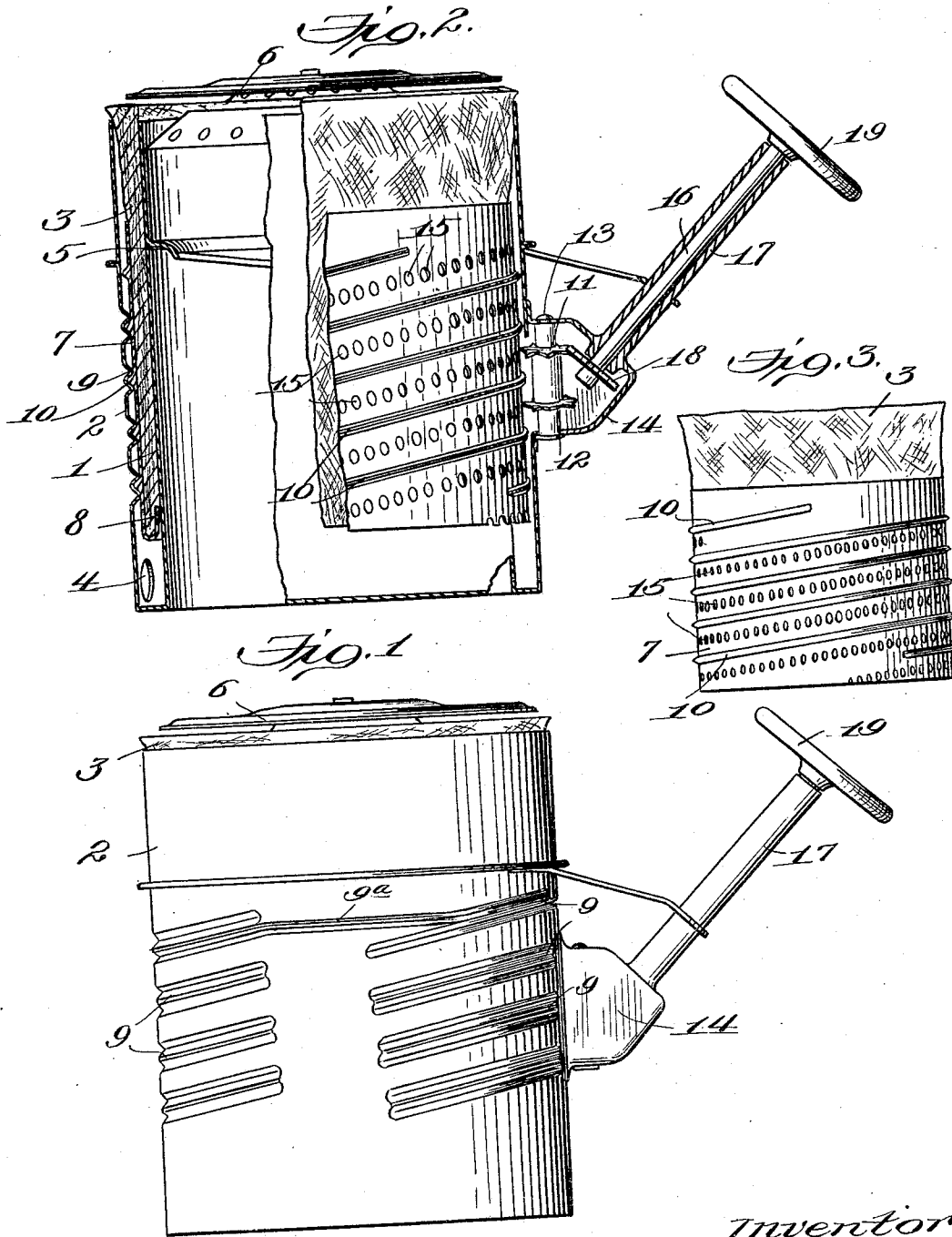


938,236.



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Fig. 4.

