No. 897,280. PATENTED SEPT. 1, 1908.

R. FORSYTH & W. W. HANSCOM.

AUTOMATIC STOKING INDICATOR MECHANISM.

APPLICATION FILED SEPT. 15, 1904.

3 SHEETS—SHEET 1.

Fig. 1.

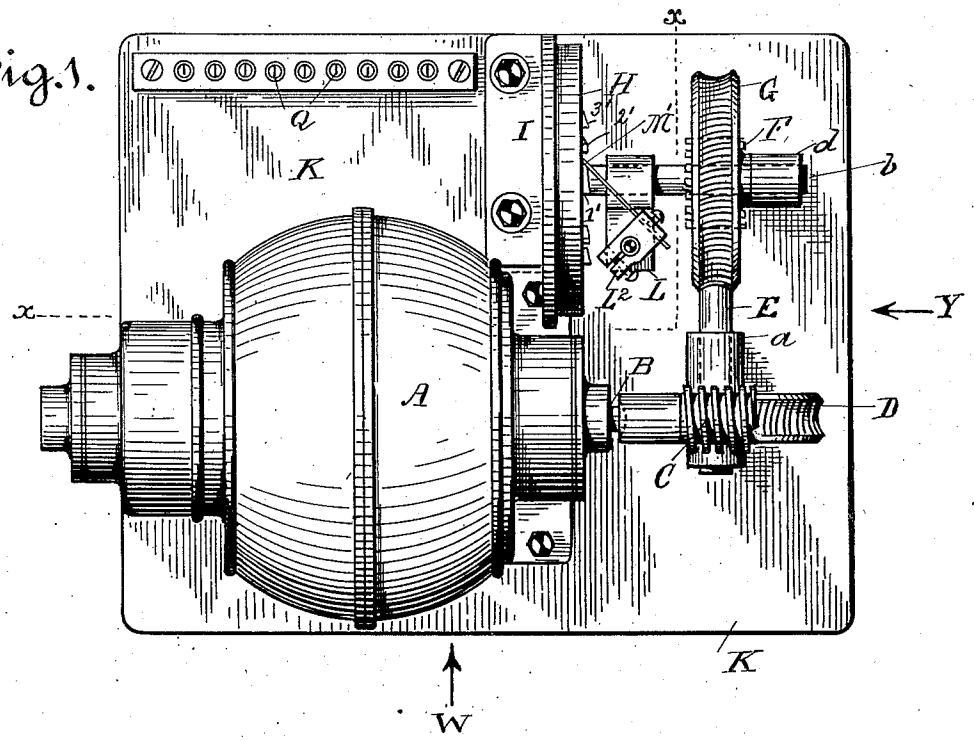
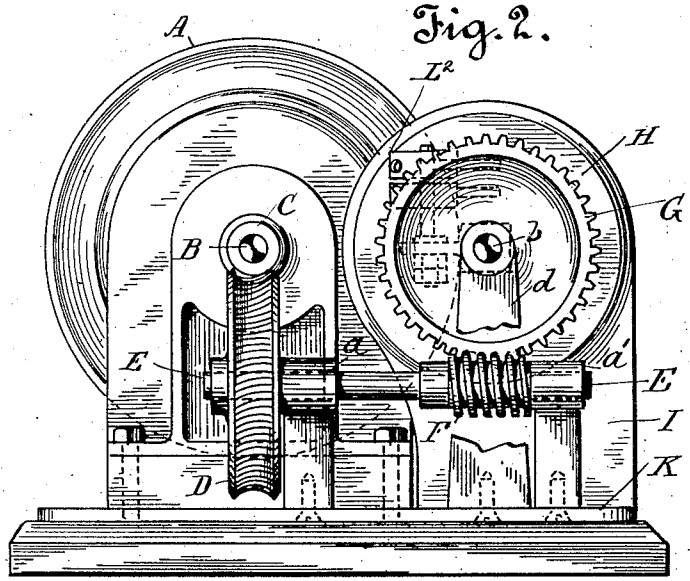


Fig. 2.



Witnesses.

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3 SHEETS—SHEET 2.

Fig. 4.

