

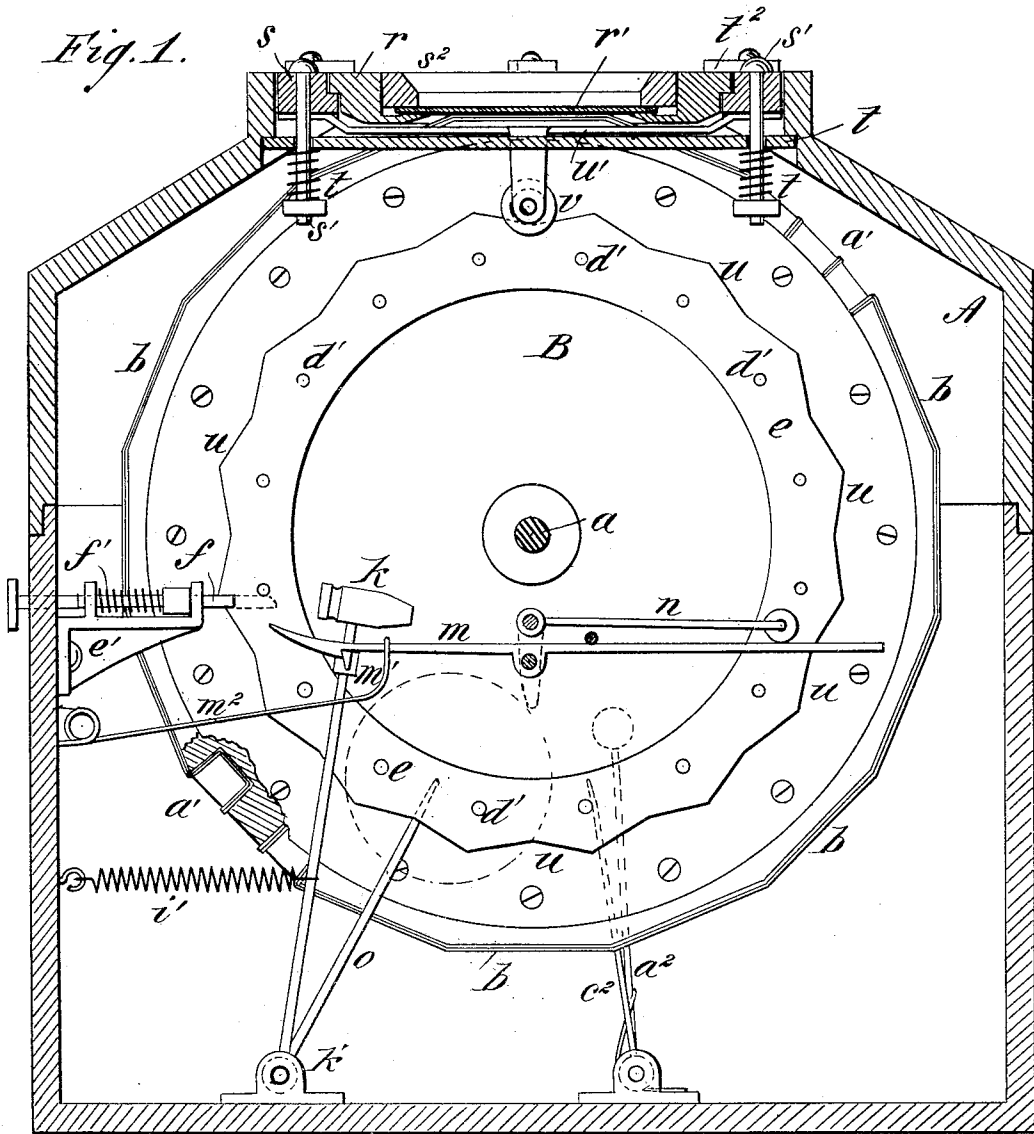
W. HILL & T. R. WILSON.

PHOTOGRAPHIC PRINTING APPARATUS.

No. 319,975.

Patented June 16, 1885.

Fig. 1.



WITNESSES:

*Donn Twitchell*  
*C. Sedgwick*

INVENTOR:

*W. Hill*  
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 ATTORNEYS.