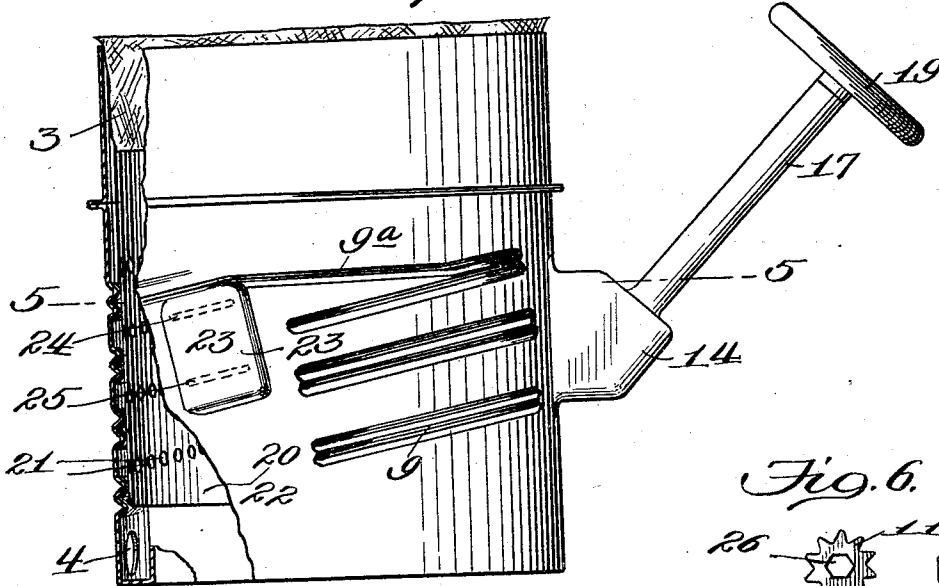


Fig. 6.

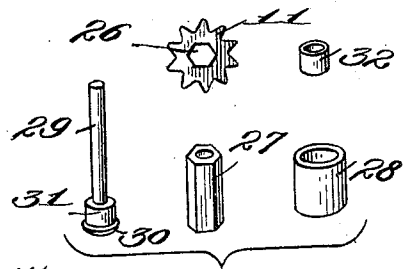


Fig. 5.

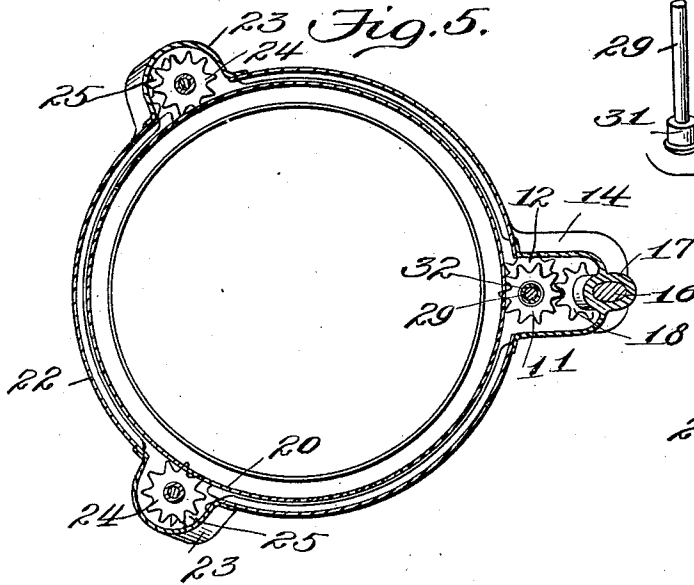
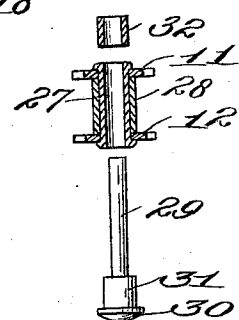


Fig. 7.



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UNITED STATES PATENT OFFICE.

ELWIN K. HILL, OF CLEVELAND, OHIO.

OIL-BURNER.

938,236.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed April 6, 1909. Serial No. 488,178.

To all whom it may concern:

Be it known that I, ELWIN K. HILL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Oil-Burners, of which the following is a specification.