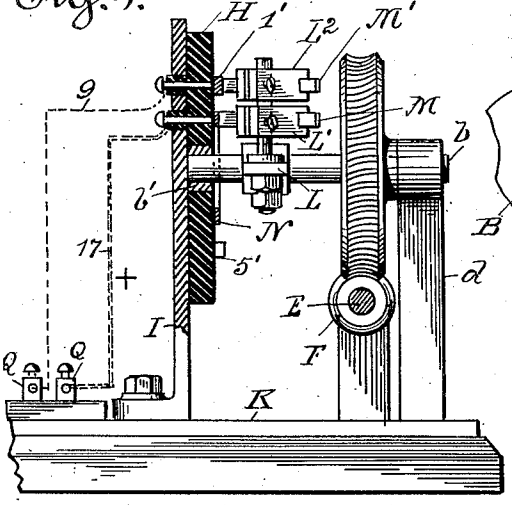


Fig. 3.

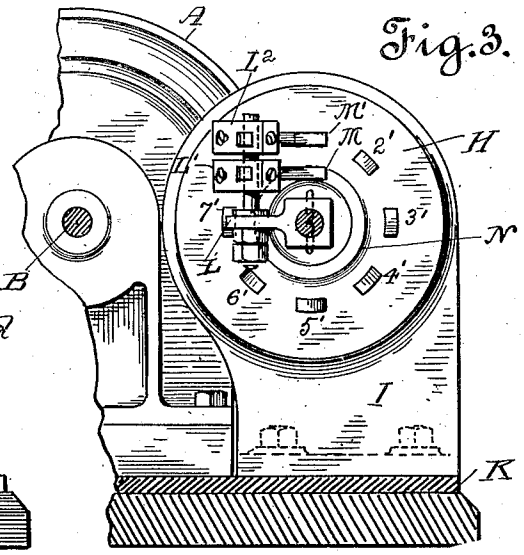


Fig. 6.

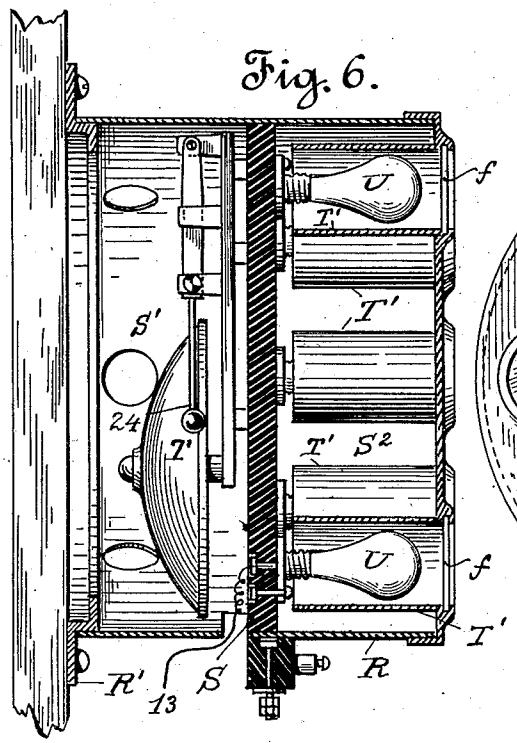
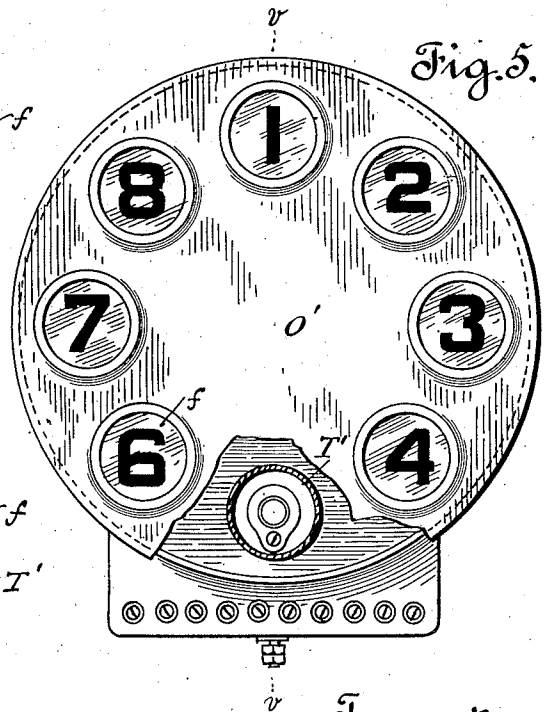


Fig. 5.



