

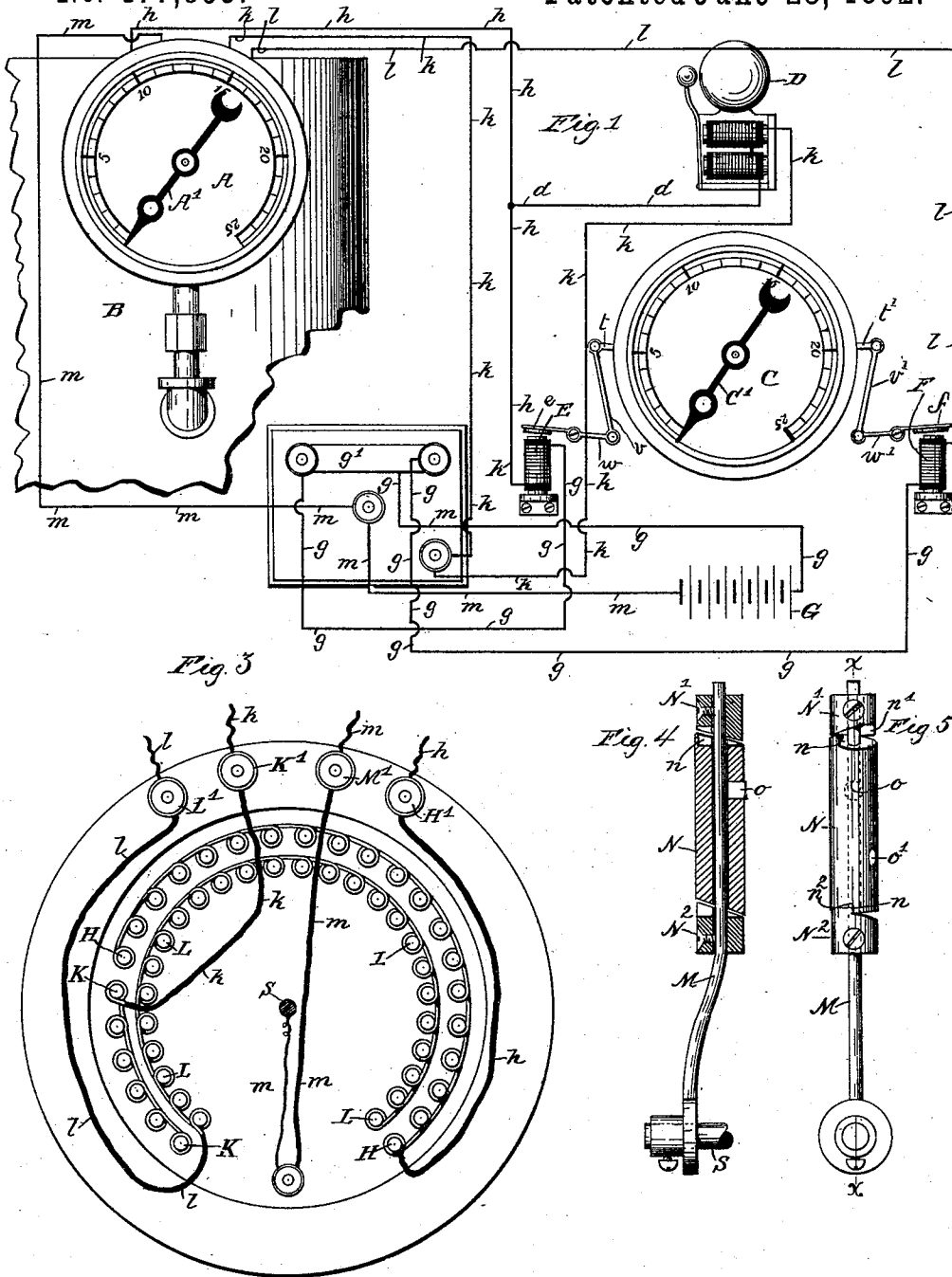
(No Model.)

2 Sheets—Sheet 1.

C. T. BARRETT.
ELECTRIC TELEMETER.

No. 477,853.

Patented June 28, 1892.



Witnesses
J. Greer
Fred Kemper

Inventor
Cornelius J. Barrett.
By his Attorneys
Gifford & Saw.