My present invention relates to improvements in oil burners of the type employing an annular wick, and it has for its object primarily to provide an improved burner of this class wherein a positive and uniform feeding of the wick at all points in its circumference is insured and tilting of the wick within the wick tube is thereby prevented, the wick being capable of adjustment with facility and without liability of its binding at any point within the wick tube.

Another object of the invention is to provide a burner of this class wherein a novel means is provided for positively producing a vertical or axial movement of the wick and at the same time producing a revolving movement between the wick and the wick tubes inclosing it whereby accumulations of gum or other matter which tend to cause a sticking of the wick to the upper ends of the wick tubes shall be sheared or cut so as not to obstruct the adjustment of the wick and, furthermore, the construction of the wick-carrying member and its guiding and operating means is such that the wick-carrier cannot become distorted and a proper engagement between the wick-carrier and its operating and guiding means is insured.

A further object of the invention is to provide a novel construction for the operating and guiding gears whereby these parts may be constructed inexpensively and readily assembled, these gears being so mounted within the burner as to prevent leakage of oil.

To these and other ends, the invention consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing:—Figure 1 is a side elevation of an oil burner constructed in accordance with my present invention, the reservoir and other accessories being omitted; Fig. 2 is a sectional view of the burner as shown in Fig. 1, illustrating the relative arrangement of the wick, wick-carrier and the wick tubes, and also the con-

struction of the guiding and operating means for the wick-carrier; Fig. 3 is a detail view of the wick-carrier removed from the wick tubes and with the wick shown in the carrier; Fig. 4 is a view of another form of the invention, the view being partially in elevation and partly in section; Fig. 5 represents a transverse section on the line 5—5 of Fig. 4; Fig. 6 is a collective view of the parts which comprise the operating or guiding gears used in the constructions shown in Figs. 4 and 5; and Fig. 7 is a detail sectional view showing the gears assembled and illustrating also the means for journaling the gears within the wick tube.

Similar parts are designated by the same reference characters in the several views.

Burners constructed in accordance with the present invention are capable of use generally for lighting and heating purposes, and the invention pertains more especially to that class of burners wherein the annular wick is contained within a pair of inner and outer wick tubes and the oil is conveyed to the oil space thus provided by means of a tube or other appropriate means leading from a reservoir. In the accompanying drawing, I have shown two embodiments of the invention which are illustrated merely as examples, it being understood that the invention is not limited in its details to either construction shown, as certain modifications and changes may be made therein in order that the invention may be applied to the best advantage in each particular instance.

In that form of the invention shown in Figs. 1 and 2, the burner comprises generally a pair of inner and outer cylindrical wick tubes 1 and 2 which are preferably concentric and spaced apart to form an annular chamber for an annular wick 3, the upper ends of the wick tubes preferably terminating on the same level to insure the proper burning of the wick, and their lower ends are suitably connected so as to provide an oil well to which oil may be supplied in an appropriate manner from a reservoir through the supply opening 4. The inner wick tube forms a central draft passage through which air is fed to the inner side of the wick and any appropriate means may be employed for distributing or spreading the air so as to insure the proper burning of the wick, a spider 5 being suitably secured within the tube 1 in the present in-

stance which serves as a support for the spreader means 6. A wick carrier 7 is adapted to operate within the space between the wick tubes, this carrier in the present instance being annular or cylindrical in form and it incloses or fits around the lower portion of the annular wick, the lower end of the carrier in the present instance having a suitable number of fingers or lugs 8 turned upwardly therefrom so as to clamp the wick and thereby insure a movement of the wick with the carrier.

In burners of this class considerable difficulty has been occasioned owing to a tilting or binding of the wick carrier within the wick tubes, this difficulty being due mainly to the fact that the operating means for feeding the wick acted upon the wick carrier at one point only in its circumference, and hence any friction between the wick carrier and the tubes at a point opposite or removed from the operating means would cause a binding and consequently a tilting of the wick carrier within the tubes which would either prevent lifting or feeding of the wick or it would cause the wick to be fed unevenly, that is to say, higher at one side than at the other and consequently the flame would burn unevenly. According to the present invention means is provided for insuring positively a uniform movement between the wick carrier and the wick tubes so that binding or tilting is prevented and an even burning of the flame is obtained. This result is attained essentially by providing means between one of the wick tubes and the carrier which acts at two or more points to positively feed the wick and in order to permit the wick to be easily adjusted to the proper height, the upward or axial feeding movement of the wick is the resultant of a rotary motion or, in other words, the wick tube has a spiral movement during its adjustment which movement will prevent any binding between the wick carrier and wick tubes, and any accumulation of gum or other substance between the wick and the upper ends of the wick tubes will be broken and hence will not interfere with the adjustment of the wick.