Witnesses.

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3 SHEETS—SHEET 3.

Fig. 7.

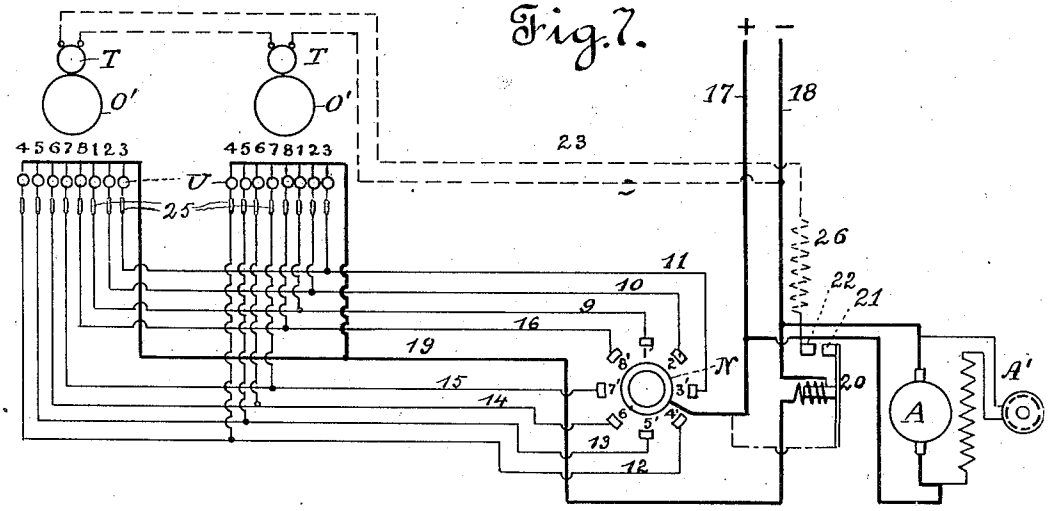
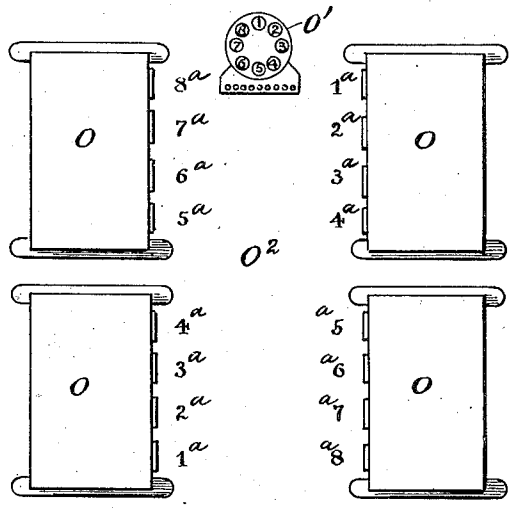


Fig. 8.



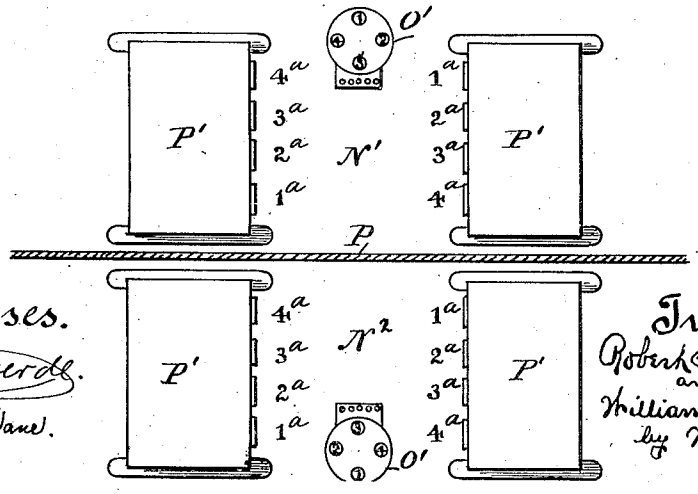


Fig. 9.

Witnesses.

F. Montevercle.

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UNITED STATES PATENT OFFICE.

