

(No Model.)

A. B. CALKINS.

# STEAM ENGINE INDICATOR.

No. 330,958.

Patented Nov. 24, 1885.

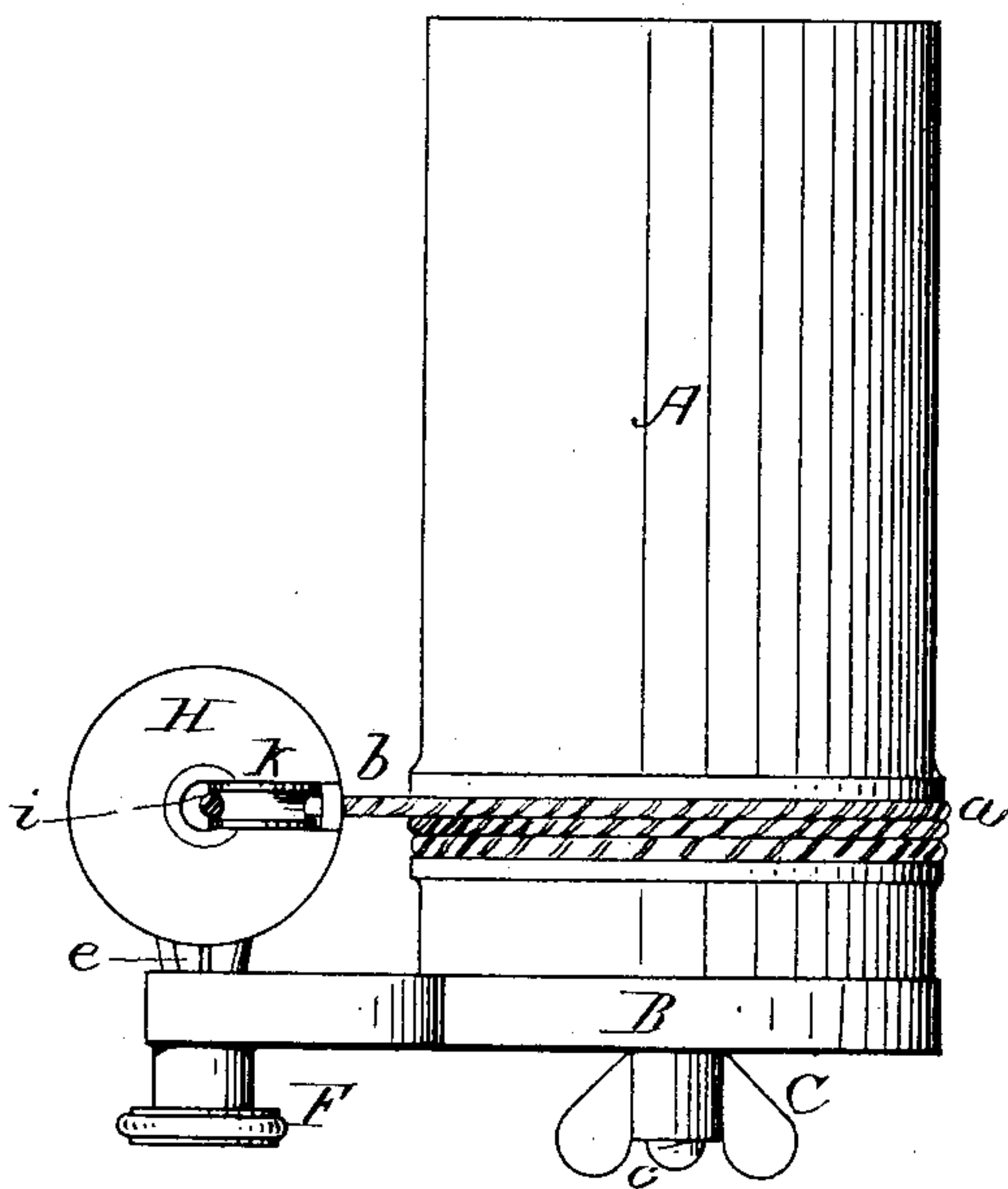


Fig-1.

