

(Model.)

E. MÜLLER.
SELF SETTING TIME PIECE.

No. 392,056.

Patented Oct. 30, 1888.

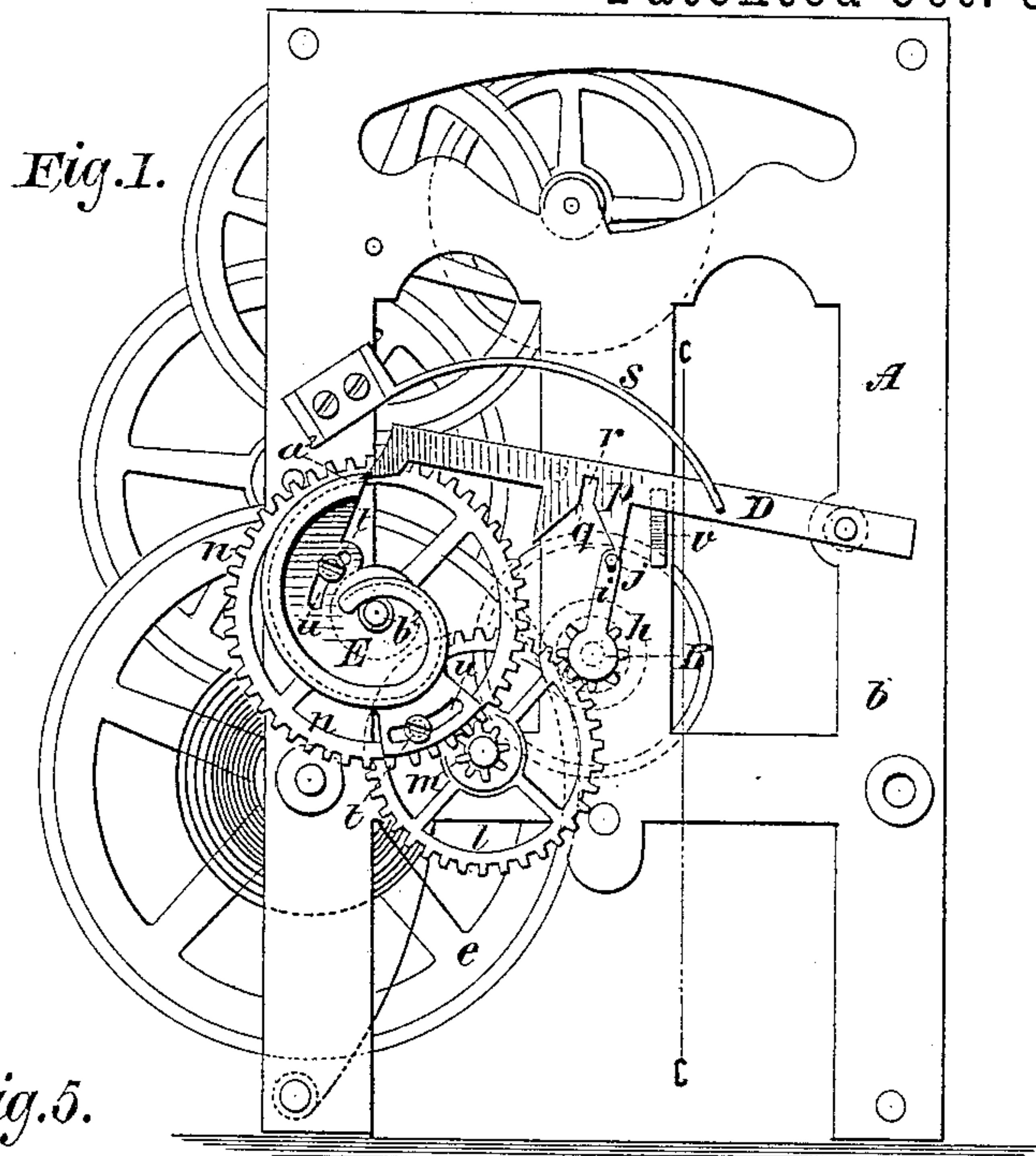
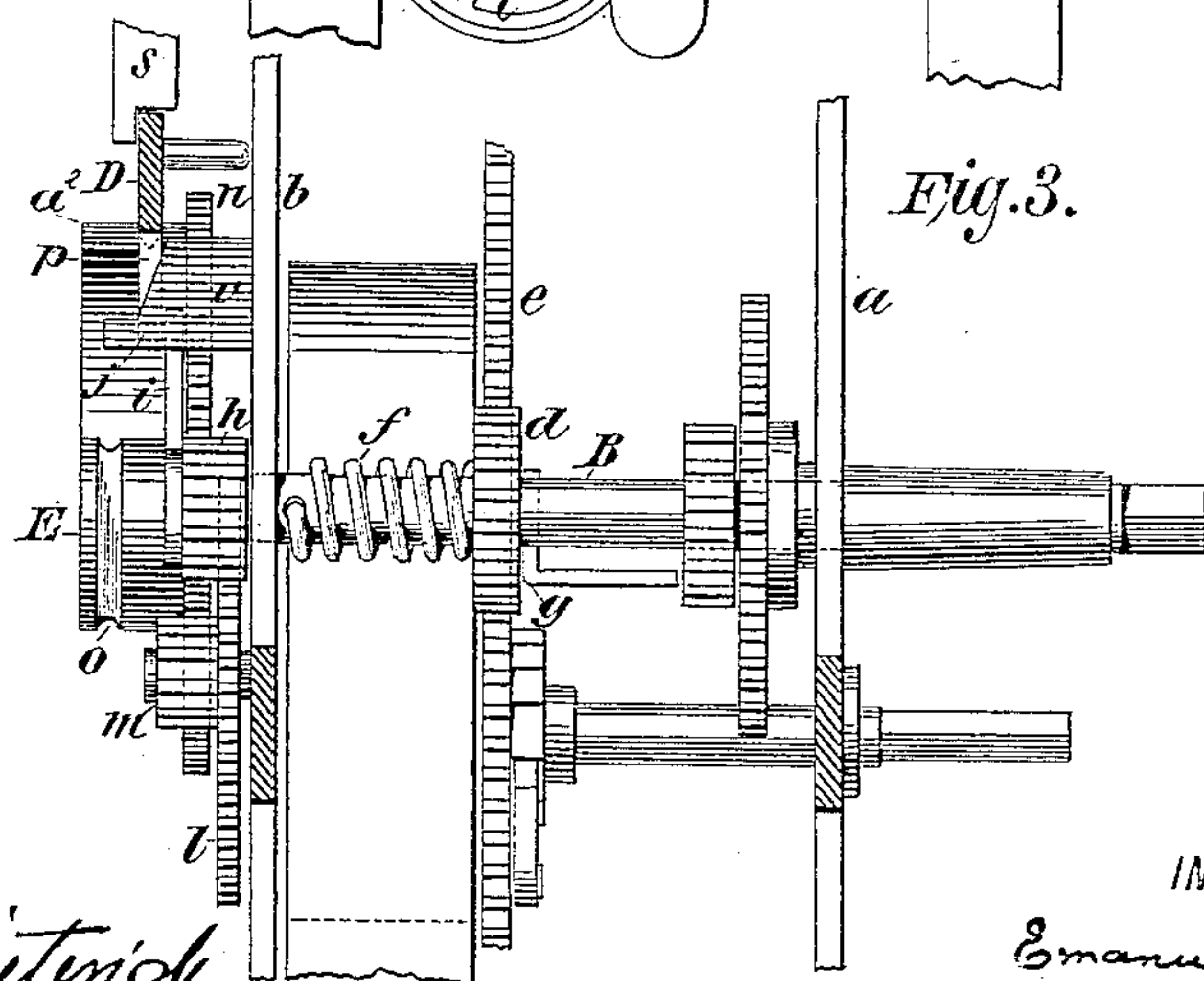
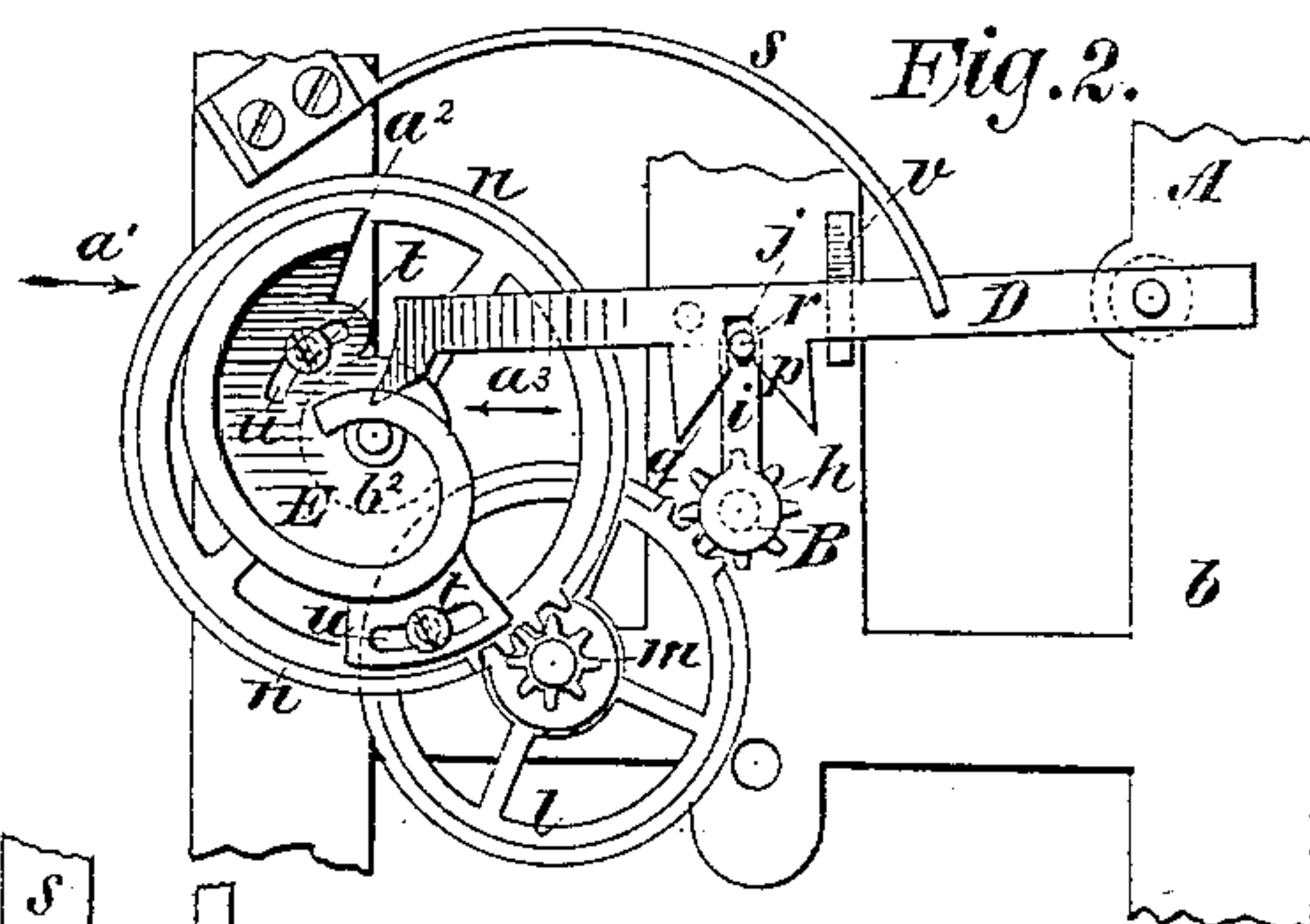