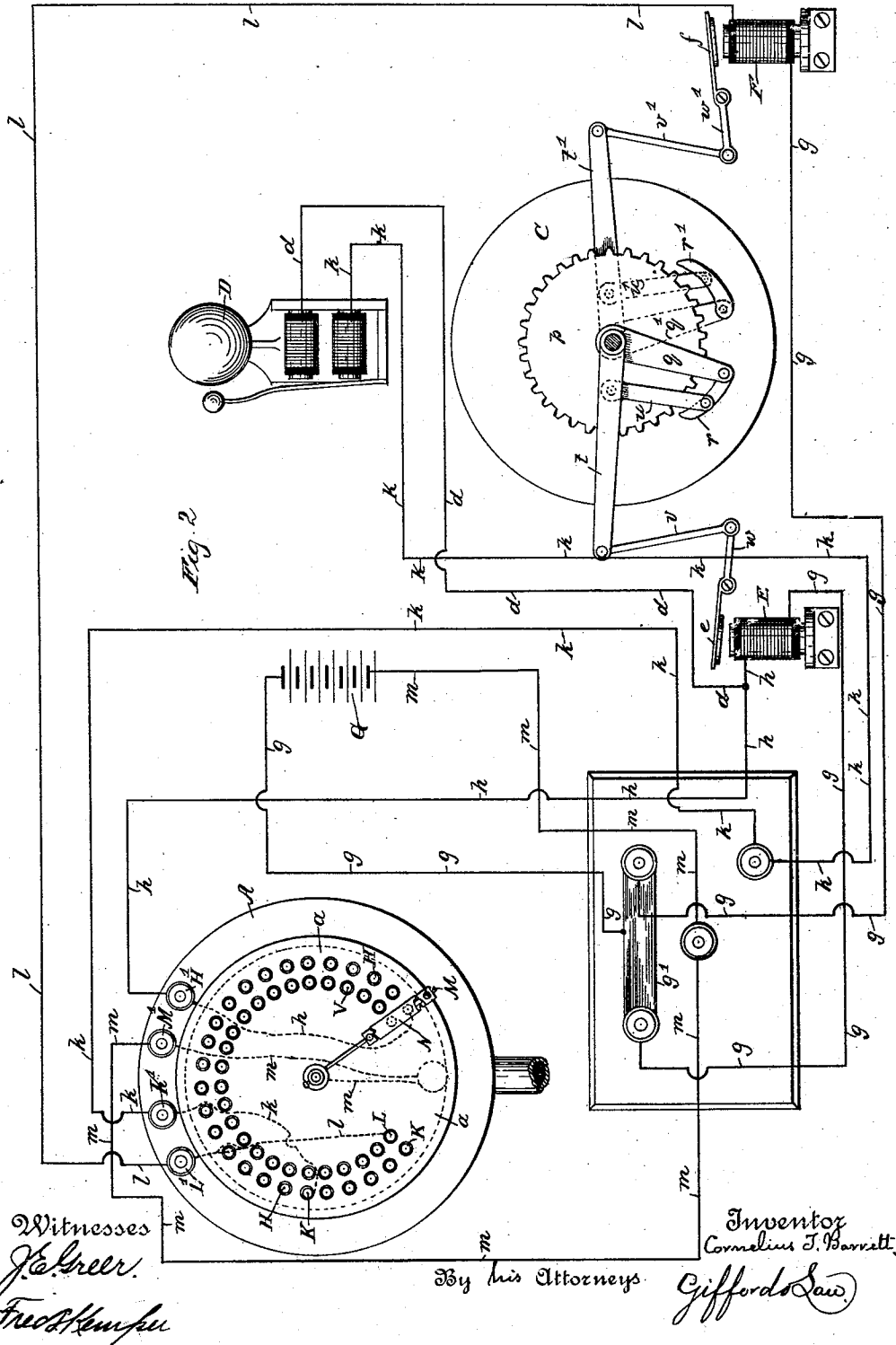
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UNITED STATES PATENT OFFICE.

CORNELIUS T. BARRETT, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-THIRD TO HARRY W. DOUTY, OF JERSEY CITY, NEW JERSEY.

