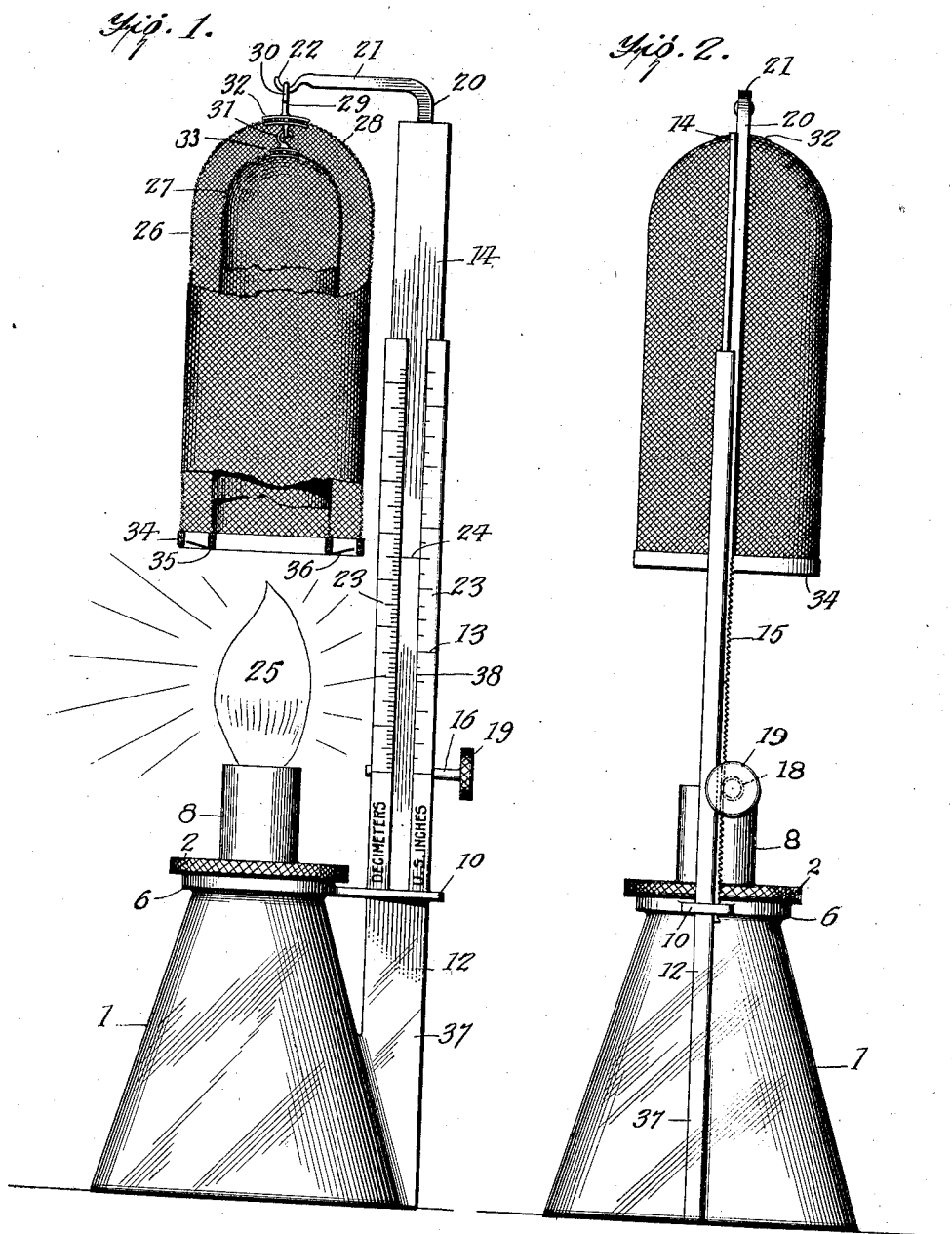


F. W. MANN.
SMOKE METER.
APPLICATION FILED APR. 12, 1911.

1,002,717.

Patented Sept. 5, 1911.
2 SHEETS—SHEET 1.