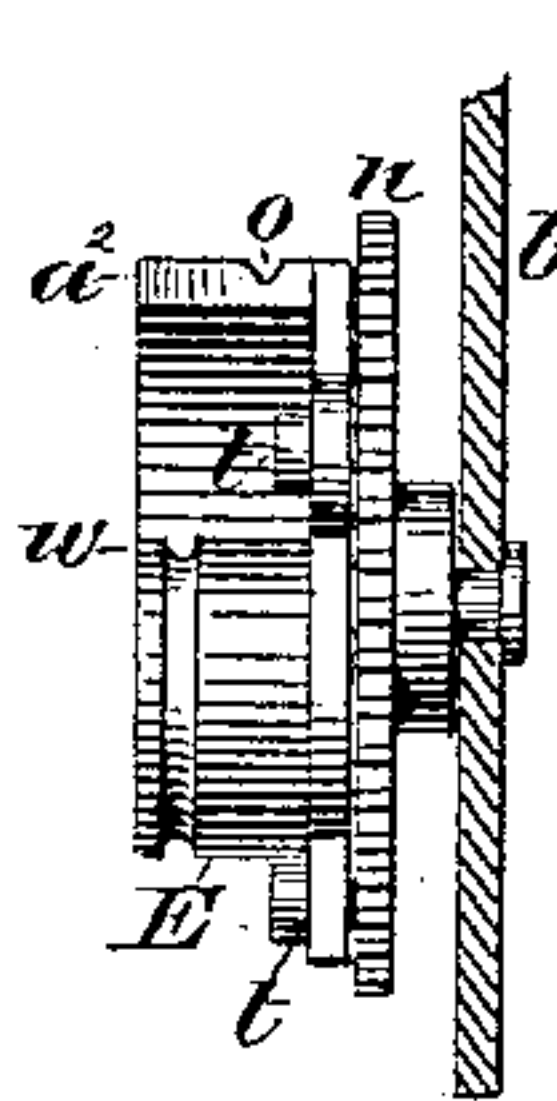
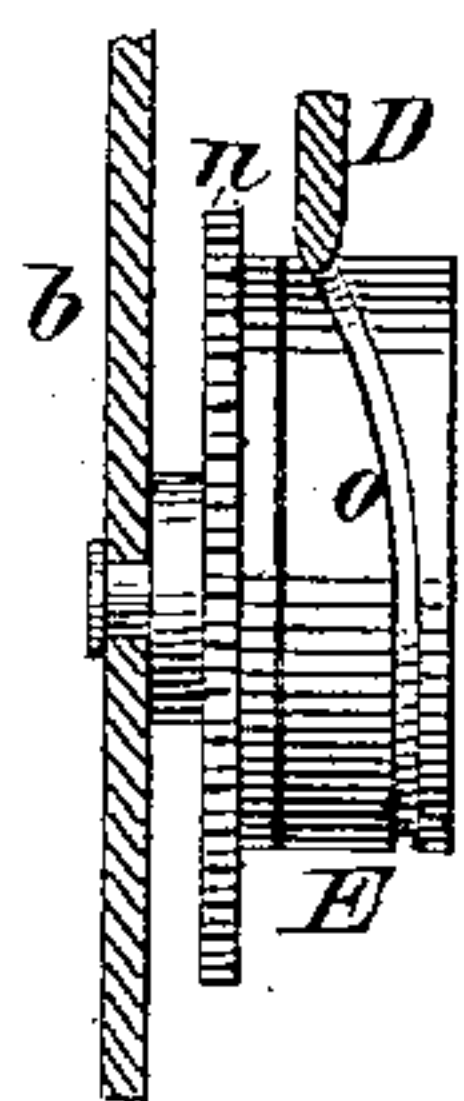