ELECTRIC TELEMETER.

SPECIFICATION forming part of Letters Patent No. 477,853, dated June 28, 1892.

Application filed November 5, 1891. Serial No. 410,923. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS T. BARRETT, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Electric Telemeters, of which the following is a specification.

The object of my invention is to furnish a recording and alarm device for use with steam-boilers which will show on a dial placed at any desirable point the exact condition of the steam-gage on the boiler at all times and will, moreover, give an alarm when the pressure of the steam in the boiler reaches and exceeds the danger-point.

In the accompanying drawings, Figure 1 is a view of my improved recording device in position and ready for use. Fig. 2 is the same as Fig. 1, but showing the steam-gage reversed, so as to exhibit the back of the same, and the face removed from the second dial or indicator to show its inner mechanism. Fig. 3 is an enlarged view of the back of the steam-gage, showing the electrical attachment to the same. Fig. 4 is a sectional side view of the contact-arm. Fig. 5 is a plan view of Fig. 4.

A is the steam-gage, located on the boiler B.

C is the second dial or indicator, which may be located at any place desired, either in the same building with the steam-boiler or at some distance away from it.

D is the electric alarm-bell used with the dial C.

E is the electro-magnet, which moves the indicator or hand C' forward, or from zero, and

F is the electro-magnet which moves the hand C' back, or toward zero. The electro-magnets E and F and the bell D are connected with the steam-gage by electric wires in such a manner that as the hand A' of the gage moves a degree forward from the zero-point the electric current will operate the magnet E and cause the hand C' to move forward in a corresponding manner, and so on until the hand A' reaches the danger degree, when the current will operate the electric bell as well as the magnet E and cause the hand C' to indicate the danger degree at the same time that the alarm is given, and when the hand A' of the gage moves back toward the zero-point the current will operate the magnet F and

cause the hand C' to move back in a corresponding manner.

The method of connecting the electric wires with the steam-gage and operating the alarm and recording device is shown in Fig. 2, and more particularly in Fig. 3. At the back of the gage are arranged two series of metallic studs or pins H K L. The series are arranged in circular form, one within the other, and each row or series contains as many pins or studs as there are degrees on the dial of the gage, so that each degree has its corresponding pin in both the inner and outer row of studs, the outer row corresponding to the degrees from zero to the highest degree on the dial and the inner row corresponding to the degrees from the highest to zero. To the outer row of pins H is connected a wire *h*, which, as seen in Fig. 3, is coiled around each pin in the series and connects all the pins in that series from the pin corresponding to zero up to and including the pin corresponding to the degree next before the first danger degree—that is, if the gage is set to carry twenty pounds of steam. The next degree to twenty or twenty-one will be the first danger degree, and hence the wire *h* connects all the pins corresponding to the degrees from zero to and including twenty. This wire *h* is connected to the binding-post H' on the gage and then passes to the electro-magnet E, which moves the hand C' in a forward direction. The remaining pins K in the outer row (those corresponding to the degrees above the safety degree) are connected in the same manner to a separate wire *k*, which passes from the binding-post K' to the alarm-bell D and thence to the magnet-wire *h*. All the pins L of the inner row are connected to a third wire *l*, which passes from the binding-post L' to the electro-magnet F, which moves the hand C' in a backward direction. Over these wires on the gage is placed a cover or back *a*, provided with holes through which the studs project, so that the ends of the studs are flush with the surface of the back *a*. This cover *a* should be constructed of some non-conducting material, as rubber, and it is necessary that the pins should be insulated from each other, except as they are connected by the wires.

