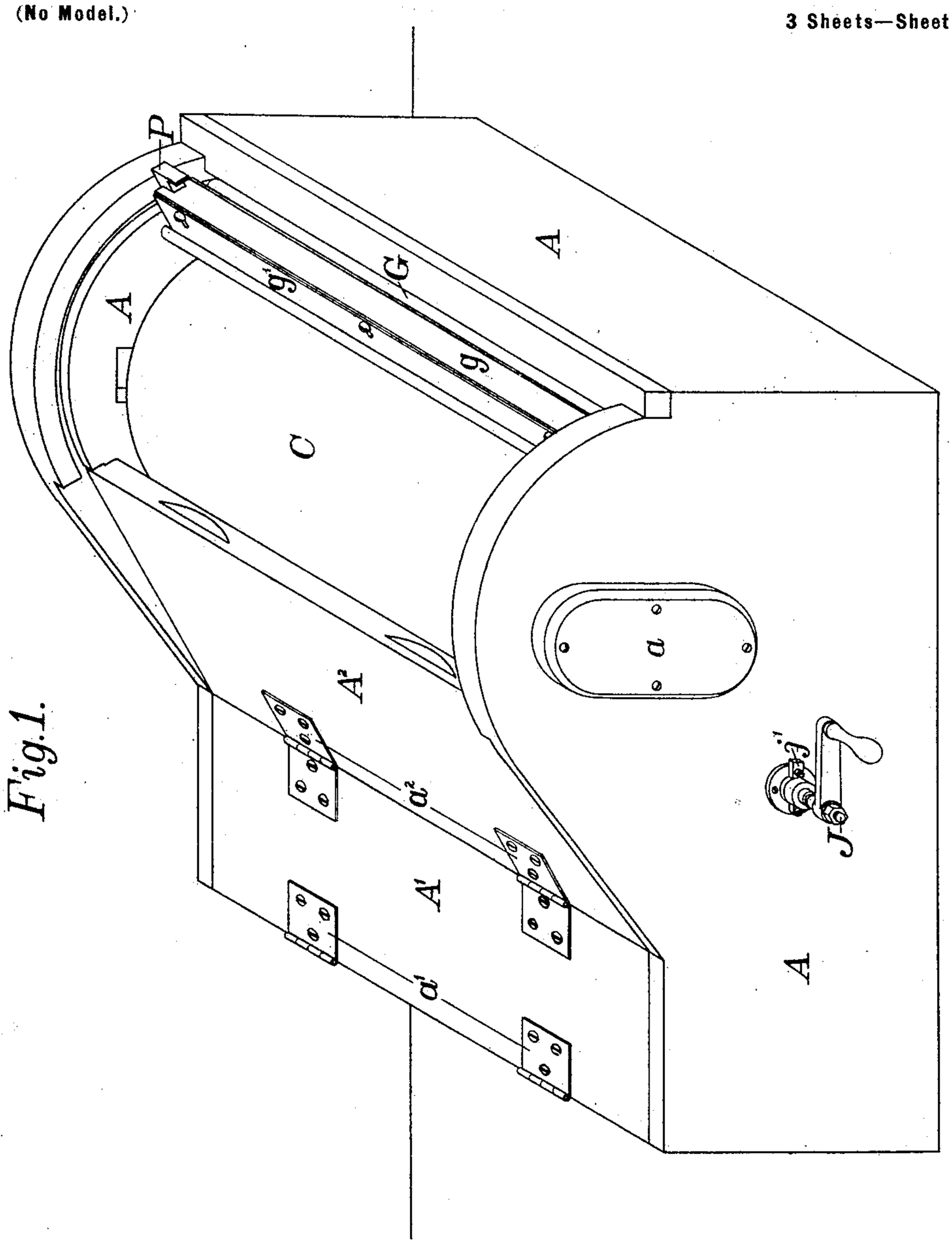
L. F. RONDINELLA.

CONTINUOUS PHOTO PRINTING APPARATUS.

