No. 771,776. PATENTED OCT. 4, 1904.

J. M. G. FULLMAN.

APPARATUS FOR COPYING DRAWINGS, &c.

APPLICATION FILED SEPT. 11, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

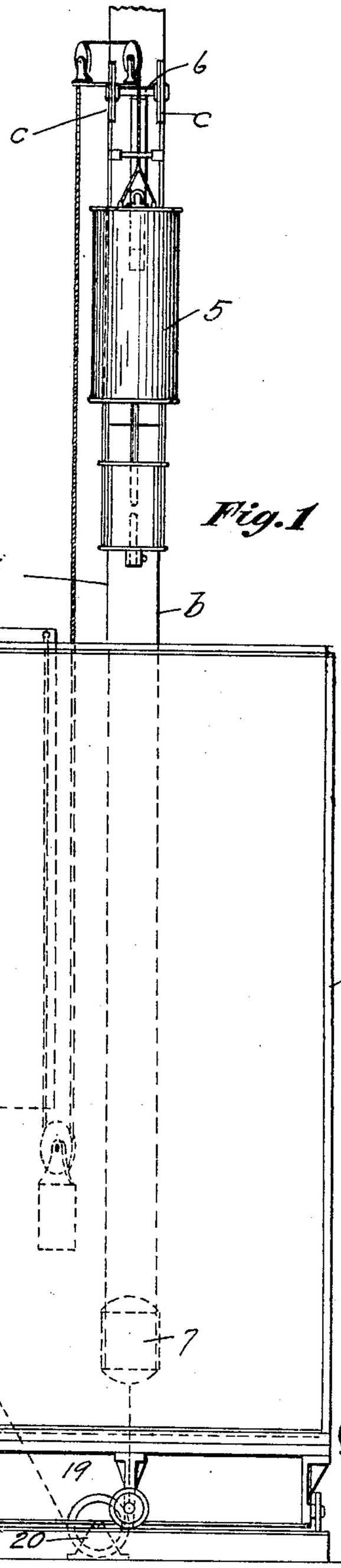

Fig. 1

Witnesses
C. A. Williams
James C. Herron.

Inventor
James M. G. Fullman
by John H. Roney
his
Attorney

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NO MODEL. 2 SHEETS—SHEET 2.