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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SELF-SETTING TIME-PIECE.

SPECIFICATION forming part of Letters Patent No. 392,056, dated October 30, 1888.

Application filed February 4, 1888. Serial No. 263,397. (Model.)

To all whom it may concern:

Be it known that I, EMANUEL MÜLLER, formerly of Montgomery, county of Montgomery, Alabama, at present residing in the city, county, and State of New York, have invented an Improved Self-Regulating Time-Piece, of which the following is a specification.

Heretofore time-pieces have been regulated by means of the pendulum or balance-spring, and again by electrical connection with a central regulator.

The object of my invention is to produce a self-regulating time-piece, or one which will automatically set the hands to 12 or to any other prearranged position, whether the time-piece has gained or lost time. This automatic setting can take place every twenty-four hours, every hour, or after any suitable length of time has elapsed.

The invention consists in the novel means for effecting the above objects, and in the combination of parts, that will be more fully hereinafter set forth.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of the back of a spring-balance clock-movement embodying my invention, showing the position the parts assume just before the mechanism acts to set the hands, the clock being represented as having lost time. Fig. 2 is a detail view of the setting device, shown in the position the parts assume after having set the hands. Fig. 3 is a vertical cross-section on the line *cc*, Fig. 1, part of the movement being broken away. Fig. 4 is an edge view of the cam, looking in the direction of the arrow *a'*, Fig. 2, showing the cam. Fig. 5 is an edge view of said cam, looking in the direction of the arrow *a''*, Fig. 2.

In the accompanying drawings I have illustrated a mechanism for setting the hands at the end of every twenty-four hours. This setting mechanism is intended to be operated solely by the movement of the clock.

A represents the frame of a clock-movement carrying a suitable train of gearing.

a is the front plate, and *b* the back plate, thereof.

