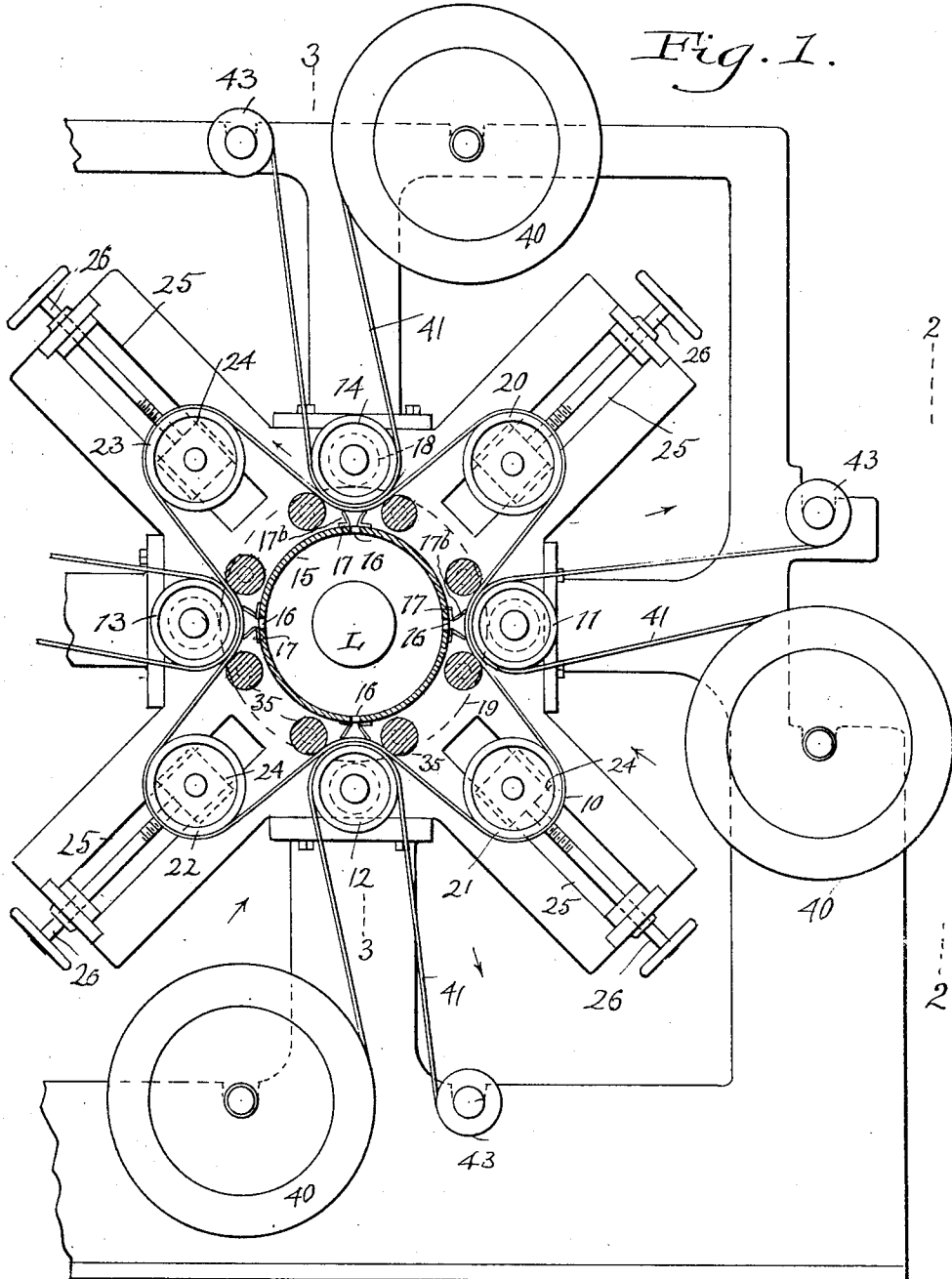


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 PHOTOGRAPH PRINTING APPARATUS.
 APPLICATION FILED APR. 17, 1918.

1,335,860.

Patented Apr. 6, 1920.
 3 SHEETS—SHEET 1.