In the present instance, the outer wick tube 2 is formed with one of more sets of inwardly projecting ribs 9 that are formed in pairs and extend helically or spirally of the tube, each pair of these ribs 9 forming a groove between them to slidably receive or cooperate with a rib 10 that is formed on the periphery of the wick carrier, the ribs on the wick carrier being inclined or arranged helically and at a pitch corresponding to the pitch of the ribs 9 so that a relative rotation between the wick carrier and the tube will cause an axial and also a rotary movement of the wick. The inwardly projecting ribs of the outer wick tube may

either extend continuously around the said tube or they may be interrupted or arranged in groups at two or more points in the circumference of this outer wick tube whereby the rotary movement of the wick carrier within the wick tube will cause a lifting movement to be exerted on the carrier uniformly and positively. In the present instance, I have shown the inwardly projecting ribs of the outer wick tube as arranged in three groups spaced equidistantly around the circumference of this outer wick tube, and I have shown the wick carrier as provided with a set of three ribs to cooperate with those of the outer wick tube whereby an increased axial movement of the wick carrier is effected at each revolution, and in order to insure the entrance of the ribs of the wick carrier only within the narrow space between the ribs 9, I prefer to prolong the lower rib of each uppermost pair of ribs 9 in a direction at right angles to the axis of the oil tube to form a deflector 9^a which spans the space between the adjacent groups of ribs and thereby acts to prevent an improper application of the wick carrier to the wick tubes. A prolongation of the deflector 9^a forms the upper rib of the next adjacent group as shown in Fig. 1.

By reason of the interengagement of the spiral or inclined ribs of the wick carrier and outer wick tube, it is obvious that a rotation of the carrier within the wick tube will produce a spiral movement of the wick which movement will serve both to adjust the height of the wick and to break any gum or other accumulation that may form between the wick and the upper ends of the wick tubes.

Various means may be provided for imparting a relative rotation between the wick carrier and the cooperating wick tube. In that form of the invention shown in Figs. 1 and 2, I have shown a pair of upper and lower spur gears 11 and 12 which are connected to rotate simultaneously and are mounted on a journal 13 which has an oil-tight fit within a casing 14 which is suitably attached to the outer wick tube, and these spur gears cooperate with spiral racks that are formed upon the wick carrier in the present instance by rows of apertures 15, these apertures being arranged preferably in rows between and extending parallel with the ribs 10 of the wick carrier, the bridged portions of the metal between the apertures forming the teeth of the spiral racks. Obviously, rotation of the spur gears 11 and 12 will cause rotary movement of the wick carrier, and by reason of the interengaging ribs between the latter and the outer wick tube, a spiral movement of the wick will result. Any suitable means may be employed for imparting movement to the spur gears, a shaft 16 being provided in the present in-

stance which is inclined upwardly and outwardly from the burner and is inclosed in a sleeve 17 that forms a prolongation of the casing 14, this sleeve being of such a length as to prevent leakage of oil between it and the shaft which it incloses, the lower end of the shaft being provided with a gear 18 which coöperates with the upper spur gear 11 and the upper end of the shaft is provided with a hand-wheel 19 by means of which it may be conveniently manipulated.