(Application filed Oct. 18, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

John B. Alker

Albert Paul Willis

INVENTOR

Lino F. Rondinella

BY Howson & Howson

ATTORNEYS

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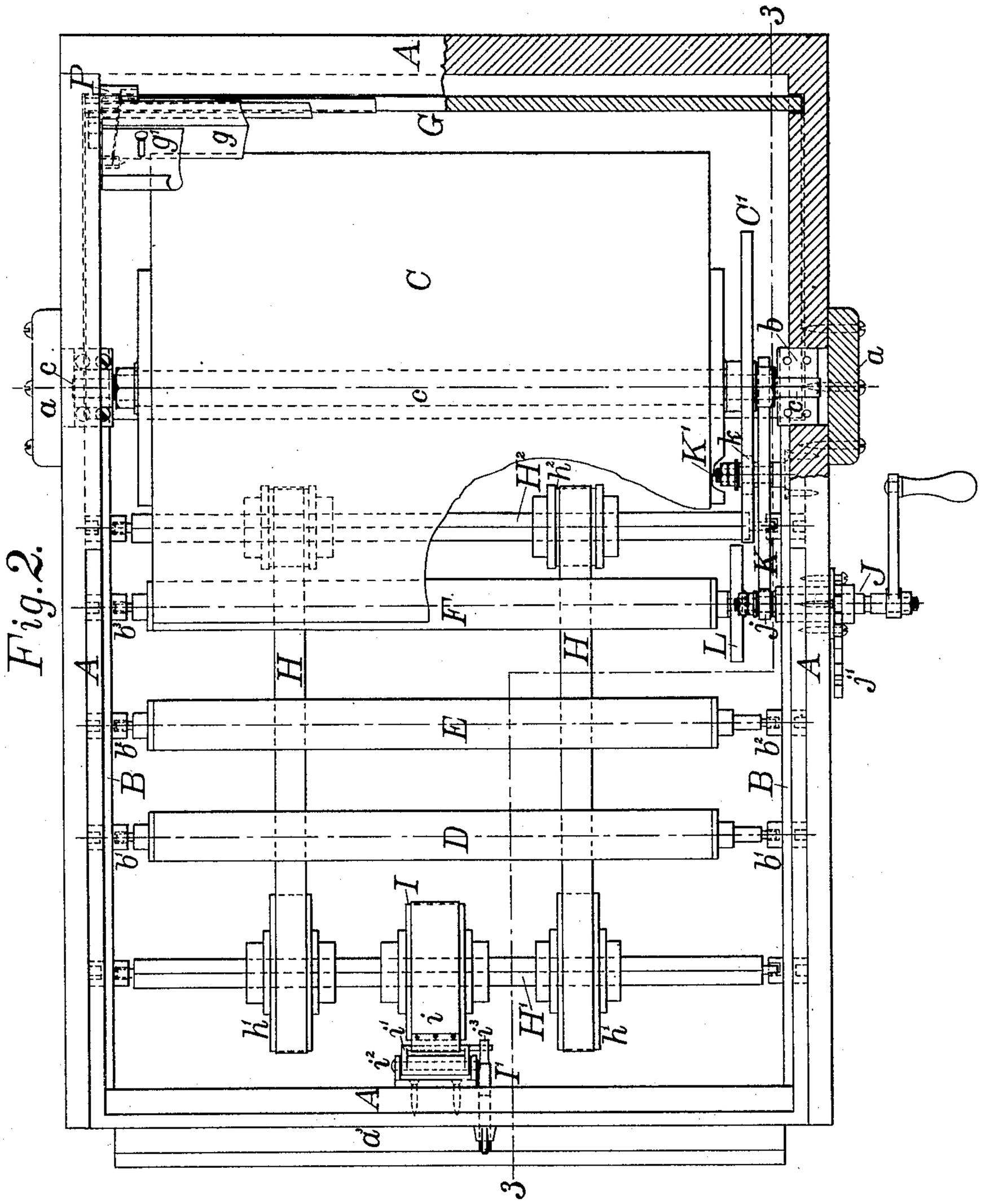
(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