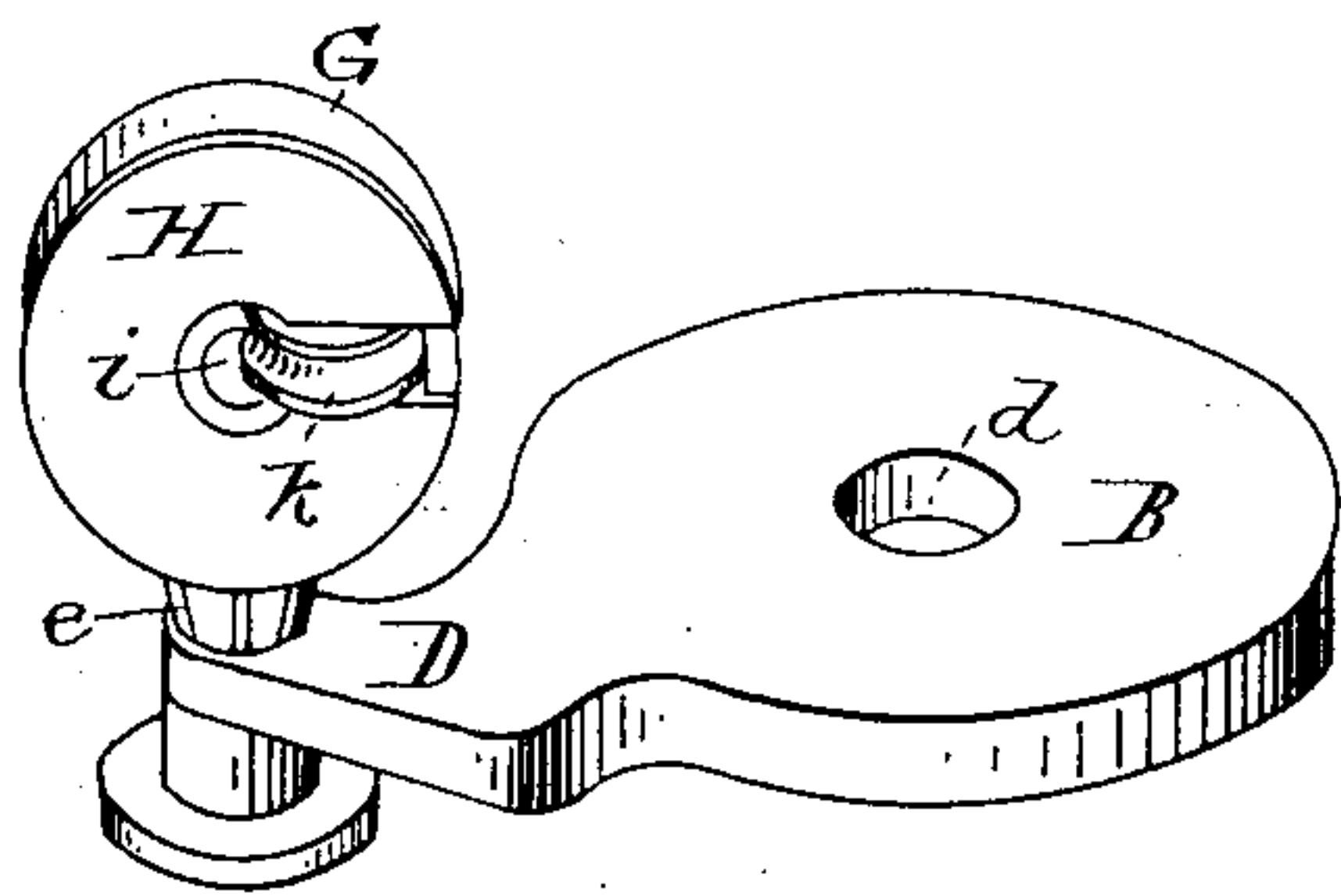


Fig. 2.