Instead of using a wick carrier such as that shown in Figs. 1 and 2, one may be employed wherein the ribs 10 are omitted, the wick carrier 20 in Figs. 4 and 5 being of such a construction although the wick carrier in the latter instance is provided with the spirally or helically arranged rows of apertures 21. In this form of the invention, an outer wick tube 22 is shown which may be similar to that shown in Figs. 1 and 2 except that one or more idler gears are added to take the place of the ribs of the wick carrier in order that the wick may be adjusted positively and uniformly. In this instance, the inwardly projecting ribs of the outer wick tube provide a snug fit for the wick carrier so as to prevent tilting of the latter within the wick tube, and in this instance, the operating mechanism shown in Figs. 1 and 2 is of the same construction. A pair of gear casings 23, however, are arranged on the exterior of the outer wick tube and are preferably spaced equidistantly around its circumference, each of these gear casings inclosing a pair of upper and lower spur gears 24 and 25 which may be constructed and mounted in a manner similar to the construction and mounting of the gears 11 and 12, the axes of both the operating and idler gears being preferably inclined at an angle perpendicular to the rows of apertures in the wick carrier whereby a proper engagement between these gears and the apertures in the wick carrier is insured. In this form of the invention, the rotary movement is imparted to the wick carrier through the operating gears 11 and 12 as in the preceding construction, these operating gears owing to their inclination producing a spiral movement of that portion of the wick carrier engaged by them, and the idler gears owing to their inclination and their engagement with the apertures in the wick carrier will also produce a positive and uniform spiral movement of those portions of the wick carrier which they engage, and owing to the equidistant disposition of the operating and idler gears around the wick carrier, it is obvious that uniform axial movement of the wick at all points in its circumference is insured.

In Figs. 6 and 7, I have shown a preferred construction for the operating and idler gears, one of the gears, the gear 11 for in-

stance, which has a hexagonal or other angular bore 26, and these two gears 11 and 12 are slipped over a sleeve 27 which has a hexagonal or other corresponding angular form, thereby forming a driving connection between the two gears. One end of this sleeve is headed over or otherwise adapted to form a shoulder for the lower gear 12 and a sleeve 28 is slipped over the sleeve 27 and forms spacing means between the two gears, the end of the sleeve 27 adjacent to the upper gear 11 being also headed over or otherwise formed into a shoulder whereby the two gears and the connecting and spacing sleeves will be locked together as a unit. The gears may be revolubly journaled within the casing 14 by means of a pin 29 which is adapted to be passed through an aperture in the bottom of the casing 14 and has a head 30 thereon which may be soldered or otherwise sealed to prevent the leakage of oil, and adjacent to this head is formed a shoulder 31 which serves to position the gears vertically. A collar 32 is fitted over the pin above the gears and the upper end of the pin is extended through the top of the casing 14 and is riveted or soldered so as to prevent the leakage of oil at this point.

I claim as my invention:

1. A burner comprising a wick tube and a wick carrier, one of said parts being rotatable and axially movable with reference to the other, interengaging means for causing uniform axial movement of said movable part when rotated and means arranged to traverse said movable part helically for rotating it.

2. A burner comprising a wick tube and a wick carrier, said tube and carrier being relatively rotatable and axially movable, interengaging means for causing uniform axial movement between the wick carrier and tube when said parts are relatively rotated and means mounted to traverse one of said parts helically for rotating it.

3. A burner of the central draft type comprising a wick tube and a wick carrier, one of said parts being capable of axial and rotary movement with respect to the other, means for producing positive uniform axial movement between the tube and wick carrier at a plurality of points in the circumference of the latter when the movable part is rotated and means mounted to traverse the movable part helically for rotating it.

4. A burner comprising a wick tube and a wick carrier, one of said parts being capable of rotary and axial movement with respect to the other, means engaging said movable part at a plurality of points in its circumference and operative to insure uniform axial movement thereof when said parts are relatively rotated and means mounted to traverse the movable part helically for rotating it.

5. A burner of the central draft type comprising an outer tube, an inner cylindrical wick carrier, one of said parts being capable of axial and rotary movement with respect to the other, and interengaging means at a plurality of points in the circumference of said parts arranged to traverse the movable part helically to produce positive axial movement between the two parts when one of them is relatively rotated.

