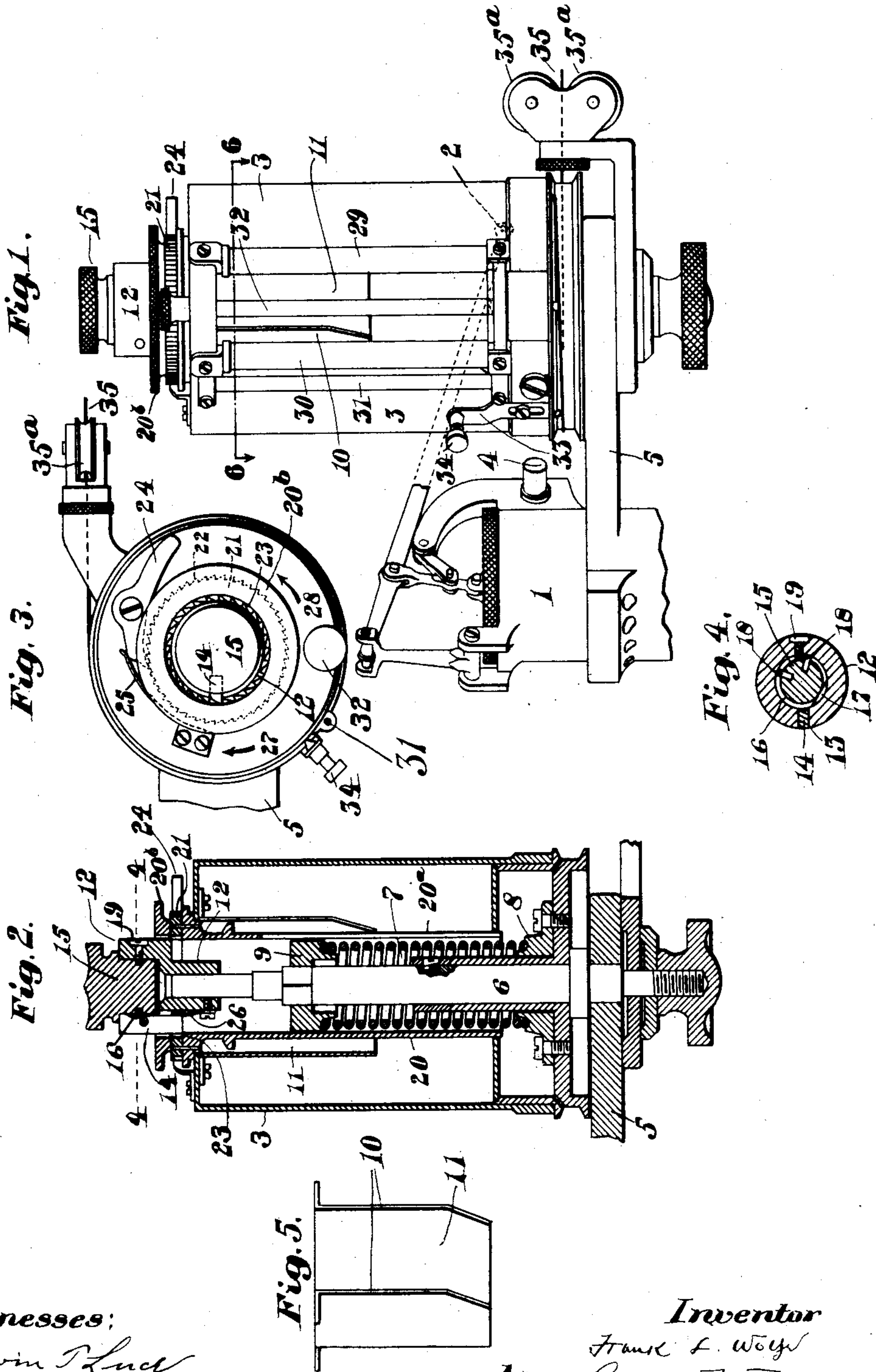


F. L. WOLFE.
ENGINE INDICATOR.
APPLICATION FILED JAN. 2, 1906.

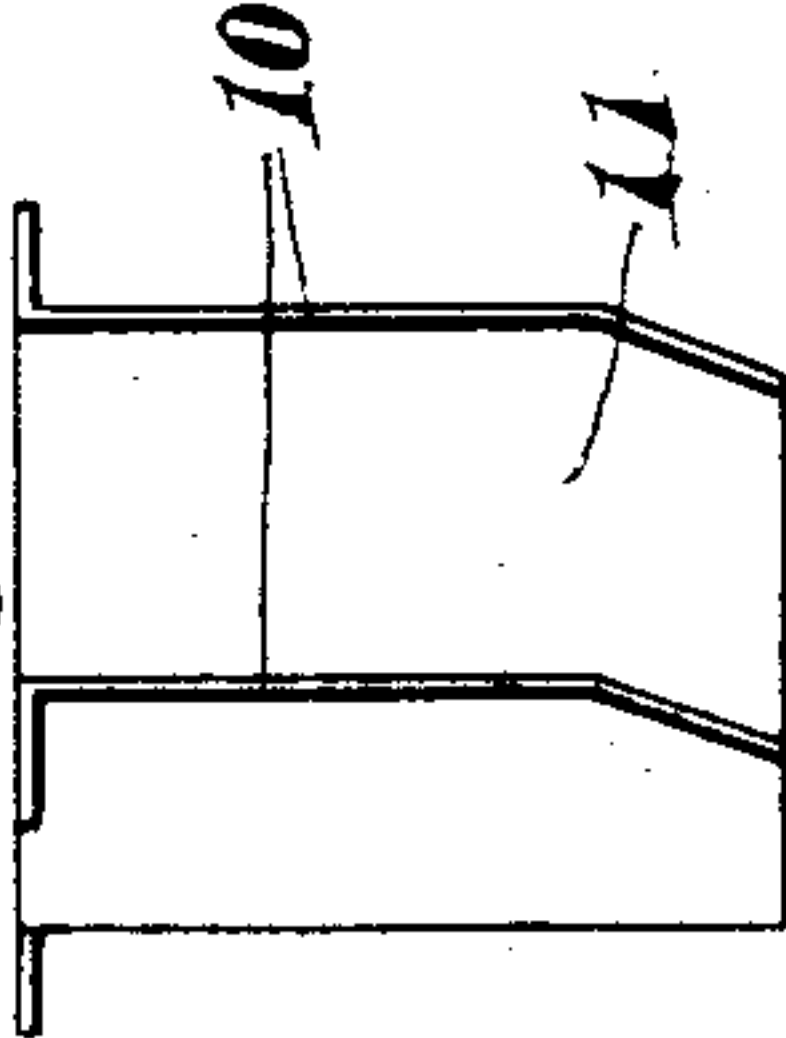
2 SHEETS—SHEET 1.



Witnesses:

Edwin Luck
Harry M. Rugg

Fig. 5.



by

Inventor

Frank L. Wolfe
Ralph W. Foster

his Atty.

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ENGINE INDICATOR.
APPLICATION FILED JAN. 2, 1906.

2 SHEETS—SHEET 2.

Fig. 6.