ROBERT FORSYTH AND WILLIAM W. HANSCOM, OF SAN FRANCISCO, CALIFORNIA.

AUTOMATIC STOKING-INDICATOR MECHANISM.

No. 897,280. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed September 15, 1904. Serial No. 224,571.

To all whom it may concern:

Be it known that we, ROBERT FORSYTH and WILLIAM W. HANSCOM, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Automatic Stoking-Indicator Mechanism; and we do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to means for automatically operating signals or indicators located in one or more furnace rooms adjacent to the furnaces of the boiler or boilers, the object of the invention being first, to notify the person or persons having charge of the furnaces at the exact time at which to supply fresh coal to any furnace under his charge, in order that accuracy and uniformity in the stoking of the furnaces may be accomplished, the time interval between successive signals being readily adjustable to suit existing conditions, and secondly, to furnish means whereby the engineer having charge of the operation of an engine, can so control the times of firing or stoking the furnaces of the boiler or boilers as to insure a supply of steam adequate to the demands.

The invention while adapted for use in connection with furnaces generally, is mainly designed for use on steam vessels, wherein the maximum efficiency of the coal being consumed is obtained by a system of uniformity in the stoking of the furnaces of the boilers, resulting in economic running of the vessel and the production of steam in proportion to the work required of the engines.

To comprehend the invention reference should be had to the accompanying sheets of drawings, wherein—

Figure 1 is a plan view showing the motor, contacts, gearing and supporting base assembled, which parts are generally located within the engine room, the distant indicator or indicators situated within the furnace room or rooms, together with the connections therewith being removed; Fig. 2 is a front view in elevation of the parts disclosed by Fig. 1 of the drawings, viewed in the direction of the arrow *y*; Fig. 3 is a similar view disclosing the insulated base plate, the contacts thereon, the contact brushes and the brush holders, the drive gearing being removed and the motor being partly broken; Fig. 4 is an irregular sectional side view in elevation taken on line *x*—*x* Fig. 1 of the drawings, and viewed in the direction of the arrow *w*, said view disclosing the insulated base plate, the contacts, the brushes in contact therewith, the worm and the worm gears for driving the shaft carrying the brushes, and the connection with the said contacts; Fig. 5 is a front view of the illuminating dial indicator to be located within a furnace room, said dial indicator being partly broken away for the showing of one of the lamp compartments; Fig. 6 is a vertical sectional view of the illuminating dial indicator, taken on line *v*—*v* of Fig. 5 of the drawings; Fig. 7 is a diagrammatic view disclosing the connections between the motor, the contacts, the indicators and signal bells; Fig. 8 is a plan view of a single furnace room having four or two pair of boilers therein and a single indicator for the eight furnaces arranged four under each boiler; and Fig. 9 is a similar view disclosing a series of furnace rooms separated by a bulkhead or partition wall, in which case an indicator is situated in each furnace room and so connected as to operate either simultaneously or successively at regular intervals.

In the drawings the letter A is used to designate the motor of the transmitter, having upon the extension of its armature shaft B, the worm C. This worm C meshes with the worm wheel D, which worm wheel is mounted upon one end of the cross shaft E, mounted in bearings *a a'*. Said cross shaft E carries, in addition to the worm wheel D, a worm F, which meshes with the worm wheel G, fastened on the shaft *b*, supported at one end by bearing *d*, secured to the base plate K, and at its opposite end by a bearing *b'* secured within an insulating base H, which base is supported by the bracket I, upwardly extending from the base plate K.

The shaft *b*, which is arranged parallel to the extension of the armature shaft B, has attached thereto an arm L, to which arm two brush holders L', L^2 are fastened. Into the brush holders the brushes M, M' are clamped, the brush M making continuous contact with the contact ring N, secured to the insulating base H, while the brush M' intermittently makes contact with the series of segment contacts $1'$, $2'$, $3'$, $4'$, $5'$, $6'$, $7'$, $8'$, also secured to the insulating base H, Figs. 3 and 4 of the drawings. The number of contact pieces, which are located an equi-distance apart, may be increased or decreased at will, as hereinafter fully explained and the arrange-

ment thereof may be varied, although, preferably, the same are disclosed as being arranged in circular form and surrounding the contact ring N. The brush M′ makes intermittent contact successively with the contact pieces or segments of the said series during the rotation of the shaft *b*, which shaft is driven from the armature shaft B, of the motor A, by means of the described intermeshing worms and worm wheels.