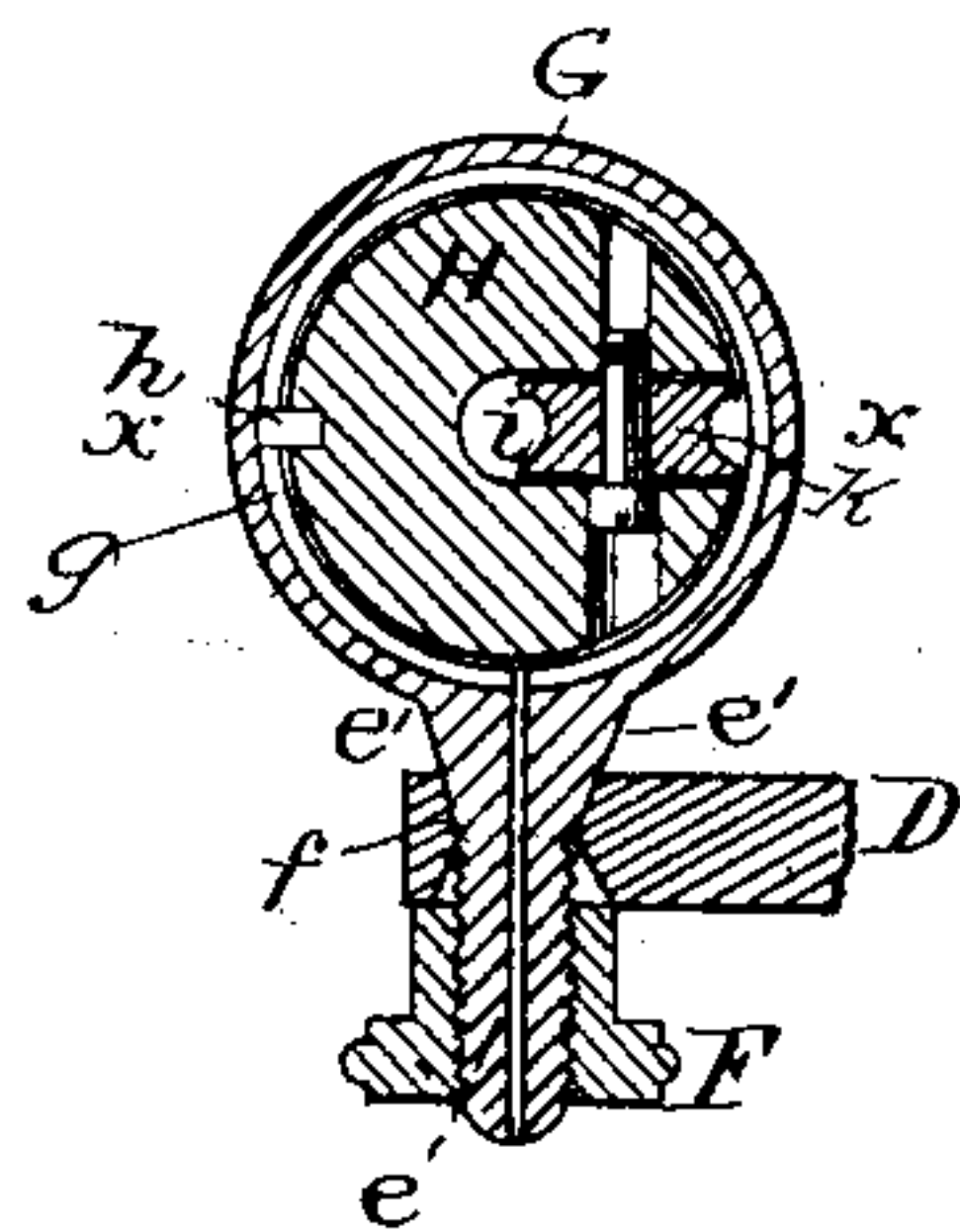


Fig. 3

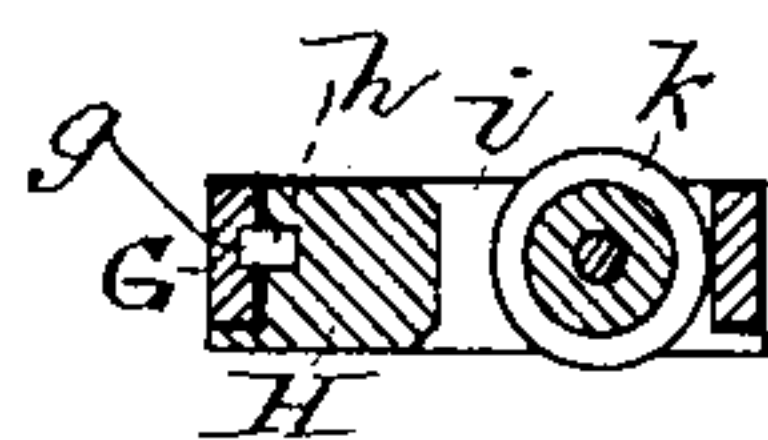


Fig. 4.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## STEAM-ENGINE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 330,958, dated November 24, 1885.

Application filed June 27, 1885. Serial No. 169,954. (No model.)

*To all whom it may concern:*

Be it known that I, ALMON B. CALKINS, of Medford, in the State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Steam-Engine Indicators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

This invention relates to the base-plate and leading-off pulley of a steam-engine indicator.

In the drawings, Figure 1 is an elevation of the drum and base-plate of the paper-drum and base-plate of a steam-engine indicator. Fig. 2 is a perspective of the base-plate and leading-off pulley. Fig. 3 is a section through the leading-off pulley and a part of the base-plate. Fig. 4 is a section of the leading-off pulley transverse to Fig. 3 on the line *x x*.

The same letters indicate the same or like parts in all the figures.

A is the drum. It has, as is usual in such implements, a cord-pulley, *a*, around which the cord is wrapped that rotates it against the tension of the spring.