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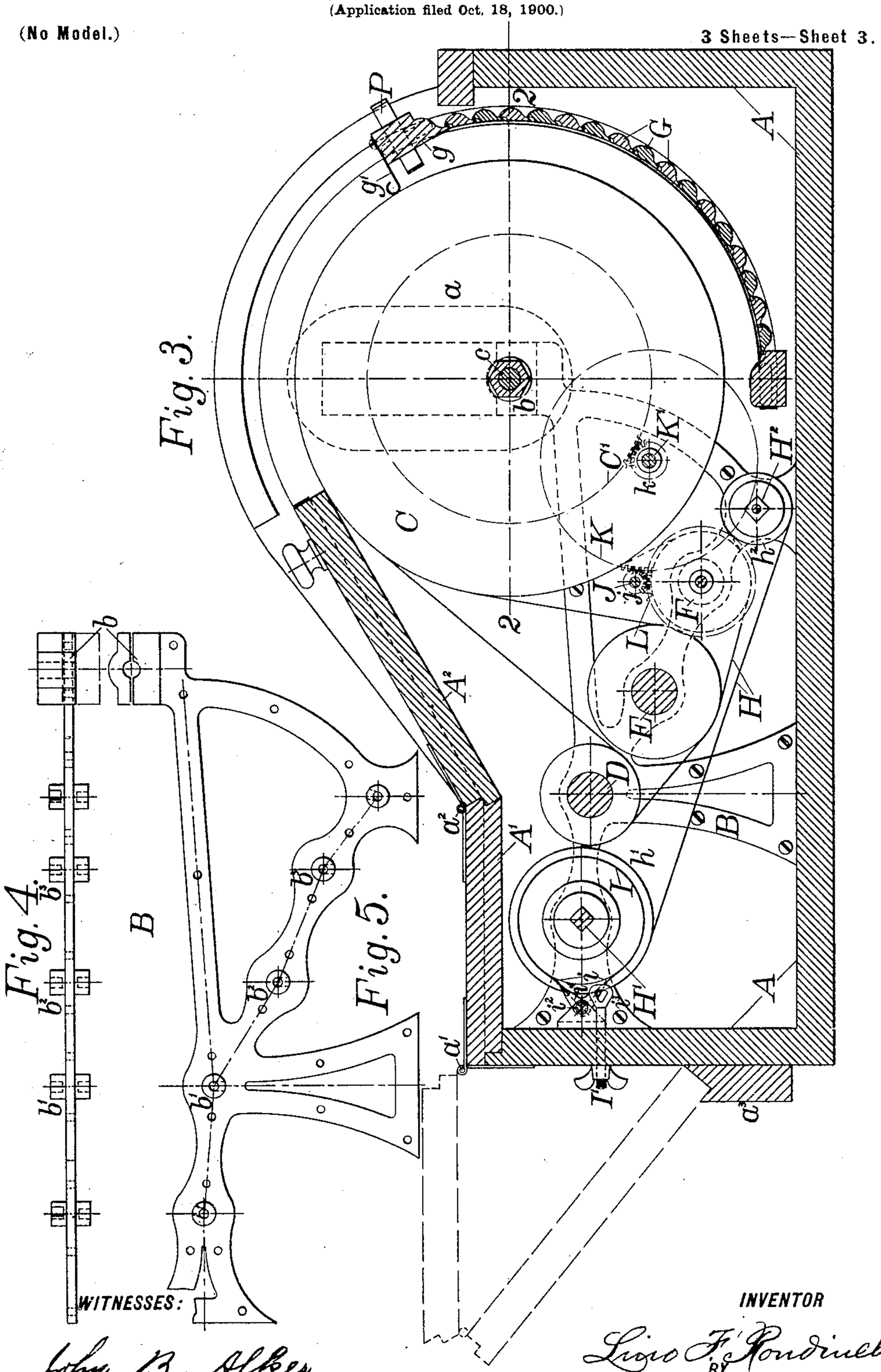

Fig. 3.

Fig. 4.

Fig. 5.

WITNESSES:

John B. Alkes

Albert Paul Willis

INVENTOR

Ligio F. Rondinella

BY

Howson & Howson

ATTORNEYS

UNITED STATES PATENT OFFICE.

LINO F. RONDINELLA, OF PHILADELPHIA, PENNSYLVANIA.

CONTINUOUS PHOTOPRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 670,349, dated March 19, 1901.

Application filed October 18, 1900. Serial No. 33,467. (No model.)

To all whom it may concern:

Be it known that I, LINO F. RONDINELLA, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Continuous Photoprinting Apparatus, of which the following is a specification.

The object of my invention is to provide a convenient and effective apparatus for making photographic prints from long or continuous flexible drawings, tracings, negatives, or the like, an object which I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved photoprinting apparatus. Fig. 2 is a plan view with the covers removed, with some of the parts broken away to illustrate parts beneath, and with part in section on the line 2 2, Fig. 3. Fig. 3 is a section on the line 3 3, Fig. 2; and Figs. 4 and 5 are detached views of one of the bearing-frames.

Heretofore it has been difficult to make a one-piece photographic print of a long drawing, tracing, or the like, and the devices used have been cumbersome, expensive, and troublesome to operate. My invention has been designed with the view of overcoming these objections.