Inventor:
 Herman Shapiro
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 Attorneys

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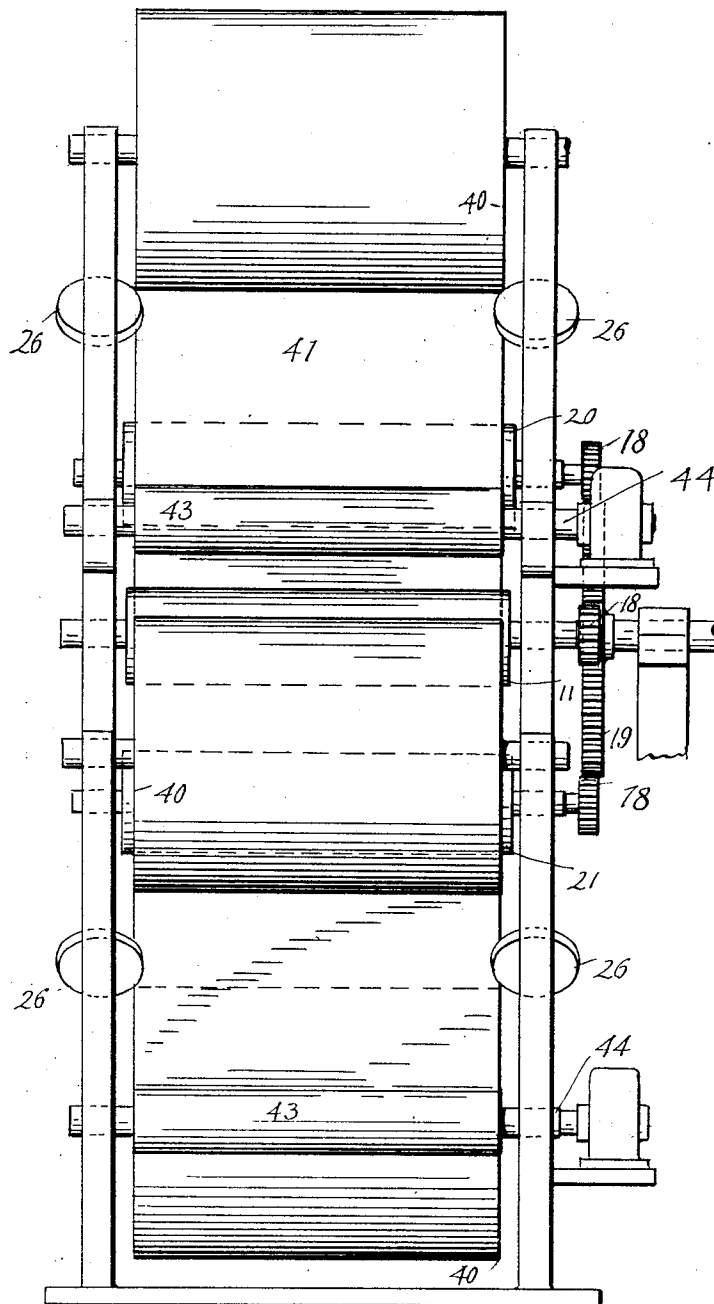


Fig. 2.

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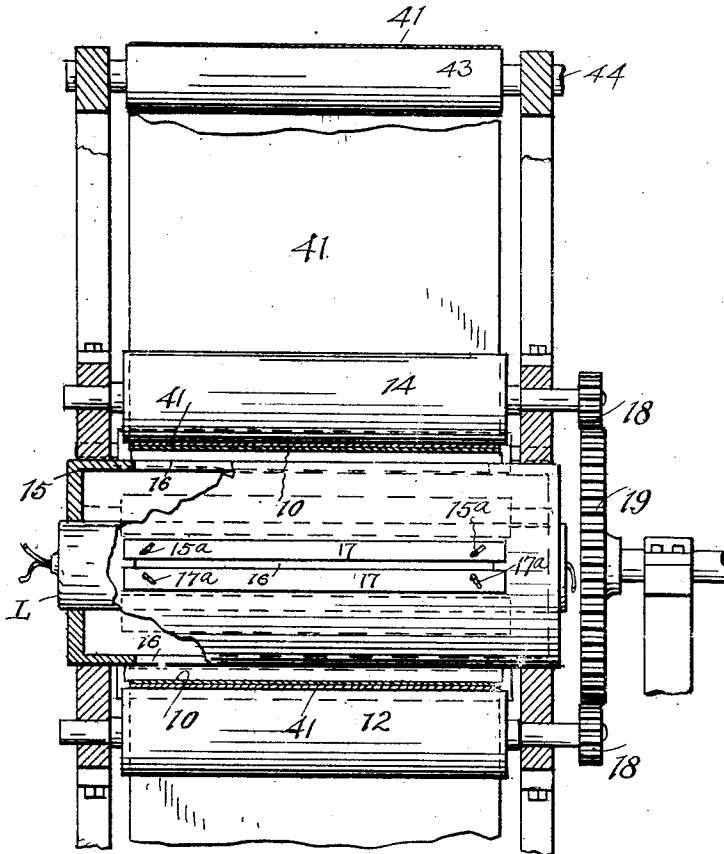


Fig. 3.