WITNESSES

L. H. Schmidt
C. E. Trimmer

INVENTOR

FREDERICK W. MANN,

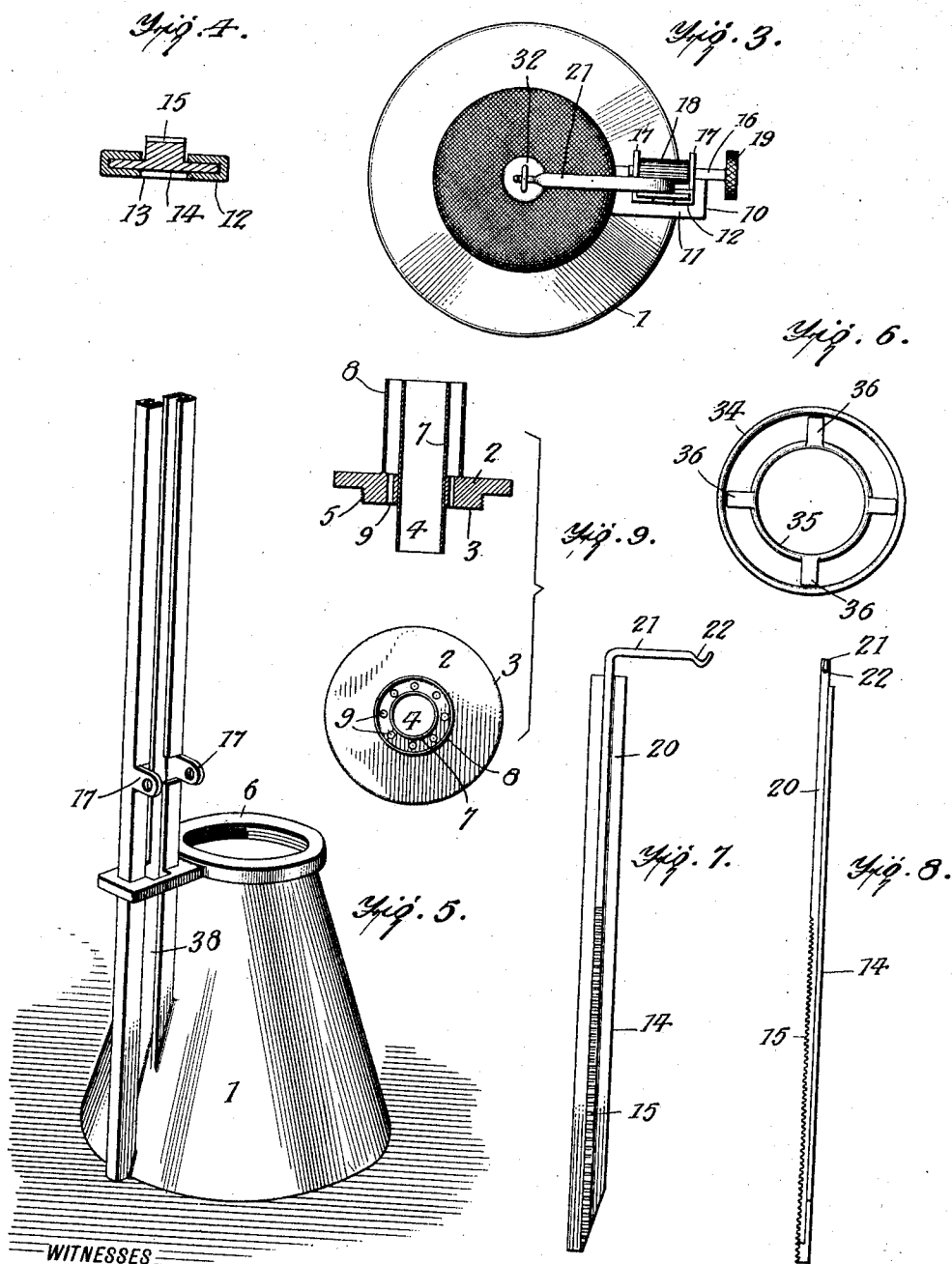
BY *Munn & Co.*

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FREDERICK W. MANN,
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

FREDERICK W. MANN, OF FRANKLIN, PENNSYLVANIA.

SMOKE-METER.

1,002,717.

Specification of Letters Patent.

Patented Sept. 5, 1911.

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To all whom it may concern:

Be it known that I, FREDERICK W. MANN, a citizen of the United States, and a resident of Franklin, in the county of Venango, State of Pennsylvania, have invented a new and useful Improvement in Smoke-Meters, of which the following is a specification.

My invention is an improvement in smoke meters, and the object of the invention is to provide an efficient but simple device of the character specified for determining the amount of unconsumed carbon in illuminants when burned under predetermined conditions.