Referring to the drawings, A represents the casing which incloses the working parts of the apparatus. Secured to each of the two sides of this casing is a frame B, of metal, firmly fastened in place and carrying the bearings for all of the rotating parts of the apparatus. These two frames are identical, except that the bearings for the rollers in one side are closed to receive their spindles longitudinally, while in the other side they are open to receive the spindles laterally, thus providing a ready means for inserting and removing the rollers. The frames are so made that one pattern can be used for both castings in order to insure the parallelism of the axes of the rollers D E F and the drum C, for it is essential in constructing an apparatus of this type to have all the rollers in perfect alinement, so that there will be no buckling of the material rolled upon the exposing-drum C.

Mounted in bearings *b* on the frames B B is a large cylinder or drum C, which may be made of wood or other suitable material and may be covered with felt or other elastic substance. Extending through the drum is a metal shaft *c*, forming the journals of the drum, which are adapted to bearings *b*, above described.

The casing A may be cut away at and above each of the bearings *b* to form an additional support for these bearings and so that easy access may be had to their caps when necessary, cover-strips *a* being secured to the casing in order to close said openings.

A roller D is mounted in suitable bearings b' in the frame B, and on this roller is placed the drawing, tracing, or the like of which a photographic print is to be made. Another roller E is mounted in bearings b^2 in the frames B B, and upon this roller is wound the roll of photosensitive paper or material upon which the print is to be made. Another roller F is mounted in bearings b^3 in the frames B B and carries a roll of opaque paper or material, so that when the photographic print is wound upon the drum C it will be protected from the effect of the light when the next layer of photosensitive material is being exposed.

The forward ends of the drawing, photographic paper, and opaque paper are secured to the drum C by means of ordinary thumb-tacks or by any other suitable device, so that when the drum C is turned forwardly the opaque material is next to the surface of the drum. Above this is the photosensitive material, and covering that is the drawing, tracing, or negative from which the print is to be made. Hence it will be seen that when the three strips encircle the drum C the next layer of the opaque strip will protect the sensitized material under it while the outer layer is being printed upon.

I so construct the inclosing case that only a certain portion of the revolving drum C is exposed to the light, and to accomplish this in the present instance I groove each side of the case for the reception of a sliding cover or shutter G, which is preferably made up of a series of overlapping strips flexibly connected by opaque material, any desired width of opening and consequent duration of exposure being provided by its proper adjustment. The end piece *g* of the cover carries a strip g' of opaque sheet material whose lower edge is

rounded and is by gravity kept in contact with the drawing or tracing on the drum C, so that when the cover is moved it will slide freely over the radial face, and the end piece *g* may also be provided with a wedge P or other suitable means for retaining the cover G in its adjusted position.

Hinged to the rear of the casing at *a'* is a cover A', and hinged to this cover at a^2 is a second cover A^2, these covers A' and A^2 being above the rollers D, E, and F and part of the drum C and their edges where they join each other and the sides of the casing being rabbeted to prevent light from entering between them.

While making a print the covers are in the position shown in Figs. 1 and 3, so as to expose only that portion of the sensitized material then between the edge of the cover A^2 and the adjusted edge *g'* of the sliding cover G above the drum C; but when it is desired to gain access to the rollers the covers A' and A^2 may be swung back, as shown by broken lines in Fig. 3, and supported in a rest a^3.

In order to impart proper tension to the tracing or drawing, to the sensitized material, and to the opaque strip, so as to keep them drawn taut, I preferably mount two or more elastic belts H upon rollers *h' h²*, secured to shafts H' H^2, respectively, the upper run of each belt H being in frictional contact with the material on the rollers D, E, and F, as indicated in Fig. 3. The movement of these belts by reason of their contact with said material may be more or less retarded by means of a friction-brake secured to the shaft H'. In the present instance this brake consists of a brake wheel or disk I, around which passes a strap *i*, having its opposite ends connected to a two-armed lever *i'*, pivoted at i^2 to a bracket secured to the casing.

Through the back of the casing passes a screw-rod I', carrying a wing-nut on its outer end and with its middle part made square to prevent turning in the square hole through the casing and with its inner end formed into an eye i^3, through which passes a pin on one of the arms of the lever *i'*. The wing-nut on the outside of the casing can then be turned to regulate the friction of the band *i* upon the wheel or disk I, so as more or less to retard the movement of the bands or belts H, and thereby to regulate the tension of the materials being wound around the drum C from the rollers D, E, and F.

It will be understood that other means of imparting tension to the rolls of material may be resorted to without departing from my invention.