Inventor:
Herman Shapiro
By: Thurston & Koon
attys

UNITED STATES PATENT OFFICE.

HERMAN SHAPIRO, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO A. E. BERNSTEEN
AND FRANK S. DAY.

PHOTOGRAPH-PRINTING APPARATUS.

1,335,860.

Specification of Letters Patent.

Patented Apr. 6, 1920.

Application filed April 17, 1918. Serial No. 229,184.

To all whom it may concern:

Be it known that I, HERMAN SHAPIRO, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Photograph-Printing Apparatus, of which the following is a full, clear, and exact description.

This improvement in photographic printing apparatus is designed to rapidly produce a multiplicity of prints from a film negative. To accomplish this result according to this invention the film negative is made into the form of an endless belt which is caused to continuously travel over suitable guide rollers through a prescribed path around a slotted casing in which is a light, and at the same time a plurality of strips of sensitized paper is caused to travel in surface contact with certain parts of the film adjacent the slots in the light inclosing casing.

The invention consists in the construction and combination of parts shown in the drawing and hereinafter described and pointed out definitely in the appended claims.

In the drawings, Figure 1 is an end elevation of the apparatus; Fig. 2 is a sectional side elevation on line 2—2 on Fig. 1, and Fig. 3 is a sectional view on line 3—3 on Fig. 1.

The apparatus as shown in the drawing is designed for simultaneously printing four pictures during each complete revolution of the endless film belt. It is obvious, however, that the apparatus could be organized to print more or less pictures at the same time by properly disposing the guiding rollers and properly slotting the light inclosing casing.

Referring to the parts by reference characters, 10 represents an endless photographic film, on which is the picture or pictures to be reproduced. 11, 12, 13 and 14 represent four parallel rollers arranged symmetrically around and close to a light inclosing casing 15 in which are four longitudinal slots 16 adjacent the several rollers. These slots are of variable width made so by the movable shutters 17 in order that the intensity of the light may be regulated

in accordance with the thickness of the film 10. These shutters may be formed with inclined slots 17^a through which pass pins 15^a carried by the light casing, so that by the endwise movement of these shutters they will be caused to move toward or from each other. These shutters are formed with the flanges 17^b on their adjacent edges,—which flanges at their outer edges come close to the surface of the film, so as to substantially confine the action of the light to the narrow space thereon which for the time being is between these flanges. The light employed in the casing must obviously be one that is equally operative and effective at the four light slots. A Cooper-Hewitt light is suitable for this purpose. These rollers 11 to 14 are the film driving rollers. Each has on its end a pinion 18 that meshes with a driven gear 19.

Intermediate of the four driven rollers are four idler rollers 20, 21, 22, 23, which are adjustable toward and from the light casing 15. These rollers are mounted in journal boxes 24 and the journal boxes are mounted in guideways 25. Each box is independently movable in its guideway by an adjusting screw 26. By the adjustment of one or more of these idler rollers the endless film belt may be made sufficiently tight regardless of its length, within the limits of the machine. A roll 40 of sensitized paper 41 is associated with each of the driving rollers 11, 12, 13, 14. It is rotatably mounted in a suitable position relative to its associated driving roll, so that the paper may be drawn from the paper roll and passed, in surface contact with the film belt, between the same and the associated driving roll. As the film and each strip of paper pass along, in surface contact between the driving roll and the light casing, past the associated slot in the latter, the picture on the film will be progressively printed on the paper. Each paper strip after it passes the printing position goes to and is secured to a reel 43 which embraces a motor driven shaft 44 with which the reel has such frictional engagement as will permit relative slippage, but will cause the reel to turn fast enough to wind up the paper.