The contact with the studs is made by a contact-arm M, which is rigidly secured to a prolongation of the spindle S on which the hand A' is mounted, and thus turns around in either direction with the latter. This arm consists of a metallic rod or wire M, on the outer end of which is a roller N, arranged to turn freely on the wire and held in place by the fixed pieces N' and N². The roller N rests on the surface of the back cover *a*, and if left free would revolve on the cover as the arm turns over the gage. On each end of the roller are notches *n*, which are arranged so as to engage as the roller revolves with similar notches *n'* *n*² on the fixed pieces N' and N². These notches on the fixed pieces are arranged with respect to each other in such a manner that the roller can make but a partial revolution in either direction before engaging with either one of the notches. Thus as the arm commences to move forward the roller turns until the notch *n* at the inner end of the roller engages with the notch *n*² in the piece N², when the further revolution of the roller is arrested and the roller slides over the back *a* as the arm continues to move forward. As the arm moves back the roller turns in the opposite direction until the notch *n* in the outer end of the roller engages with the notch *n'* in the end piece N', when the revolution of the roller is arrested and slides as before. The roller N is constructed of some non-conducting material, as hard rubber, and in the roller are two metallic pins *o* *o'*, which extend from the outer circumference of the roller to the inner wire N, with which they form a contact. These pins *o* *o'* are situated so they are in line with the two rows of studs H, K, and L, respectively, on the gage, and are so placed in the roller with respect to the notches on the end pieces that as the arm M moves forward and the roller turns until the notch *n* engages with the notch *n*² the outer end of the pin *o* will be brought around and touch the ends of the studs H K, and thus form a connection between the studs and the wires M of the arm, and in the same manner as the arm moves back and the roller turns until the notch *n* on the other end engages with the notch *n'* the outer end of the pin *o'* will come in contact with the studs L and form a connection between the studs and the wire M. Thus as the arm moves around in either direction corresponding with the movement of the hand A' one or the other of the pins *o* and *o'* will always be in contact with the outer or inner row of studs on the gage, and thus with the magnet E or F or the alarm-bell D.

Connection is made with the arm M by the wire *m*, which is attached to the gage by the binding-post M'. The connection of the arm M with the spindle S is insulated so that the current cannot pass out through the gage. The wire *m* passes from the gage to one pole of the battery G, the other pole of which is con-

nected by means of the wires *g* with the electro-magnets E and F.

The hand C' on the indicator C is moved in both directions by the tooth-wheel *p*, mounted on the spindle with the hand. This wheel is caused to revolve in either direction by the pallets or pawls *r* and *r'*, suspended by the hangers *q* and *q'* from the spindle and operated by the levers *t* and *t'* through the bars or links *u* and *u'*. The outer ends of the levers *t* and *t'* are raised by the rods *v* and *v'*, connected to the levers *w* and *w'*, one end of which is formed by the armatures *e* and *f*, respectively, and of the magnets E and F. As will be seen from the drawings, when the armature *e* is drawn down on the magnet the lever *w* and rod *v* will raise the end of the lever *t* and this will raise the pallet *r*, so as to engage with one of the teeth on the wheel *p* and cause the wheel to revolve as far as the distance between two of the teeth. In like manner when the armature *f* is drawn down on the magnet F the outer end of the lever *t'* is raised by the lever *w'* and rod *v'* and the pallet or pawl *r'* lifted by means of the link *u'* so as to engage with the teeth of the wheel and turn the latter. The number of the teeth on the wheel *p* corresponds with the degrees on the dial C, and thus every time the wheel is moved by the engagement of the pallet with one of the teeth the hand C' is moved forward or backward one degree on the dial.

The operation of my invention is as follows: As the hand A' moves over the dial of the steam-gage the contact-arm M moves in a corresponding direction over the back of the gage and over the rows of studs H, K, and L. As the hand arrives opposite the first stud in the row H, or the stud corresponding to zero on the dial, the pin *o* in the roller N is turned down and touches the studs, thus forming a contact between the arm and the row of studs or between the wires *h* and *m* and completes the circuit, the current passing over the wire *h* to the electro-magnet E, thence over the wire *g* to one pole of the battery, and thence from the other pole of the battery over the wire *m* to the contact-arm M. Thus as the contact with the zero-stud is made the armature *e* is brought down on the magnet and the wheel *p* turned so as to bring the hand C' of the indicator C on the same or zero-point. In the same way as the hand A' of the gage advances to the next degree the arm M touches the next stud in the row H, the circuit is completed, the armature *e* brought down on the magnet, and the hand C' moved a degree, and so on as far as the hand A' advances in the gage. When the hand A' recedes or goes back toward zero, the point of contact with the arm M is shifted, as described, to the inner row of studs L. The contact is now made with the wires *l* and *m*, and the current passes over the wire *l* to the electro-magnet F, thence over the wire *g* to the bat-