B is the minute-arbor, upon which the hands

are mounted in suitable manner. The arbor *B* carries a loose pinion, *d*, which gears with the driving-wheel *e* of the train. The pinion *d* is crowded against a shoulder, *g*, on the arbor *B* by means of a spring, *f*. Although the arbor *B* will be rotated by the pinion *d*, the arbor is nevertheless free to be rotated independently of the pinion; but this loose pinion *d* is old and well known in clocks.

Upon the arbor *B* is secured a pinion, *h*, and an arm, *i*. The free end of the arm *i* carries a pin, *j*. The pinion *h* gears with a spur-wheel, *l*, hung on the plate *b*. A pinion, *m*, carried by the wheel *l*, gears with a spur-wheel, *n*, also hung on the plate *b*. When the arbor *B* is driven by the pinion *d*, the above gearing will be driven thereby; but the pinion *h* may gear directly into the wheel *n*. By taking hold of and turning the arm *i* the arbor *B* will be turned, thereby setting the hands carried by said arbor, as will be more fully hereinafter shown.

D is a lever pivoted to the plate *b*. At its free end the lever *D* bears upon a snail, *E*, which is carried by the gear-wheel *n*, as shown. The snail *E* has by preference a groove, *o*, on its periphery, in which the end of the lever *D* rests. The lever *D* carries a projection, *p*, provided with a Y-shaped recess, *q*, which is adapted to engage the pin *j* on the arm *i*. As the lever *D* drops off the end *a'* of the snail *E*, one of the inclined edges of the recess *q* strikes the pin *j*. Said pin will thereby be carried into the straight part *r* of said recess. This movement carries the arm *i* into the perpendicular position, as in Fig. 2. By this movement of the arm *i* the hands on the arbor *B* are set to the correct time. A spring, *s*, carried by the clock-frame, bears upon the lever *D*, causing it to retain its position on the snail *E*, and also causing it to drop with a quick movement when the end *a'* of the snail *E* passes from under it. The snail *E* is adjustably secured to the gear-wheel *n* by means of screws *t t*, which pass through slots *u u* in said snail and into said wheel. (See Figs. 1 and 2.) This permits an adjustment of the snail on its supporting-wheel, for the purpose hereinafter stated.

This hand-setting device is adjusted and op-

erates as follows: The gearing $h l m n$ represented in the drawings is so calculated that as the pinion h makes one revolution an hour the wheel n will make one revolution in twenty-four hours, the snail or cam E thereby also making one revolution in twenty-four hours. The time which the clock gains or loses in twenty-four hours is first ascertained by allowing it to run, say, for twenty-four hours. In Fig. 1 of the drawings the clock is represented as having lost about three minutes in twenty-four hours—that is to say, the correct time is, say, twelve o'clock, while the minute-hand points to three minutes of twelve. This is shown in Fig. 1 by the arm i on the rear end of the arbor B being slightly off the perpendicular. The clock at this moment is stopped. The cam E is now adjusted and secured in place by the screws t , so that the tip end of the lever D will just pass from the end a^2 of the cam. When the lever D is thus made to slip off the end a^2 of the cam, it causes the inclined recess q to ride on the pin j , thereby turning the arm i into the perpendicular position, as shown in Fig. 2, which turns the arbor B instantly, so as to set the hands to 12; but at the same time the wheel h causes the wheel n and cam E to be turned a corresponding distance, as hereinafter described. The lever D will now rest upon the small part of the snail E . (See Fig. 2.) In its descent the lever D rides upon an incline, v , carried by the plate b , which moves it gradually outward to free the pin j from the projection p , to enable the arm i to afterward freely rotate as the clock continues to go. The free end of the lever D will now be in the part w of the groove o which is farthest from the plate b . The cam E now continues to revolve with the running of the clock, and the lever D will be gradually raised thereby, at the same time riding in the groove o . On that part of the cam E which is farthest from its axle b^2 the groove o courses inward. By this means as the cam revolves the lever D is moved inward, bringing the recess q over the pin j , ready again to descend to bring the arm i to the perpendicular position to set the hands, as before described. At the time the lever D descended to advance the arm i on the minute-arbor B , in manner described, the cam E , through the gearing $h l m n$, was turned a corresponding distance, thereby making up at the start the difference between the distance the cam would travel if the clock kept correct time, and the distance it actually travels when running an incorrect time. Thus, supposing the clock to run three minutes slow in a day, it follows that it marks on its dial only twenty-three hours and fifty-seven minutes during twenty-four actual hours. The cam E revolves once in twenty-three hours and fifty-seven minutes; but to that is added the rapid motion which is imparted to the cam by its gear-connection with the arbor B at the time the lever D descends. This rapid motion advances the cam a distance equal to make up