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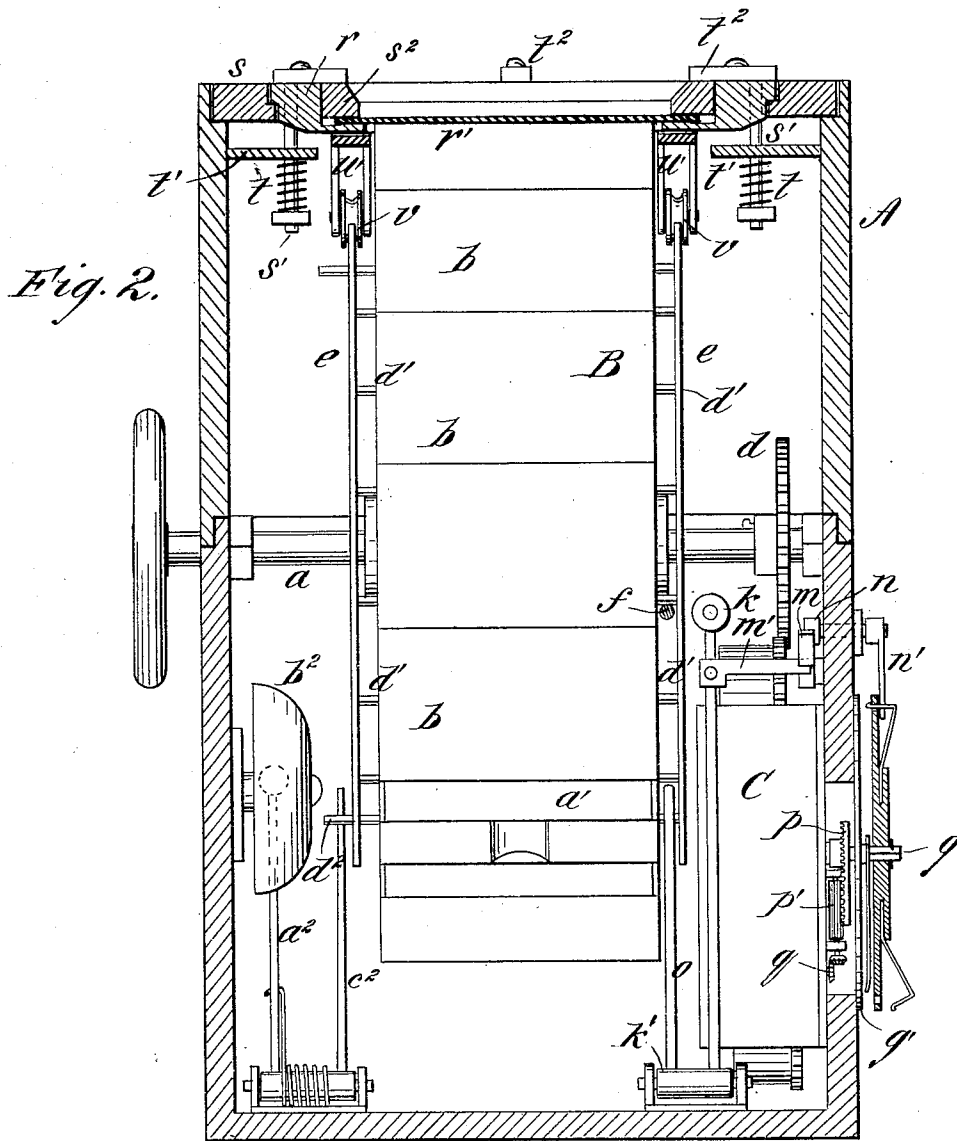


Fig. 2.

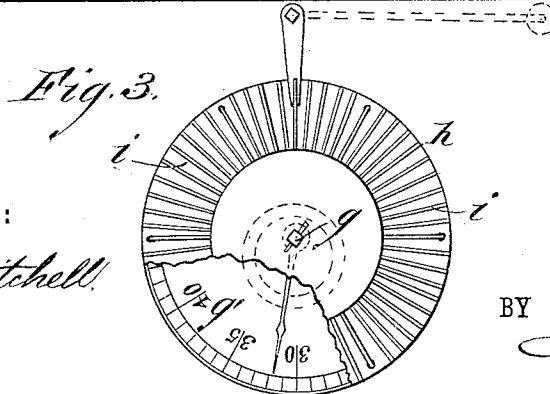


Fig. 3.

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# UNITED STATES PATENT OFFICE.

WILLIAM HILL AND THOMAS R. WILSON, OF SALT LAKE CITY, UTAH TERRITORY.

## PHOTOGRAPHIC-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 319,975, dated June 16, 1885.

Application filed July 15, 1884. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM HILL and THOMAS R. WILSON, both of Salt Lake City, in the county of Salt Lake and Territory of Utah, have invented a new and Improved Photographic-Printing Apparatus, of which the following is a full, clear, and exact description.