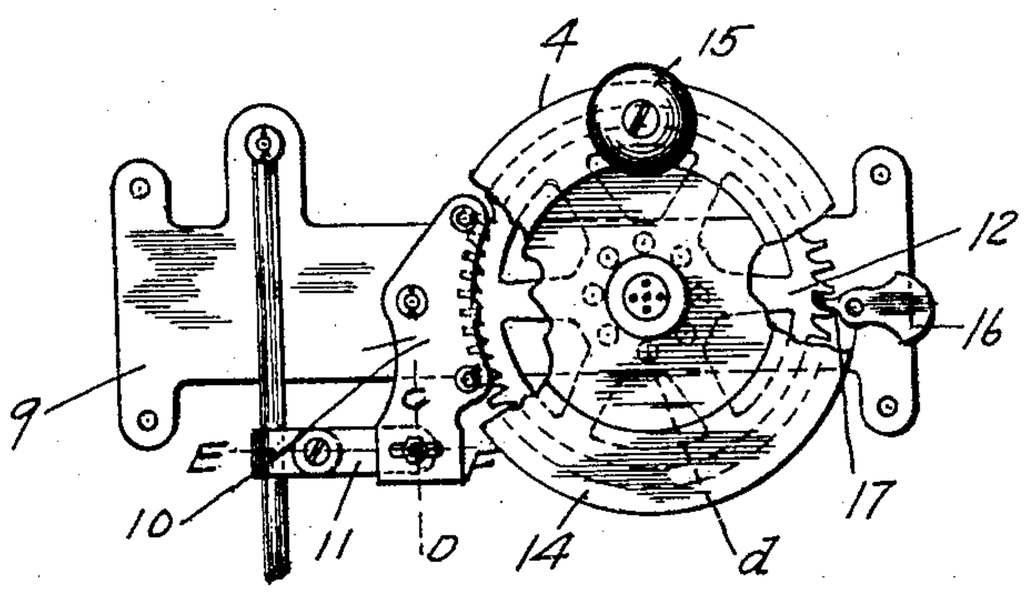


Fig. 2

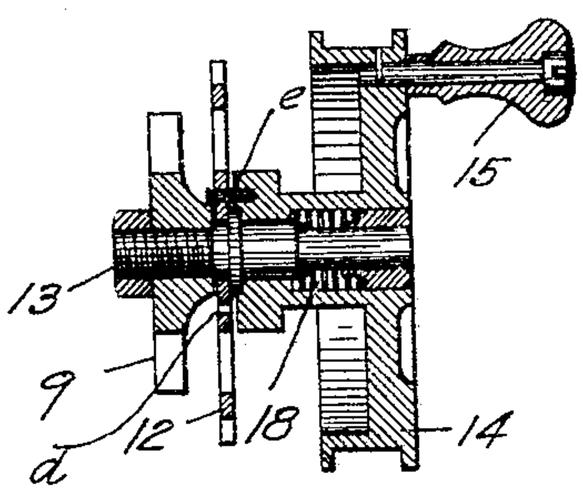


Fig. 3

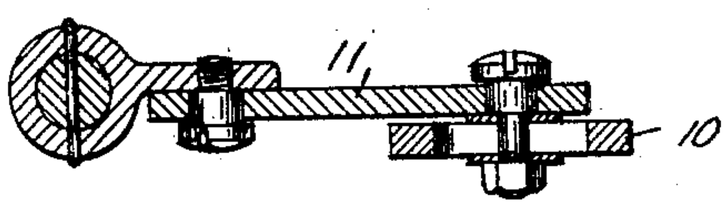


Fig. 7

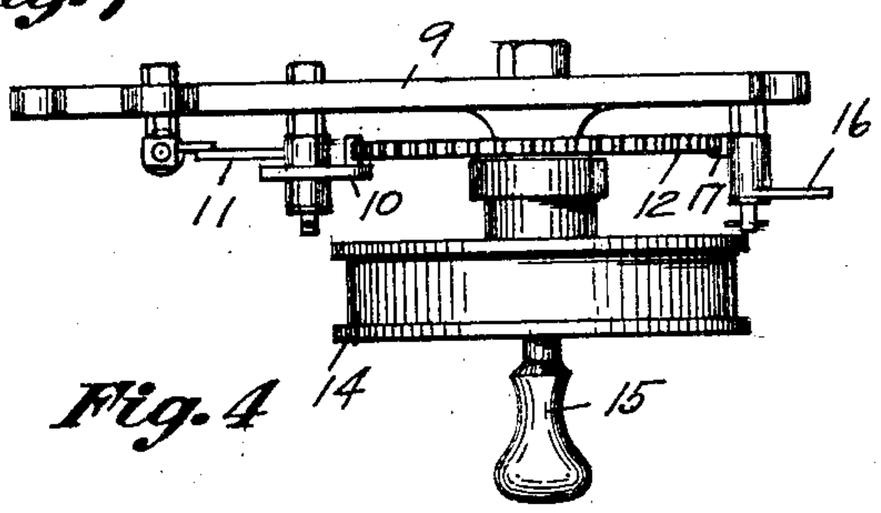


Fig. 4

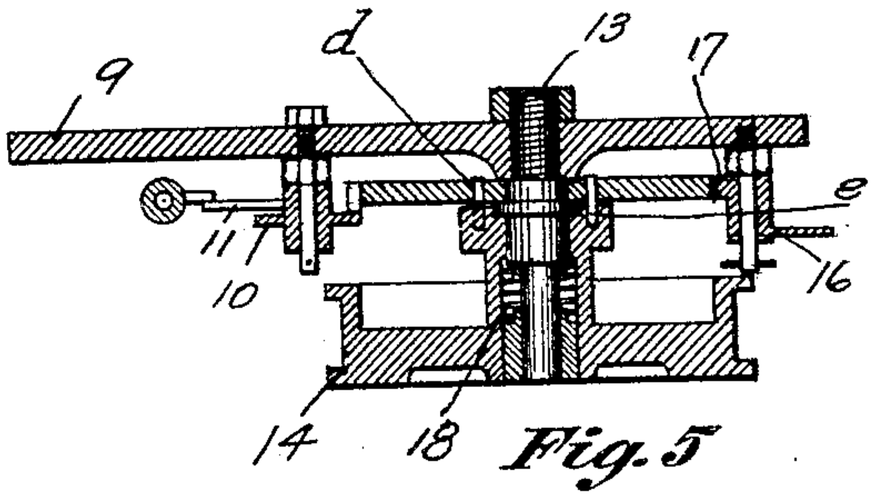
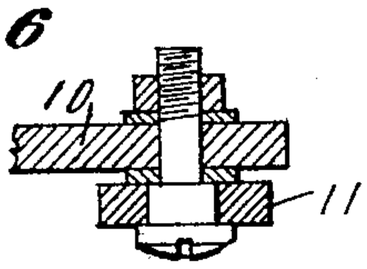


Fig. 5

Fig. 6



Witnesses
C. F. Williams
James C. Herron.

Inventor
James M. G. Fullman
by John H. Roney
his Attorney

No. 771,776. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

JAMES M. G. FULLMAN, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR COPYING DRAWINGS, &c.

SPECIFICATION forming part of Letters Patent No. 771,776, dated October 4, 1904.

Original application filed July 24, 1901, Serial No. 69,562. Divided and this application filed September 11, 1902. Serial No. 122,982. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. G. FULLMAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Copying Drawings, &c., of which improvement the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 indicates a front elevation of my improved apparatus for copying or reproducing drawings, tracings, negatives, &c. Fig. 2 is a front elevation of the automatic gear. Fig. 3 is a section of the same, taken on line *x y* of Fig. 2. Fig. 4 is a plan view of the same. Fig. 5 is a section taken through line *a b* of Fig. 2. Fig. 6 is a section taken through line *c d* of Fig. 2. Fig. 7 is a section on line *e f* of Fig. 2.

My present invention, which is a division of my copending application, Serial No. 69,562, filed July 24, 1901, relates to apparatuses for copying or reproducing drawings, tracings, negatives, &c., and particularly to that class of such devices in which the copying or reproducing is obtained by electrically-produced light.

The objects of my invention are to produce for use in such devices an automatic gear by the use of which the descent of the arc-lamp into the cylinder is automatically controlled and regulated and to means to prevent or stop the movement of the gearing or escapement mechanism when the lamp is not in use; and to accomplish these objects my invention consists in the novel combination and arrangement of parts hereinafter more specifically set forth, reference being had to the accompanying drawings, in which like reference characters indicate like parts wherever they occur throughout the several views.

Referring to said drawings, 1 is a vertically-disposed glass cylinder comprising two segmental sections, the ends of which are secured in wooden blocks or holders on opposite sides of said cylinders and which extend the entire length thereof, the lower ends of said holders being secured in the revoluble base 2. The block or holder at the upper end of said sections is secured together by bolts or in any other suitable manner. The cylinder is mounted on the base 2, which is provided with wheels adapted to travel on ways whereby said cylinder may be carried or caused to travel in a circular path.