for its loss of three minutes. Thus, after the next twenty-three hours fifty-seven minutes are recorded, the point a^2 will again drop the lever D and set the hands to twelve. In other words, each time the cam E has made one revolution the lever D will drop, thereby moving the arm i and setting the hands to the correct position, and moving the cam E , also, to compensate for the time lost or gained by the clock. If the time-piece is found to have gained time instead of having lost it, the arm i at the correct time will have been carried past the perpendicular, as in dotted lines, Fig. 1. The cam E in that case is then set back a corresponding distance by the motion given it by the arbor B at the time the lever D descends.

If it is preferred to have the time-piece correct itself every hour instead of every twenty-four hours, it is only necessary to gear the cam carrying the wheel n so as to revolve in unison with the arbor B . If it is desired to correct the time every twelve hours, the cam-wheel n should be geared to revolve once while the pinion h revolves twelve times.

Although I have shown this setting mechanism as carried by the back plate, b , of the movement, it may be otherwise suitably carried, if desired.

By using the slip-pinion d on the minute-arbor B the turning of said arbor by the arm i is permitted, which would be prevented were the pinion rigid on the arbor; but said pinion could be otherwise held to the arbor B than shown to produce a slip-pinion, if desired.

The mechanism above described is subject to modifications by which the same effects may be accomplished, and various known hand-setting devices may be used in connection with my invention to be operated on the same principle. The lever D may be made of a spring, if desired, in which case the separate springs could be dispensed with, or any other device equivalent to a lever can be used.

Having now described my invention, what I claim, is—

1. In a time-piece, the combination of an arbor, and mechanism for revolving the same, with a lever for turning said arbor to set the hands, and with an adjustable support for said lever, and means for automatically turning said support by connection with said arbor, substantially as specified.

2. In a time-piece, the arbor B and mechanism for driving it, combined with the lever D , for turning said arbor independently of its driving mechanism to set the hands, and with an adjustable support for said lever, and means for automatically turning said support to permit movement of said lever, substantially as described.

3. In a time-piece, the arbor B , arm i , slip-pinion d , and its driving-wheel e , combined with the lever D and means for raising and lowering said lever to turn the arbor B to set the hands, substantially as described.

4. In a time-piece, the arbor B , having arm i , combined with the lever D , having recess q ,

adapted to straddle said arm *i*, and with means for moving said lever slowly in one direction away from said arm and rapidly in the other toward said arm, substantially as described.

5 5. The hand-driving arbor, means for driving same, arm *i*, carried by said arbor, and lever *D*, for turning said arbor, in combination with the cam *E* and means for rotating said cam from said arbor, substantially as herein
10 shown and described.

6. The hand-driving arbor *B*, arm *i*, and pinion *h*, carried by said arbor, in combination with the lever *D*, for turning said arbor *B* to set the hands, cam *E*, and gearing connecting
15 said cam with the pinion *h*, whereby, when the arbor *B* is turned by the lever *D*, the cam *E* will also be turned, substantially as described.

7. The cam *E*, having slots *u*, spur-wheel *n*, and screws *t*, passing through said slots and
20 into said wheel, combined with the lever *D* and arbor *B*, having pinion *h*, substantially as described.

8. The combination of the arbor *B*, pinion *d*, and mechanism for driving said arbor, arm
25 *i*, and pin *j*, in combination with the lever *D*,

recessed projection *p*, cam *E*, and gearing connecting said cam with the arbor *B*, substantially as described.

9. The arbor *B*, for driving the hands, arm *i* on said arbor, recessed lever *D*, incline *v*, for
30 moving said lever away from the arm *i*, and means for actuating said lever, substantially as described.

10. In a time-piece, the combination of gearing for turning the minute-hand arbor, with
35 said arbor, a projection thereon, and with a lever for dropping onto said projection, a device for raising and lowering said lever, and means for adjusting the time for lowering said
40 lever by connection with said arbor, as specified.

11. The setting-arbor *B*, combined with a lever for turning the same, and with an adjustable rotating support for said lever, and
45 means for moving said support quickly when said lever drops off the same, as specified.

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Witnesses:

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