The contact segments 1′, 2′, 3′, 4′, 5′, 6′, 7′, and 8′ are connected to different numbers of an indicator, located within a furnace room, which numbers correspond with the several doors of the furnaces located beneath the boilers O, each number of the indicator representing a given door of the furnaces. In the present case, the indicator comprises a dial O′, situated in the furnace room O^2, which dial is divided into a series of numbered compartments, the numbers ranging from 1 to 8, to correspond with the number of contact segments. The contact segments 1′, 2′, 3′, 4′, 5′, 6′, 7′, and 8′ are connected respectively with the compartments 1, 2, 3, 4, 5, 6, 7 and 8, by means of the leads or lead wires 9, 10, 11, 12, 13, 14, 15 and 16, Fig. 7 of the drawings, so that when the brush M′ makes contact with either of the contact segments, the number of the compartment of the indicator corresponding thereto is at once displayed in the furnace room O^2, in order to indicate to the man having charge of the furnace door designated thereby that it is time to supply fuel to such furnace.

The numbered compartments 1, 2, 3, 4, 5, 6, 7 and 8, of the indicator, designates respectively furnace doors 1^a, 2^a, 3^a, 4^a, 5^a, 6^a, 7^a and 8^a, of the furnaces so that when indicator #1 is displayed or brought into view within the furnace room, it designates that the furnaces of door 1^a require fuel.

Where more than one furnace room is present, as is the case illustrated by Fig. 9 of the drawings, where two furnace rooms N′ and N^2 are disclosed, separated by a bulkhead or partition wall P, two indicators are employed, one for the furnaces of each pair of boilers P′. In such case only four furnaces are used for each boiler, hence the numbering of the doors only range from 1^a to 4^a, the same numbering being used on the dial in each furnace room. Under such circumstances the numbering of the contact segments must be varied, and if necessary the arrangement thereof on the insulated base H, to conform thereto. The arrangement of the contact segments may be such that number 1 of the indicator in each furnace room will be exposed simultaneously, or said number of one indicator may be exposed to view a short interval, any desired period, prior to the exposure of such numeral of the indicator in the companion furnace room. It is thus obvious that the number of furnace rooms is not limited to one or two, but any number of such rooms may be utilized in the system. Thus the contact segments on the insulating base H, will vary in number as required, and it is intended that such contact segments shall equal the number of furnaces in any one fire room or in charge of one man, for the number of furnaces in each fire room are equal and the number of furnaces under the charge of any one man is the same in the respective furnace room.

By Fig. 8 of the drawings, the maximum number of furnaces usually provided for any one furnace room is disclosed, although any series of furnace rooms may be employed. The essential requirement is that the corresponding numbered furnaces of any one furnace room, shall be indicated or designated at approximately the same time for stoking. The designation for the stoking of furnaces in a series of furnace rooms may be done simultaneously or successively at regular intervals.

The motor A, gearing, bearings, contacts and binding posts Q, are all mounted on the common base K, so that they will always occupy their respective positions in relation to one another, which base is preferably situated in the engine room, in order that the regulating of the motor as to speed may be at all times under the control of the engineer or a man specially appointed to look thereafter.

The indicator preferably consists of a case R, mounted on a wall bracket or suitable support R′. This case is subdivided by an insulating plate S, into two compartments S′, S^2. In the compartment S′ is located an alarm or signal bell T, while in the compartment S^2 is arranged a series of cylindrical casings T′. There is a casing T′ for each number compartment of the indicator, and in each of the casings T′ is placed an electric lamp U. With these lamps connect respectively the beforementioned leads or lead wires 9, 10, 11, 12, 13, 14, 15 and 16, which connect at their opposite ends respectively with the contact segments 1′, 2′, 3′, 4′, 5′, 6′, 7′ and 8′.

Each lamp inclosing casing T′ is closed by a glass, transparent or other suitable covering *f*. The object of inclosing the lamps U within individual casings T′, is to prevent the illumination from one lamp interfering with or illuminating any number of the dial other than the one to be displayed. While any suitable form of indicator for annunciating the number desired may be employed, it is preferred to utilize an electric lamp display indicator, acting in conjunction with an alarm signal for attracting or directing attention to the indicator when a display is made.