3 is a board arranged at one side of the cylinder, upon which is arranged an automatic gear mechanism or clock-escapement 4 for automatically regulating the descent of the arc-lamp 5 into the cylinder. The said lamp is suspended upon cords *b*, which pass over pulleys *c*, mounted in the outer and inner ends of the bracket 6. The said cords *b* pass around and under the counterweight 7, which is somewhat lighter than the arc-lamp, so as to permit the lamp to descend into the cylinder at a speed dependent on the adjustment of the pendulum-bob 8 of the automatic gear or escapement mechanism. The said pendulum-bob is pivotally secured at its upper end at *x* upon the base-plate 9 of the automatic gear or escapement mechanism and is connected to an escapement or oscillating pallet 10 by means of the link 11. The said escapement or pallet is pivotally mounted upon the plate 9 and engages with the gear-wheel 12, which is mounted on the shaft 13, whereby movement is transmitted to said mechanism through the drum 14 as the cord is unwinding during the descent of the lamp. The said drum is detachably mounted on the shaft 13 and is provided with a crank or handle 15, whereby the same may be turned, wound up, or lowered. The gearing or escapement mechanism may be held against movement by the latch lock or stop 16, which is capable of being withdrawn or thrown out of engagement or thrown into engagement therewith to admit of this. The tooth 17 of said latch lock or stop is adapted to engage with the gear-wheel 12 to prevent movement of the escapement mechanism when the lamp is out of operation and when withdrawn or disengaged therefrom to permit movement of said mechanism when the lamp is descending into the cylinder and the pendulum-bob is put in operation. The said pendulum-bob is adjustably secured upon the pendulum, whereby the

descent of the lamp or time thereof in descending into the cylinder may be varied, regulated, and controlled. The hub of the gear-wheel is provided with one or more orifices or holes *d*, in which the pin *e*, projecting from the hub of the drum, is adapted to engage, whereby the said gear-wheel and drum are detachably connected, whereby when it is desirable the drum may be disengaged from the gear-wheel by pulling it forward, thus releasing it from the pin and compressing the spring 18, mounted on the outer end of the shaft, which will permit the drum to be rotated without actuating the gear of the automatic gear mechanism. The retraction of the spring causes the pin *e* in the hub of the drum to again engage the orifices in the gear-wheel, and the mechanism is again in operative condition.

The lower ends of the cords *b*, which pass around the counterweight 7, are connected to the cord *f*, which passes under the pulley 19, mounted in the bracket 20, and is connected at its opposite end to the drum of the automatic gear mechanism, whereby when said lamp descends into the cylinder the counterweight ascends and the escapement mechanism is operated, as heretofore stated.

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

1. In an apparatus for copying or reproducing drawings, the combination of an automatic gear mechanism for regulating and controlling the descent of the lamp comprising a pendulum with an adjustable bob thereon, an escapement operatively connected with said pendulum, a gear adapted to engage intermittently with said escapement, a drum mounted on the shaft on which the said gear is mounted, and means to disengage said drum from said gear.

2. In an apparatus for copying or reproducing drawings, an automatic gear mechanism for regulating and controlling the descent of the lamp comprising a pendulum with an adjustable bob thereon, an escapement operatively connected with said pendulum, a gear adapted to engage intermittently with said escapement, a drum mounted on the shaft on which the said gear is mounted, means to disengage said drum from said gear, and a latch to lock the gear against movement.

3. A printing-drum, a lamp, an escapement mechanism for lowering the lamp into the drum, and a catch for preventing the operation of the said mechanism.

4. A printing-drum, a lamp, a winding-drum, connections between the winding-drum and the lamp, an escapement mechanism for governing the speed of the winding-drum, said winding-drum and escapement being separable to permit the free turning of the former.

5. A printing-frame, a lamp, a winding-drum, a pair of cords for suspending the lamp, an escapement mechanism for governing the travel of the lamp, and a weight, one of the cords being connected to the drum and the other, to the weight.

6. A printing-frame, a lamp, a winding-drum, a pair of cords for suspending the lamp, an escapement mechanism for governing the travel of the lamp, and a weight, the drum being separable from the escapement-wheel to permit the free turning of the former, one of the cords being connected to the drum and the other to the weight.

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

JAMES M. G. FULLMAN.

In presence of—

CLARENCE A. WILLIAMS,

JOHN H. RONEY.