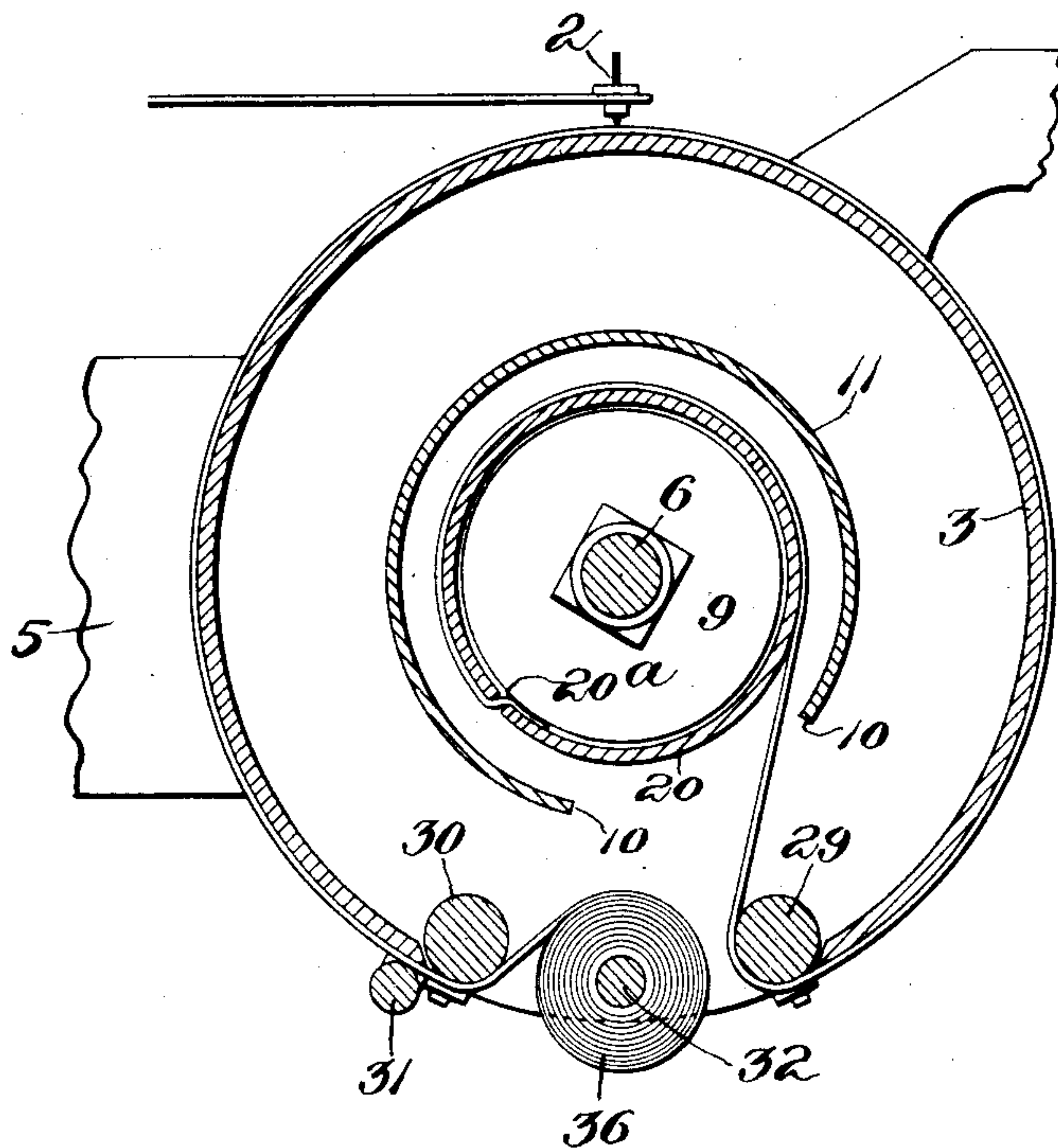
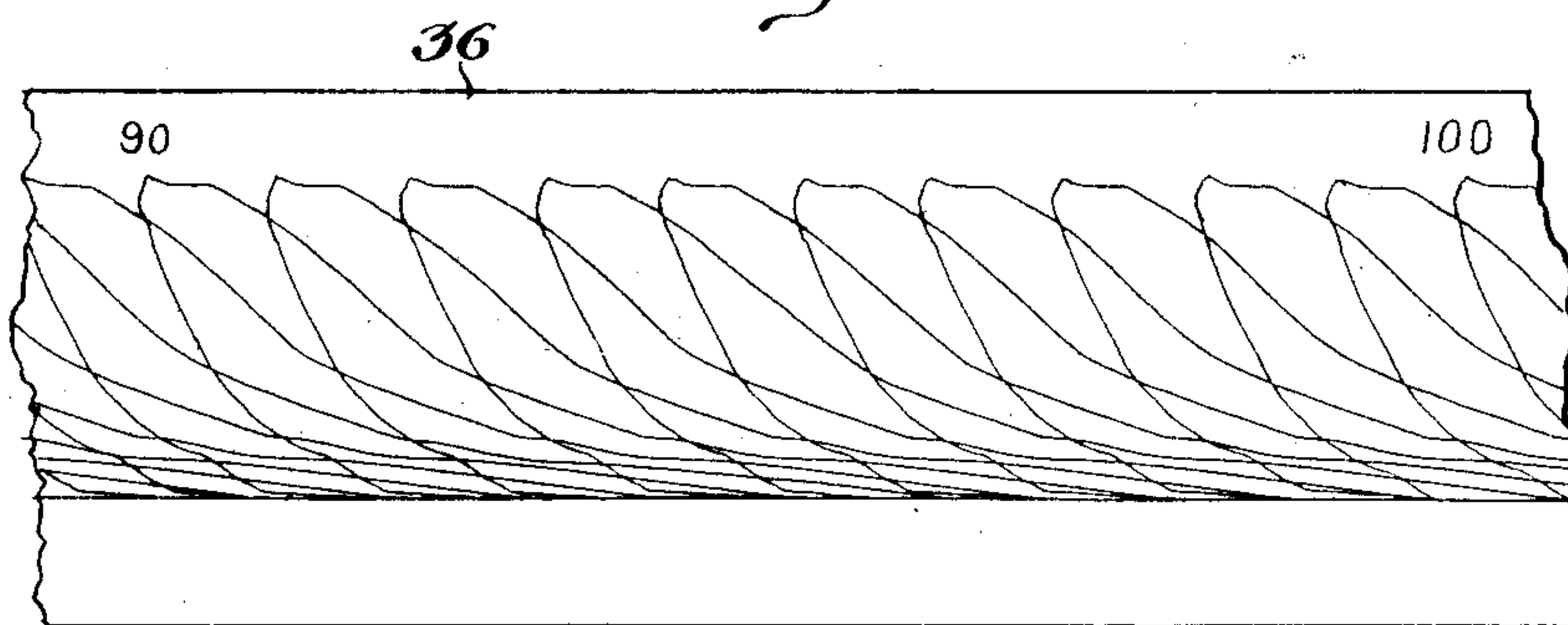