In the drawings: Figure 1 is a front view of the improvement, partly in section; Fig. 2 is a side view; Fig. 3 is a plan view; Fig. 4 is a transverse section of the telescoping standard and guide; Fig. 5 is a perspective view of a slightly modified form of the shield and the lower part of the standard; Fig. 6 is a bottom plan view of the spacing rings; Fig. 7 is a front view of the upper section of the standard; Fig. 8 is a side view of the same; and Fig. 9 is a vertical section and a top plan view, respectively, of the burner head.

The present embodiment of the invention comprises a burner consisting of a frusto conical reservoir body 1 and a burner head 2. The burner head consists of a plate 3 having central opening 4 and a cylindrical externally threaded enlargement 5 coaxial with the opening 4, and engaging a threaded ring 6 in the top of the reservoir.

The burner head is provided with an inner wick tube 7 fitting the central opening and extending above and below the plate, and with a concentric outer air tube 8 extending above the plate. The plate is also provided with an annular series of openings 9 between the tubes.

The ring 6 of the reservoir is provided with a radial arm 10 having a longitudinal slot 11 for receiving the outer section 12 of a telescoping standard. The section 12 of the standard extends through the slot 11 and is secured to the reservoir 1 in any suitable manner.

As shown in Figs. 1 and 2, the section 12 is tubular and is longitudinally slotted in both faces at 13. The inner section 14 is slidable in the section 12 and is provided on its rear face with a longitudinal series 15 of

rack teeth which extend into the slot 13 in the rear face of the section 12. A shaft 16 is journaled transversely of the section 12 in bearing arms 17 and is provided with a pinion 18 engaging the teeth. The shaft is provided with a milled wheel 19, and it will be evident that when the shaft is rotated by the wheel 19 the section 14 will be moved up or down to lengthen or shorten the standard 12—14. The teeth 13 of the section 14 of the standard are arranged on a rib 20 which extends the full length of the section. At its upper end the rib is bent laterally to form an arm 21 and the arm is provided with a transverse groove 22 forming a hook at the end of the arm 21. A scale 23 is provided on the front face of the section 12 on each side of the slot 13, and the section 14 is provided with an indicator 24 for cooperating with each scale.

The device for collecting and holding the smoke or unconsumed carbon is supported by the hook 22 directly above the flame 25, and by means of the shaft 16 the said device may be moved toward or from the flame and held in adjusted position. The said device comprises a plurality of shells 26 and 27 in the form of mantles, and having their tops closed as indicated at 28. The shells are of perforate material and are supported in spaced relation by means of a bolt 29 having an eye 30 at each end, one for engaging the hook 22 and the other for engaging a hook 31 to be described. The bolt 29 is provided with spaced washers 32, between which the material of the outer shell 26 is received, and the hook 31 is provided with similar washers 33 for engaging the material of the inner shell 27. The shells are spaced apart at their bottoms by a plurality of rings 34—35, each of which is U-shaped in cross section. The rings are clamped on the material of the shell and are held in spaced relation by radial lugs 36 on the inner ring 35 which extends toward the outer ring 34, as shown in Fig. 1.

The burner reservoir is arranged with its large end downward, and the portion 37 of the standard below the arm 10 may be entirely tubular, as shown in Figs. 1 and 2, or the slot 13 may continue below the arm, as shown at 38 in Fig. 5.

The section 12 of the standard shown in Fig. 5 consists of two guideways which are spaced apart from each other. It will be

evident that many other changes might be made in the invention without departing from the scope of the claims.

The scale 23 is preferably graduated in millimeters, and also in fractions of inches, the one graduation being on one side of the slot and the other on the other side, and the rack and pinion is very fine, so that the adjustment may be very close. The size of the flame is preferably adjusted by pulling the wick up or down with a platinum tool, so that the flame will not be contaminated by impurities.

The mantles or shells are of unoxidizable material, as, for instance, platinum gauze, and the space between them is one-fourth inch. The center of the inner mantle is directly over the flame and the devices for holding the mantles together are also of platinum.

The mantles should be kept inclosed in the presence of calcium chlorid when not in use, to retain them in a dry condition and at a constant weight. The reservoir should have 50 c. c. of the illuminant for testing purposes.