The time during which the lamps U remain illuminated depends upon the length

of the contact segments and the speed at which the arm L is revolved, by the rotation of the shaft *b*, which is always a certain proportion of the time between successive illuminations or signals. Inasmuch as the speed of the motor A, which imparts motion to the shaft *b*, is always under the control of the person having charge thereof, it will be apparent that the periods and duration of illumination is capable of regulation proportionate to the working requirements of the furnaces.

The motor A is of any suitable type, preferably shunt wound direct current and is so designed as to have a range of speed of four or more to one, by what is known as shunt field regulation.

The adjustment of the time intervals between indications may be made by any suitable mechanical speed changer, introduced between the motor and the contact arm shaft *b*, as well as by shunt field regulation, in which case the motor will be run at a constant speed, or the adjustment may be made by a combination of the two, in case it is desired to obtain a greater range than is possible by either method alone. Inasmuch as such features are well known and understood and form no portion of the present invention, they are not illustrated in the present drawings.

The diagram of connections is plainly disclosed by Fig. 7 of the drawings, in which the shunt wound motor A, with its field rheostat A′, is shown connected to the two line wires 17, 18. The line wire 17 is continued on or branched and connected to the contact ring N, so that as the brush M′ successively makes contact with the contact segments 1′, 2′, 3′, 4′, 5′, 6′, 7′ and 8′, the current is allowed to flow respectively through the leads or lead wire 9, 10, 11, 12, 13, 14, 15 and 16 to the lamps U, in the indicator or indicators, back through the common return wire 19, through the coils of the relay 20, thence to the negative line wire 18, thus completing the lamp circuits successively. The relay 20, is thus actuated every time a lamp circuit is closed, so that when its armature 21 is attracted toward the contact 22 of the auxiliary bell circuit 23, it closes the said bell circuit to actuate the hammer 24 for the striking of the signal bell or bells T, to direct the attention of those having charge of the furnaces.

Any or all of the lamp circuits can be switched out of each indicator by means of the switches 25, shown immediately beneath the lamp in Fig. 7 of the drawings. The indicators may be connected in multiple and any number thereof thus operated simultaneously; the bells, however, being connected in series and operated by a current whose strength is readily adjusted by the resistance 26 shown in the diagram.

The foregoing invention will be found of value in connection with steam going vessels, more especially war vessels. Its simplicity of construction, reliability, automatic and positive character of action, the ease with which it is understood by those having the same and being governed by its operations, its inexpensiveness as to installation and the minimum space occupied thereby when installed, are points which will readily appeal to constructors of steam vessels generally.

Having thus described the invention, what is claimed as new and desired to be protected by Letters Patent, is—

1. In a device of the character described, the combination of a supporting base, an insulating disk mounted thereon, a series of contact segments arranged equi-distant apart and concentrically mounted upon the surface of said disk, signaling devices connected with said contacts, a concentric ring contact on said disk surface arranged within said segment contacts and spaced therefrom, a rotary shaft having a bearing at one end in said insulating disk, and an auxiliary bearing at its opposite end, a bracket on said shaft intermediate said bearings, and connected brushes mounted on said bracket and extending into contact with the surface of the disk whereby they connect with said contacts and operate the signaling devices.

2. In a device of the character described, an indicator comprising a casing having a plurality of separated compartments, designating instrumentalities for each compartment, a sounding signal, and electrical means for automatically successively illuminating each compartment and simultaneously setting into operation said sounding signal, said means comprising a motor, an armature shaft rotated thereby, a cross shaft, a worm on the armature shaft, an intermeshing worm wheel on the cross shaft and a spaced worm also mounted thereon, an auxiliary shaft, a worm wheel thereon arranged to mesh with said last mentioned worm, an insulated plate carrying a series of spaced segment contacts concentrically arranged about and separated from a continuous contacting strip and having connection with the insulated partition plate, and brushes on the auxiliary shaft cooperating with said contacts.

In witness whereof we have hereunto set our hands.

ROBERT FORSYTH.
WILLLAM W. HANSCOM.

Witnesses:
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WALTER F. VANE.