Fig. 7.



Witnesses:
Roswell F. Hatch
Arthur F. Randall

Inventor:
Frank L. Wolfe,
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Attorney.

UNITED STATES PATENT OFFICE

FRANK L. WOLFE, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO CROSBY STEAM GAGE AND VALVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

ENGINE-INDICATOR.

No. 868,056.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed January 2, 1906. Serial No. 294,333.

To all whom it may concern:

Be it known that I, FRANK L. WOLFE, a citizen of the United States, and a resident of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Engine-Indicators, of which the following is a specification.

My invention relates to engine indicators and its object is to provide a drum furnished with a paper strip on which a series of diagrams may be taken without removing such strip from the drum.

It is illustrated by the accompanying drawings in which:—

Figure 1 is an elevation of the drum with a portion of the indicator. Fig. 2 is a central vertical section of the drum. Fig. 3 is a top view of the drum. Fig. 4 is a section on the line 4—4 Fig. 2. Fig. 5 is a detailed view of the guard. Fig. 6 is an enlarged section on the line 6—6, Fig. 1. Fig. 7 is an enlarged view of a portion of the record-strip with diagrams thereon.

Similar characters refer to similar parts throughout the several drawings.

1 is the indicator on which is mounted the pencil 2 movable towards and away from the drum 3, being manipulated by the knob 4. On the arm 5, fixed to the indicator, is mounted the fixed spindle 6 and on this spindle is mounted the rotary spring actuated drum 3 with a central opening at the top and a vertical opening as shown. The spring 7 is fixed at its lower end to the springhead 8 on said drum and at its upper end to the springhead 9 on said spindle.

The cylindrical guard 11, having a cut out portion 10 is fixed to the upper part of the drum adjacent to the central opening thereof, and concentric therewith, and is adapted to protect the paper roll hereinafter mentioned.

On the upper end of the spindle 6 is fixed the cylindrical hub 12, having a vertical slot 13 in which is pivoted the vertical retaining pawl 14. In this hub 12 is arranged the rotary cam 15 with its outer end knurled for manipulation and its inner end furnished with an annular groove 16 dividing it into two parts, the upper part having a flattened portion 17 constituting the cam proper. Fixed to this cam and extending into said annular groove are two studs 18 adapted to contact with the screw 19 engaging said hub and extending into said groove. This screw 19 prevents vertical movement of the said cam 15 and together with said studs 18 limits its rotatability. The reel 20 with vertical slot 20^a and knurled head 20^b is rotatably mounted upon the drum and depends from the opening therein. This knurled head 20^b is fixed to the reel 20 in any way, for instance riveted thereto, forming a part thereof and providing a convenient means for handling said reel. Upon the

upper end of said reel is fixed the double annular ratchet 21 having outer teeth 22 and inner teeth 23.