In operation, the reservoir or bowl being supplied with the illuminant to be tested, the wick is inserted, and the exact weight of the reservoir, illuminant, and wick is ascertained preferably to four decimals. The weight of the mantles is also ascertained in the same manner. The operation preferably takes place in a quiet place, free from drafts, and lighted sufficiently. The flame is regulated to one and one-half inches in height, and the double mantle is suspended over the flame and is adjusted to leave a space of one-fourth inch between the flame and the mantle. After burning three hours under the above conditions, the flame is extinguished, the mantles removed, and brought to normal temperature, preferably in an exsiccator, as is also the reservoir and the remainder of unconsumed oil. The reservoir and unconsumed illuminant are then weighed separately to ascertain the exact amount of illuminant consumed, and the net weight of unconsumed carbon is ascertained by the difference in weight between the mantles before and after use.

I claim:—

1. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, said section having a longitudinal rib on its rear face extending through the adjacent slot and provided with rack teeth, the

first-named section being provided with bearings near the reservoir, a shaft journaled in the bearings, a pinion on the shaft meshing with the rack teeth, said last-named section having a lateral arm provided with a hook, and means for collecting the unconsumed carbon said means being supported by the hook, and comprising a plurality of concentric shells of perforate material, each shell being open at its lower end and closed at its upper end and spaced apart from the other shell, and a ring substantially U-shaped in cross section connected with the lower edge of each shell, the inner ring having radial arms for engaging the outer ring to space the rings apart.

2. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, said section having a longitudinal rib on its rear face extending through the adjacent slot and provided with rack teeth, the first-named section being provided with bearings near the reservoir, a shaft journaled in the bearings, a pinion on the shaft meshing with the rack teeth, said last-named section having a lateral arm provided with a hook, and means supported by the hook for collecting the unconsumed carbon, said means comprising spaced concentric shells of perforate material closed at the top and open at the bottom, and means for spacing the shells.

3. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, said section having a longitudinal rib on its rear face extending through the adjacent slot and provided with rack teeth, the first-named section being provided with bearings near the reservoir, a shaft journaled in the bearings, a pinion on the shaft meshing with the rack teeth, said last-named section having a lateral arm provided with a hook, means supported by the hook for collecting the unconsumed carbon, said means comprising spaced concentric shells of perforate material, each being closed at its top and open at its bottom.

4. A device of the character specified, comprising a reservoir for the fuel, a burner

for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, said section having a longitudinal rib on its rear face extending through the adjacent slot and provided with rack teeth, the first-named section being provided with bearings near the reservoir, a shaft journaled in the bearings, a pinion on the shaft meshing with the rack teeth, said last-named section having a lateral arm provided with a hook, and means supported by the hook for collecting the unconsumed carbon.

5. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, means for raising and lowering the last-named section, said section having a lateral arm provided with a hook, and means supported by the hook for collecting the unconsumed carbon.

6. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, means for raising and lowering the last-named section, said section having a lateral arm provided with a hook, means supported by the hook for collecting the unconsumed carbon, said means comprising spaced con-

centric shells of perforate material open at their bottoms and closed at their tops, a ring substantially U-shaped in cross section engaging the lower end of each shell, the inner ring having radial arms for engaging the outer ring to space the rings apart.

7. A device of the character specified, comprising a reservoir for the fuel, a burner for the reservoir, a standard comprising a plurality of sections, one of the sections being tubular and being secured to the reservoir and provided with oppositely arranged longitudinal slots, the section having a scale adjacent to each slot, the other section being slidable in the first-named section and having an indicator cooperating with each scale, means for raising and lowering the last-named section, said section having a lateral arm provided with a hook, and means supported by the hook for collecting the unconsumed carbon, said means comprising spaced concentric shells of perforate material open at the bottom and closed at the top.

8. A device of the character specified, comprising a reservoir for the fuel provided with a burner, a standard comprising a plurality of sections slidable on each other connected with the reservoir, means for moving the said sections with respect to each other, and means supported by the outermost section for collecting the unconsumed carbon, said means comprising a plurality of spaced concentric shells of perforate material.

9. A device of the character specified, comprising a reservoir for the fuel provided with a burner, a standard comprising a plurality of sections slidable on each other connected with the reservoir, means for moving the said sections with respect to each other, and means supported by the outermost section for collecting the unconsumed carbon.

FREDERICK W. MANN.

Witnesses:

E. E. BOYD,
W. J. WHITING.