*b* is the cord. This is an apparatus for converting the longitudinal reciprocating movement of the cord *b* into the reciprocating rotatory movement of the drum A around its axis, and this reciprocating longitudinal movement of the cord is caused by fastening it to any reciprocating part of the engine, and as these reciprocating parts of the engine which it is convenient to lay hold of with the cord are not always situated in the same relation to the position of the drum, it is of importance that the leading-off pulley shall be of such a character and so situated that the cord may lead in any direction, and for economy's sake the same instrument should be made so that it can be used either with the cord leading toward or from the side of the pulley on which the axis of the cylinder *a* is situated, or, as it is usually expressed, to have the same indicator a right-hand or a left-hand indicator, at the will of the user. To effect these objects is the plan of the present invention.

B is the base-plate, which may be clamped in any desired position around an extension

of the axis of the cylinder by means of the bolt *c* and thumb-nut C, which bolt *c* passes through the hole *d* in the center of the base-plate B. This base-plate B has at one part of its periphery an ear, D, in which is mounted a standard, *e*. The hole *f* in the ear D is beveled each way from the center, of the thickness of the plate D, and the standard *e* is a split or partly-split standard, formed on the outside with a half-cone, *e'*, to each member, and this standard has a screw upon its smaller end, on which screw the thumb-nut F may be turned to clamp the apparatus in the plate D. From either side of the half-cones *e'* there is a hoop, G, in the interior of which is a groove, *g*. (Shown in Fig. 3.) In this groove fits a pin, *h*, which projects from a disk, H, and serves to allow said disk to be revolved in the plane of the disk around the center of the ring G. In the center of this disk H is a hole, *i*, and on one side of this hole *i* is placed a pulley, *k*, for the cord to lead over.

It is obvious from this construction that the pulley *k*, over which runs the cord *b*, may be set in any desired position around the center of the disk H, and that this disk may be set in any plane around the axis of the standard *e*, and may there be clamped. It is also obvious that by the aid of the thumb-nut C and the screw-bolt *c* the position of the ear D may be any position around the axis, or a continuation of the axis of the paper-carrying drum A; and it is also obvious that the plate B may be reversed, so that the ear D shall project from the paper-carrying drum A on the other side, and that the disk H and its contained wheel *k* may be set in any plane which passes through the axis of the drum A, or is parallel to a plane passing through it, the movability of the plate B in arc around the axial center of the drum A or its extension giving this movement. It is also clear that a cord which has passed through the center of the disk H may by adjustment be caused to lead in any direction over the pulley *k*.

I am aware that there was published in Engineering, in 1878 or 1879, a description and drawing of a tubular-shank pulley mounted caster-fashion upon the ear of a base-plate, which tubular-shank pulley gave very much



the result in leading off that is accomplished by the movability of the disk H around its center *i*, and that the caster-mounted leading-off pulley had been used in Moscrop's speed-indicator—an English machine—for some considerable time; and that a caster-mounted leading-off pulley was shown in Tilson's patent for steam-cranes, No. 137,737; and I am also aware that L. Stanek patented in Austria in 1878 a thread-guide for indicators, and that said L. Stanek patented in June 26, 1883, an improvement in steam-engine indicators in which a tubular-shank caster-mounted leading-off pulley was one of the principal features; but it will be seen that my leading-off pulley has, by its combination with the base-plate, three adjustments—two of them on vertical lines, one of which is coincident with the axis of the paper-carrying drum, and the other of which is coincident with a line parallel to the axis of the paper-carrying drum, by which two adjustable joints a very considerable variation in the place of adjustment of the cord, to obtain with it reciprocating and rotatory motion, can be obtained, and that only one of these adjustments has hitherto been provided for; and in addition to these two adjustments my arrangement has the adjustable disk H, with its contained pulley *k*, by virtue of which reciprocating rotatory motion in any direction from the center *i* of the disk may be reached and utilized to turn the drum.

The standard *e* is represented as split throughout its length; but I have found that it is best to leave it united at its lower end, as thereby the clamping-nut will catch the threads better, and the only place where the

sides are to approach is at the upper end. It is, however, possible to construct a machine with a fully-split standard, *e*, though only the upper part of it, *e'*, is required to be split.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of a leading-off pulley with a steam-engine indicator by means of two adjusting clamping-joints, one of which coincides with the axial center of the paper-carrying drum, and the other of which is parallel to the first and at some distance from it by means of clamping devices C F, substantially as described.

2. The combination of the leading-off pulley with a disk provided with a center hole for the actuating-cord to pass through, and containing on one side of the said hole a pulley mounted in said disk, which pulley may be adjusted in arc around the center of the disk H, and clamped in any desired position by means of the clamping-nut F, ring G, and clamping-cone *e'*, substantially as and for the purpose described.

3. The combination, with a steam-engine indicator, of a leading-off pulley provided with three adjustments, one of which is in position around the axis of the disk H, another of which is around the axis of the standard *e*, and the third of which is around the axis or extension of the axis of the paper-carrying drum A, substantially as described.

ALMON B. CALKINS.

Witnesses:

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