Fixed to the top of the drum 3 is the driving pawl 24 adapted to engage the outer teeth 22 of the ratchet and held against said ratchet by the spring 25. When this pawl is out of engagement with the teeth, it is held out of such engagement by the end of said spring 25, which engages the end of said pawl. The vertical pawl 14 pivoted in hub 12, as described, has its lower end in engagement with the spring 26 fixed to the hub 12 and such spring serves to thrust and hold said lower end outwardly and the upper end of said pawl inwardly. When its upper end is in engagement with the flat portion 17 of the cam, its lower end engages and prevents said ratchet from rotating in the direction shown by the arrow 27 but permits it to rotate in the direction shown by the arrow 28. This engagement of the pawl with the inner teeth of the ratchet is broken by rotating the cam, thereby bringing the upper end of said pawl into contact with the cylindrical portion of the cam. It is obvious that the two pawls when in engagement with the ratchet teeth, as described, permit said ratchet to rotate in the direction indicated by the arrow 28 but prevent its rotation in the opposite direction.

The guide rolls 29, 30, 31, fixed to the drum at its vertical opening, serve to guide the paper strip 36 which may be of any length and which, in the form of a roll, is mounted on the fixed spindle 32 arranged within said cylinder, as shown. The outer end of this roll is carried between the guide rolls 30 and 31, thence around the drum and over the guide roll 29, thence between the guard 11 and the reel 20 and around said reel, its outer edge being inserted in the vertical slot 20^a in reel.

The vertically adjustable spring 33, carrying upon its upper end the pencil 34, is employed to mark upon the card what is known as the "atmospheric line."

The cord 35 fixed to the drum and carried between the horizontally adjustable pulleys 35^a leads to the engine (not shown).

The operation of the device is as follows:—The paper strip 36, in the form of a roll, being mounted upon the spindle 32, drum 3 and reel 20, as described, and the pawls 14 and 24 engaging the teeth of the ratchet, as described, the cord 35 when drawn outwardly rotates the drum in the direction shown by the arrow 27, while the reel 20 remains stationary held by the retaining pawl 14, which, as before stated, is pivoted in the vertical slot in the cylindrical hub 12, the drum sliding under the paper strip. The outward pull upon the cord 34 ceasing and said cord relaxing; the drum is rotated in the opposite direction by the spring 7, and the reel 20 rotates therewith driven by the pawl 24. This operation presents successively new sections of the paper

strip to the pencil, which describes successive diagrams thereon. And so the operation is repeated and eventually the paper strip with the series of diagrams thereon is wound upon the reel 20, and this reel is removed from within the cylinder through the top thereof by means of the knurled top 20^b without removing the drum from its mounting, and this is an important feature of my invention.

It is perfectly obvious that, if the pawl 14 is held out of engagement with the teeth 23 and the pawl 24 remain in engagement with the teeth 22, the reel and drum rotate together as though constituting one piece. And it is equally obvious that as desired for any purpose either pawl or both pawls may be thrown in or out of engagement at will.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In an engine indicator the combination, with the drum suitably mounted, of a spindle mounted in said drum and adapted to hold a roll of paper, a winding reel mounted in said drum concentrically therewith and removable through an opening in the top thereof, and automatic means for winding such paper off said spindle onto

said reel consisting of a ratchet fixed to said reel, a driving pawl carried by said drum and a retaining pawl suitably mounted; substantially as described. 25

2. In an engine indicator the combination, with the drum suitably mounted, of a winding reel adapted to have wound upon it a paper strip, said reel being mounted in said drum concentrically therewith and removable through an opening in the top thereof, with automatic means for winding such paper strip onto said reel consisting of a ratchet fixed to said reel, a driving pawl carried by said drum and a retaining pawl suitably mounted; substantially as described. 30

3. In an engine indicator the combination, with a drum suitably mounted, of a winding reel adapted to have wound upon it a paper strip, said reel being mounted in said drum concentrically therewith, with automatic means for winding such paper strip onto said reel consisting of a ratchet fixed to said reel, a driving pawl carried by said drum and a retaining pawl suitably mounted; substantially as described. 35

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRANK L. WOLFE.

Witnesses:

IDA F. WOLFE,
RALPH W. FOSTER.