Associated with each of the rolls 11, 12,

13, 14, are two idler rolls 35 between which and the associated driving roll the sensitized paper and the film will pass. These idler rolls help to keep the sensitized paper and the film in the necessary surface contact with each other.

From the foregoing description it is evident that four strips of sensitized paper are being drawn along in surface contact with the film belt across the light slots and that the entire film belt will progressively come in contact with each of those strips of sensitized paper. The result will be that the entire picture on the film belt will be printed on each of those strips of sensitized paper during each revolution of the film belt. In other words, four pictures are being printed at the same time and the printing of pictures on each sensitized paper strip is being repeated indefinitely each time the film belt completes its revolution.

While the described apparatus embodies the invention in the best form, as I believe, for the rapid reproduction of the same picture or group of pictures, it will be obvious that any unit of the apparatus may be employed to continuously and progressively print on a strip of sensitized paper any series of pictures on a photographic film. One has only to cause the paper and film to move at the proper rate in surface contact with each other between one of the rolls 11, 12, 13, 14, past and close to the slotted light containing casing so as to come within the influence as described of the light rays emitted from the adjacent slot of said casing.

Having described my invention, I claim—

1. In a photograph printing apparatus, the combination of a closed casing, a source of light within said casing, said casing being provided with a light emitting slot, an endless belt film surrounding said casing, means for guiding the said film, means for causing the film strip to travel close to and past said slot and means for feeding a strip of sensitized material into contact with the film past the said slot.

2. In a photographic printing apparatus, the combination of a light containing casing having a narrow slot, an endless belt film surrounding said casing, guiding rolls over which said belt travels, one of said rolls being located close to the slot in the light casing but on the opposite side of the film to that on which said light casing lies, and means for causing said film belt to travel continuously in the path prescribed by said guide rolls.

3. In a photograph printing apparatus, the combination of a closed casing, a source of light within said casing, the casing being provided with a narrow slot, an endless belt film surrounding said casing, means for guiding the belt film, a roller adjacent the

said slot, said roller engaging with the belt film upon the side thereof remote from the said casing and means for speeding a strip of sensitized material around the said roll and between the roll and the belt film and means for causing said film belt to travel continuously.

4. In a photographic printing apparatus, the combination of a light containing casing having a narrow slot, an endless belt film photograph surrounding said casing, guiding rolls over which said belt travels,—one of said rolls being located close to the slot in the light casing but on the opposite side of the film to that on which said light casing lies, means for causing said film belt to travel continuously in the path prescribed by said guide rolls, a support for a roll of sensitized paper,—the said paper being extended between and in surface contact with the film belt and with that roll which is adjacent the slot in the light casing, and means to take up said sensitized paper after it has passed the last mentioned roll.

5. In a photographic printing apparatus, the combination of a light containing casing having a plurality of slots (of variable width), a plurality of parallel rolls arranged adjacent and close to the slots in said casing, a plurality of intermediately placed parallel rolls, an endless photographic film belt engaging said rolls and passing between the first named set of rolls and the casing and passing over the intermediate rolls, and means for causing the continuous travel of said film belt around the guiding rolls mentioned.

6. In a photographic printing apparatus, the combination of a light containing casing having a plurality of slots, a plurality of parallel rolls arranged adjacent and close to the slots in the casing, a plurality of intermediately placed parallel rolls, an endless photographic film belt engaging said rolls and passing between the first named set of rolls and the casing and passing over the intermediate rolls, means for causing the continuous travel of said film belt around the guiding rolls mentioned, and means for adjusting the position of at least one of the intermediate rolls toward and from the light casing to take up the slack of the film belt.

7. In a photographic printing apparatus, the combination of a light containing casing having a plurality of slots, a plurality of parallel rolls arranged adjacent and close to the slots in said casing, a plurality of intermediately placed parallel rolls, an endless photographic film belt engaging said rolls and passing between the first named set of rolls and the casing and passing over the intermediate rolls, and means for causing the continuous travel of said film belt around the guiding rolls mentioned, means for ad-

justing the position of at least one of the intermediate rolls toward and from the light casing to take up the slack of the film belt, means to simultaneously rotate all of the rolls in the first set at the same speed, a plurality of rolls of sensitized paper,—the paper from the several rolls being respectively

extended between and in surface contact with the film belt and the driven rolls, and means to take up the sensitized paper strips after they have left said rolls. 10

In testimony whereof, I hereunto affix my signature.

HERMAN SHAPIRO.