The object of our invention is the printing of numerous photographic pictures in succession from a single negative by an apparatus which, when set and adjusted, shall act automatically to feed the sensitive paper and remove the pictures when printed. To those ends we combine a multifaced cylinder or polyhedral drum with a negative-holder of peculiar construction and arrangement, and provide clock-work for causing an intermittent rotation of the cylinder at uniform intervals of time. The apparatus also embraces minor details of construction and arrangement, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of our apparatus. Fig. 2 is a transverse section of the same, and Fig. 3 is a face view, partly broken, of the time-regulator.

The machine is contained in a closed case, A, which has its top portion made removable so as to give access to the inside.

B is a drum or cylinder hung within the case on a cross-shaft, *a*, one end of which projects at the outside, and is provided with a hand-wheel for use in turning the cylinder. The surface of the cylinder is formed with numerous flat faces, *b*, of uniform width, and of greater or less width, according to the size of the pictures to be printed in the apparatus.

At *a*, on opposite sides of the cylinder, are cross-strips set in mortises, so that they can be removed and reinserted for clamping the ends of the paper placed around the cylinder. We prefer to cover the surface of the cylinder with plush or other soft material.

Within the case is a clock-movement, C, geared to a wheel, *d*, on shaft *a*, so as to rotate the shaft and cylinder. On each side of the cylinder is a ring, *e*, attached by pins *d'*,

so that the rings are set off slightly, and there are as many of these pins *d'* as there are faces *b*.

*f* is a stop or trigger sustained by a bracket, *e'*, attached to the side of the case, and around the trigger is a spiral spring, *f'*, which forces the trigger inward into the path of pins *d'*, so as to hold the cylinder from rotating. The trigger *f* extends to the outside of the case, so that it can be drawn out by hand to release the cylinder. For the automatic release of the trigger from the pins the following mechanism is provided.

The minute-hand arbor *g* of the clock-work extends through the front and carries a hand that indicates on a numbered dial, *g'*. There is also attached on the arbor a circular disk, *h*, that is provided with spring-fingers *i*, attached in radial positions and having their outer ends bent at right angles and notched to engage in holes in disk *h*, whereby any number of the fingers can be bent down and held to serve as rigid projections on the disk. The graduated spaces on dial *g'* we term "minutes," for convenience, and they are preferably sixty in number. The holes in disk *h* may correspond or be double that number, and there may be one-half the number of fingers *i*, or less, as each finger can be used with two holes.

Within the case is a hammer, *k*, hung on an arbor, *k'*, so as to swing in a plane with trigger *f*, and provided with a spring, *i'*, that draws the hammer to the trigger.

A latch, *m*, hung on the case and drawn down by a spring, *m<sup>2</sup>*, engages with an arm, *m'*, on the hammer, and holds it in the backward position.

On an arbor passing through the front of the case is an arm, *n*, that lies normally on the latch *m*, and on the outer end of the same arbor is a second arm, *n'*, projecting down in front of disk *h*, for being moved by fingers *i*, so as to cause arm *n* to press down the latch *m* and release the hammer. The arbor *k'*, carrying the hammer, has an arm, *o*, which is acted on by pins *d'*, to draw back the hammer after the blow on the trigger has been given and the cylinder started.

In applying the clock-work the gearing, driving by one spring the usual striking-gearing, rotates the cylinder. The time mechanism is operated by a separate spring, so as to

give a constant movement to the disk  $h$ ; and we prefer to make the movement variable by means of the gear-wheel  $p$ , which, as shown in Fig. 1, is placed eccentrically on the hour-hand arbor around arbor  $g$ , and gears with a long pinion,  $p'$ , that in turn is rotated by bevel-gearing  $q$ , which connects to the spring-barrel on its arbor. The effect of this connection is to rotate the disk  $h$  twelve times to one rotation of wheel  $p$ , and at a gradually-increasing speed until the maximum is reached, and then at a gradually-decreasing speed, corresponding with the increasing power of the sun from morning till noon and the decrease thereafter, so that the picture will be exposed for short periods during the middle of the day.

At the top of case A is a frame,  $r$ , receiving the negative  $r'$ , and a mat with the desired aperture. The negative is held in frame  $r$  by an interior frame,  $s$ , that is held down by the buttons  $t$ , working over inclines, so as to allow for varying thickness of the negative plates. This frame  $r$  sets within an outer frame,  $s$ , that is held down to place by pins  $s'$ , carrying spiral-springs  $t$ , taking beneath interior flanges,  $t'$ , on case A, whereby the negative is held in contact with the paper on the upper face,  $b$ , of the cylinder.