tery, and back over the wire *m* to the arm *M*. In this case the armature *F* is actuated by the contact, and the hand *C'* moves back one degree every time a contact is made. If the pressure in the boiler at any time goes beyond the safety point and the hand *A'* passes beyond the safety degree on the gage, the contact is made with the stud connected with the wire *k*, and the current passes over the wire *k* directly to the alarm-bell *D*, and from thence to the wire *h*, with which it forms a connection, and thence through the magnet *E* and the battery *G* back to the arm *M*, as before. In this case the bell rings at the same time that the hand *C'* advances, and every time the hand *A'* on the gage passes a degree beyond the safety degree the bell rings as the hand *C'* records the degree. As will thus be seen, the two hands on the steam-gage and on the indicator always record the same degree, every time the hand on the gage reaches a degree, in going forward or backward the hand on the indicator is moved to a similar degree, and when the hand on the gage passes beyond the safety point the bell rings in addition to the movement of the hand on the recording-dial.

What I claim is—

1. In combination, an indicator-hand, a ratchet-wheel adapted to move therewith, two oppositely-arranged pawls *rr'*, two arms *qq'*, upon which said pawls are mounted, two levers *tt'*, two links *uu'*, whereby said levers and said pawls are respectively coupled together, and two armatures and two magnets whereby said levers are operated, substantially as described.

2. In an electric alarm for steam-boilers, in combination, a steam-gage, a double set of contact-points on the same, mechanism whereby an electrical contact is made between the index-hand of the gage and one set of points as the hand moves in one direction and between the index-hand and the other set of points as the hand moves in the opposite direction, and an indicator electrically connected with the steam-gage, substantially as described.

3. In an electric alarm for steam-boilers, in combination, a steam-gage, an arm mounted on the spindle of the same and arranged to move with the index-hand of the gage, a double set of contact-points on the gage, means whereby as the arm moves in one direction an electrical contact is made with one set of points and as it moves in the opposite direction an electrical contact is made with the other set of points, and an indicator having a hand electrically connected with the arm and contact-points on the gage, whereby the hand on the indicator moves with the hand on the steam-gage, substantially as described.

4. In an electric alarm for steam-boilers, in

combination, a steam-gage, an arm mounted on the spindle of the same and arranged to move with the index-hand of the gage, a double series of contact-points on the gage, means whereby as the arm moves in one direction an electrical contact is made with one set of points and as it moves in the opposite direction an electrical contact is made with the other set of points, a recording-dial having a hand electrically connected with the arm and contact-points on the gage, whereby the hand on the indicator moves with the hand on the gage, and an electric bell connected with the steam-gage, substantially as described.

5. In combination, a steam-gage having two series of pins *H, K*, and *L* corresponding with the degrees on the dial, and the arm *M*, provided with the roller *N*, whereby connection is made with one series of pins and the arm when the arm moves in one direction and with the other series of pins when the arm moves in the other direction and electrically connected with the magnets *E* and *F*, the electro-magnet *E*, electrically connected with the series of pins *H, K*, the electro-magnet *F*, electrically connected with the series of pins *L*, the alarm-bell *D*, electrically connected with the series of pins *K* and with the magnet *E*, the indicator *C*, having the hands *C'*, and means whereby the charging of the electro-magnets *E* and *F* moves the hand *C'*, substantially as described.

6. In an electric indicator, the contact-arm *M*, having the roller *N* revolubly mounted on the same, provided with the pins *o* and *o'* and notches *n* and *n'*, and the fixed piece *N' N''*, having the notches *n' n''*, whereby the roller is caught and held when the pins *o* and *o'* are turned in position to form a contact, substantially as described.

7. In an electric indicator, in combination, a double series of contact-points, an arm moving laterally over them, a rotatable sleeve on said arm, and contact-points arranged at varying points circumferentially of said sleeve, whereby by the rotation of said sleeve one contact-point thereof will be brought into contact with one series or another contact-point with another series as said arm moves in one direction or the other, substantially as described.

8. In an electric indicator, in combination, a double series of contact-points, an arm moving laterally over them, and mechanism whereby said arm when moving in one direction makes contact with one series and when moving in the opposite direction makes contact with the other series, substantially as described.

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