I may drive the drum C in any desired manner—either by hand, as shown in the drawings, or by power supplied by an electric, steam, or other motor. In the present instance the driving mechanism consists of a shaft J, having a pinion *j* and a suitable hand-crank, this shaft being movable longitudinally in its bearings, so that its pinion *j* can mesh either with a spur-wheel K or with a spur-wheel L, a lock-arm *j'*, pivoted on the outside of the case, being operated so as to lock the shaft in either of its two positions. The wheel K is mounted on a stud K', secured to the casing, and on the hub of the wheel K is a pinion *k*, which meshes with a spur-wheel C', secured to one of the journals of the drum C, so that when the revolving pinion *j* is in mesh with the wheel K a slower revolving motion will be imparted to the drum C, causing the several layers of material to be wound upon the drum. The spur-wheel L is secured to the roller F, so that when the pinion *j* is in mesh with said spur-wheel L it will rewind the opaque material upon the roller F from the drum C, at the same time turning backward the drum C, so that the print and the drawing or tracing can be removed from the drum. If the rolls D and E are kept in friction-gear with the roll F by tension of the elastic bands H, the drawing or tracing and the print may be rewound upon the rollers D and E by the rewinding of the opaque material upon the roller F.

I do not limit myself to the special form of casing shown, as the same may be modified, especially to vary the length of the drum and rollers, which limits the extreme width of the print that can be made in the apparatus. Prints whose length is less than the circumference of the drum may be made by dispensing with the rollers and fastening the sensitized material with the drawing or negative above it tightly around the drum, which is then revolved as in making long prints, or as the sensitive material is unwound from its roller sections of drawings or tracings may be secured to the drum above it. In this manner a continuous print may be made from a number of tracings or drawings.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of an exposing-drum, three rollers, one for the sensitized strip, one for the strip to be photographed and one for an opaque strip, means for attaching the several strips to the drum, means for rotating the drum and frictional mechanism for connecting the rollers whereby the several strips may be wound upon or unwound from the exposing-drum, substantially as described.

2. The combination of a casing, an exposing-drum, three rollers, one for the sensitized strip, one for the strip to be photographed, and one for an opaque strip, means for attaching the several strips to the drum, means for rotating the drum so as to wind the strips thereon, and adjustable means operated from outside said casing for imparting tension to the strips as they are being wound, substantially as described.

3. The combination of a casing, an exposing-drum, three rollers, one for the sensitized strip, one for the strip to be photographed and one for an opaque strip, means for attaching

the several strips to the drum, means for rotating the drum so as to wind the strips thereon, and means within the casing constructed to maintain the strip to be photographed and the sensitized strip in close contact while the photograph is being made without in any way obstructing the opening in said casing through which light is admitted to said sensitized strip, substantially as described.

4. The combination of an exposing-drum, rollers for the sensitized strip, for the strip to be photographed, and for an opaque strip, means for attaching the several strips to the drum, provision for rotating said drum so as to wind the strips thereon, and a tension belt or band bearing upon the strips on the rollers so as to exercise a retarding influence upon the unwinding of the same, substantially as described.

5. The combination of an exposing-drum, rollers for the sensitized strip, for the strip to be photographed, and for an opaque strip, means for attaching the several strips to the drum, provision for rotating said drum so as to wind the strips thereon, and rollers with friction mechanism between them constructed so that the rewinding of the material on one roller will cause the rewinding of the materials on the others, with the unwinding of the materials from the exposing-drum, substantially as described.

6. The combination in a photoprinting apparatus, of a casing and drum, with an adjustable sliding shutter for varying the length of exposure, said shutter being constructed to conform to the curvature of the drum, substantially as described.

7. The combination in a photoprinting apparatus, of a casing, a drum mounted in said casing, an adjustable sliding shutter for varying the length of exposure, and a sliding plate secured to the shutter and resting upon the drum, substantially as described.

8. The combination of an exposing-drum, three rollers, one for a sensitized strip, one for the strip to be photographed and one for a strip of opaque material, gearing for turning the drum, gearing for turning the rollers and means common to both sets of gearing for operating either of them, substantially as described.

9. The combination of an exposing-drum, three rollers, one for a sensitized strip, one for the strip to be photographed, and one for a strip of opaque material, gearing for turning the drum, gearing for turning the rollers, mechanism common to both sets of gearing whereby the exposing-drum may first be turned to wind the several strips thereon and the rollers may afterward be turned to unwind said strips from said drum upon the rollers, substantially as described.

10. The combination in an apparatus for photographing on a continuous strip of sensitized material, of a casing, an exposing-drum and rollers for the strip to be photographed, the sensitized material and the opaque material, said drum and rollers being supported in the casing, a two-part lid to said casing, said parts being hinged together so that one of them may rest tangentially against the exposing-drum, with means for turning the said drum and rollers, substantially as described.

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

LINO F. RONDINELLA.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.