In order to raise the frame and negative when the faces are changed by rotation of the cylinder, the outer edges of the ring  $e$  are formed with double-inclined projections  $u$ , corresponding to the number of faces on the cylinder; and upon cross-bars  $u$ , attached to frame  $s$ , are brackets carrying grooved rollers  $v$ , that take on the edges of rings  $e$ , whereby the frames  $s$  and  $r$  are raised by projections  $u$  at the moment the cylinder commences to rotate, and allowed to fall as the movement is completed and a new face presented upward.

In operating the apparatus the sensitive paper is stretched on the drum B and clamped by the strips  $a'$ . The negative is placed in frame  $r$  and the cylinder turned by hand to bring the first face  $b$  beneath the negative for printing the picture. The process of printing this first picture is to be watched, and the time it takes noted from the movement of the hand over dial  $g'$ , so that the fingers  $i$  can be arranged on disk  $h$  accordingly. For instance, if the hand moves over ten minutes' space on the dial, then every tenth finger is to be bent down and caught in its corresponding hole in the disk  $h$ , so that thereafter the arm  $n'$  will be raised as the depressed fingers  $i$  come in contact with it in succession, the trigger thereby released, as before described, and the cylinder allowed to turn the distance of one face at each release.

I provide for giving an alarm when the end of the paper is reached by means of the hammer  $a^2$ , bell  $b^2$ , and trip-arm  $c^2$ , which is moved by a pin,  $d^2$ , projecting from the side of the cylinder at the proper point.

It will be seen that this apparatus, after being adjusted and set, can be left to operate au-

tomatically, as it requires no further attention until the end of the paper is reached. Whatever may be the time of day when the printing is commenced, the intervals of exposure are shortened and lengthened properly.

The cam-rings  $e$  may be attached directly to the shaft  $a$  and the shaft have a slight movement independent of the cylinder, so that the first movement shall raise the negative-holder before the cylinder starts.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a photographic-printing apparatus, the combination of a multifaced cylinder, a holder placed to retain a negative upon one face of the cylinder, a motor connected for rotating the cylinder, and mechanism, operated by clock-work for releasing and stopping the cylinder, substantially as described.

2. In a photographic-printing apparatus, the combination, with a cylinder carrying the sensitive paper and fitted for rotation by a motor, of a trigger for arresting the movement of the cylinder, and a regulator rotated by clock-work and acting to release the trigger at intervals, substantially as described.

3. In a photographic-printing apparatus, the combination of the cylinder B, formed with faces  $b$ , the frame  $s$ , carrying the negative, the cam-ring  $e$ , and the grooved rollers  $v$ , attached to the frame carrying the negative, substantially as described.

4. In a photographic-printing apparatus, the frame  $s$ , pins  $s'$ , springs  $t$ , and rollers  $v$ , combined with the rotating cylinder B and cam-rings  $e$ , substantially as described, for operation as specified.

5. In a photographic-printing apparatus, the combination of the rotating cylinder B, trigger  $f$ , hammer  $k$ , latch  $m$ , and the tripping-arm  $n$ , substantially as described.

6. In a photographic-printing apparatus, the combination of arms  $n$   $n'$ , carried by one arbor, and the rotating disk  $h$ , provided with fingers for engaging the arm  $n'$  with the rotating cylinder B, and a trigger released by movement of the arms  $n$   $n'$ , substantially as described.

7. In a photographic-printing apparatus, the combination of rotating cylinder B, disk  $h$ , rotated by clock-work and provided with fingers  $i$ , and the trip-arm  $n'$ , operating by its movement to release the cylinder, substantially as described.

8. In a photographic-printing apparatus, the time-regulator  $h$ , provided with spring-fingers  $i$ , combined with a clock-work arranged to rotate the regulator, substantially as described.

9. In a photographic-printing apparatus, the combination of a rotating cylinder and a time-regulator rotated at varying speeds, for releasing and stopping the cylinder at intervals, substantially as described.

10. In a photographic-printing apparatus, the combination of the eccentric wheel  $p$ , pin-

ion  $p'$ , and gearing  $q$ , with the clock-work C, arbor  $g$ , and disk  $h$ , substantially as and for the purposes specified.

11. In a photographic-printing apparatus, 5 the combination, with the rotating cylinder B, of the bell  $b^2$ , hammer  $a^2$ , and arm  $c^2$ , substantially as described.

12. The combination, in a photographic-printing apparatus, of a cylinder geared to a

motor, a time-regulator having a constant ro- 10 tation by a separate motor, and mechanism actuated by the regulator to release and then stop the cylinder, substantially as described.

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Witnesses:

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