6. A burner comprising a wick tube and a wick carrier, said tube and carrier being relatively movable both axially and rotatably, means to traverse one of said parts helically for producing a relative rotation between said parts, and means acting upon the wick carrier at a plurality of points in its circumference and operable to produce uniform axial movement thereof when said carrier and tube are relatively rotated.

7. A burner comprising inner and outer wick tubes forming an annular wick chamber between them, a wick carrier movable rotatably and axially relatively to said wick tubes, means to traverse said wick carrier helically to rotate it, and means connecting one of the wick tubes and the wick carrier at a plurality of points in their circumferences and operable to produce positive axial movement of the wick carrier when the latter is rotated.

8. A burner comprising inner and outer wick tubes forming an annular wick chamber between them, a wick carrier movable both axially and rotatably in said chamber, means to traverse said wick carrier helically to rotate it, and devices having a helical pitch with reference to the axis of the wick carrier and tubes and operable upon the wick carrier at a plurality of points in its circumference to produce uniform axial movement of the wick carrier when the latter is rotated.

9. A burner comprising a wick tube and a wick carrier capable of both axial and rotatable movement with respect thereto, the wick tube having inwardly projecting ribs which have a helical pitch with respect to the axis of the tube and serve to center the carrier therein, and means arranged to traverse the wick carrier helically at a plurality of points in its circumference to produce positive and uniform axial movement thereof when the carrier is rotated.

10. A burner comprising a wick tube and a wick carrier capable of both rotary and axial movement with respect thereto, said parts having a plurality of groups of interengaging ribs and grooves which extend helically with respect to the axes of the carrier and tube, and means for rotating one of said parts with reference to the other.

11. A burner comprising a wick tube and a wick carrier, said parts being capable of relative spiral movement, a plurality of

groups of interengaging ribs and grooves being formed on said parts at a plurality of points in their circumferences and serving to produce uniform and positive axial movement of the wick carrier when one of said parts is relatively rotated, a rack formed on the carrier and extending in parallelism with the ribs thereon, and a gear coöperative with said rack.

12. A burner comprising a wick tube and a wick carrier, the latter being capable of both rotary and axial movement, the wick tube having a plurality of groups of ribs with a pitch helical with respect to the axis of the tube, projections on the wick carrier arranged to traverse the ribs of the wick tube to produce uniform axial movement of the wick carrier, and means to traverse the wick carrier helically for rotating the wick carrier.

13. A burner comprising a wick tube and a wick carrier, the latter being capable of both rotary and axial movement, the wick tube being provided with ribs pitched helically of its axis, projections arranged at a plurality of points in the circumference of the wick carrier and arranged to traverse said ribs to produce uniform axial movement of the carrier, the latter being provided with rows of helically arranged apertures, and a gear element coöperative with said apertures in the carrier for rotating it.

14. A burner comprising a wick tube and a wick carrier, the latter being rotatable within said tube, the wick tube being provided with groups of ribs arranged at a plurality of points in its circumference, the carrier being provided with ribs pitched helically thereof and coöperative with the ribs of the wick tube, and means for rotating the wick carrier with respect to the wick tube.

15. A burner comprising a wick tube and a wick carrier, the wick tube being provided with groups of ribs pitched helically thereof and arranged at a plurality of points in its circumference, said ribs being arranged in pairs, the lower rib of one pair being prolonged and deflected to form the upper rib of the next group, means formed upon the wick carrier and arranged to traverse the ribs of the wick tube for producing axial movement of the wick carrier, and means for rotating the wick carrier with respect to the wick tube.

16. A burner of the class described, the combination of a wick tube, a wick carrier movable therein and provided with a rack, and gear mechanism for adjusting the wick carrier with respect to the wick tube comprising a sleeve having an exterior of angular form, a pair of gears fitted on said sleeve and having corresponding angular bores, a spacing sleeve surrounding the sleeve first mentioned and interposed be-

tween the gears, a casing fixed to the exterior of the wick tube, a pin extending through the sleeve first mentioned as a journal and having an oil-tight fit with the opposite walls of said casing, and means cooperative with one of said gears for actuating them.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ELWIN K. HILL.

Witnesses:

C. A. HITCHCOCK,
B. F. PERRY, Jr.