

(No Model.)

W. HOUGHTALING.

ATTACHMENT FOR STEAM ENGINE INDICATORS.

No. 517,006.

Patented Mar. 20, 1894.

Fig. 1.

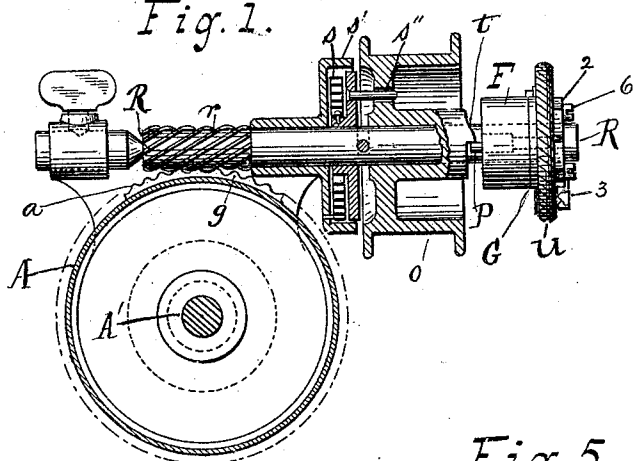


Fig. 2.

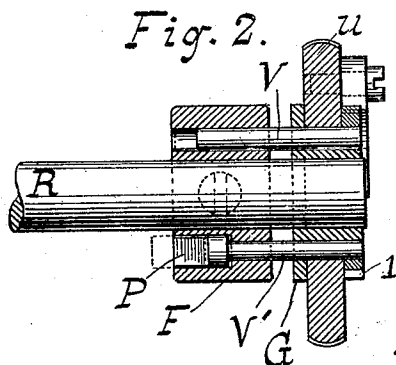


Fig. 5.

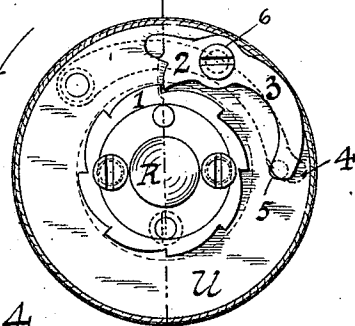


Fig. 4.

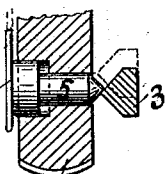


Fig. 3.

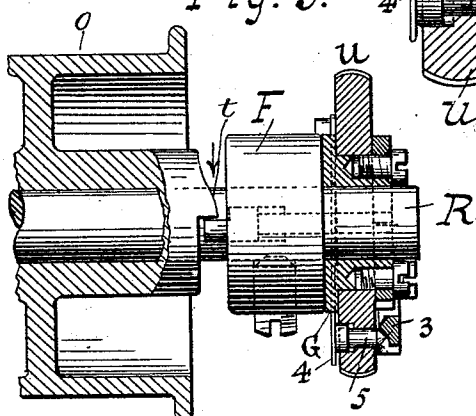
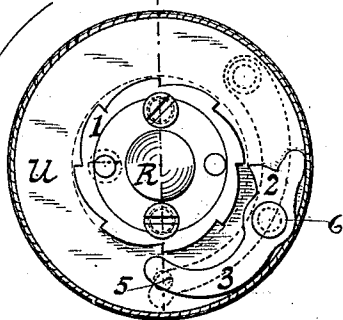


Fig. 6.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ATTACHMENT FOR STEAM-ENGINE INDICATORS.

SPECIFICATION forming part of Letters Patent No. 517,006, dated March 20, 1894.

Application filed March 3, 1893. Serial No. 464,523. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HOUGHTALING, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Attachments for Steam-Engine Indicators, of which the following is a specification.

The invention relates to an improvement upon the subject matter of my Letters Patent No. 494,482, dated March 28, 1893. In said patent, reference is made to a manner of making the clutch engagement consisting in previously turning the diagram barrel by hand slightly forward and clear of its recoil stop, so that when the engagement is made a slight extra tension is given to the cord which prevents the barrel from slamming against its stop in its recoil movement. I have found in practice that in applying the hand to the diagram barrel for the purpose stated, the diagram sheet is often moved or disarranged, and to avoid this and at the same time to more conveniently manipulate the barrel in the manner described, is the purpose of my present improvement, which I will proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1, is a plan view partly in section of the entire pulley attachment; Fig. 2, a sectional view of the clutch; Fig. 3, an enlarged view partly in section of the clutch, cord pulley, and ratchet attachment in engagement; Fig. 4, an enlarged view of the spring and pin passing through the operating collar and in contact with the pawl lever, and Figs. 5 and 6, end views of the ratchet and pawl attachment in and out of engagement.

A designates the diagram barrel, A' its shaft and *a* its worm gear wheel meshing with the worm *r* on the cord-pulley shaft R. The cord-pulley *o* is mounted loosely on this shaft and provided with a projection *t* adapted to engage a bolt P on the inner end of one of two pins V and V' which extend through guideways in a collar F, fixed on the said shaft and belonging to the clutch mechanism for the said cord pulley. The outer ends of the said pins are attached to a sliding collar G which is also a part of the clutch mechanism and is free to slide backward and for-

ward to cause the engagement between the bolt P and the projection *t* on the cord pulley or to free the latter part. The collar G has no axial motion, that being prevented by the engagement of the pins V V' with the fixed collar F. An auxiliary spring *s* acts through a disk *s'* and pin *s''* on the cord pulley *o* as a reinforce to the action of the diagram barrel spring not shown in this application. All of the aforesaid parts are described in my patent aforesaid, and merely given brief mention here for greater clearness. But in the construction shown in the said patent the collar G is made in one piece with a milled ring *u*, which ring, adapted to be held and turned by the fingers in the present instance, is separate therefrom and capable of independent rotation. A ratchet 1 is attached to the collar G and a pawl 2, adapted to engage the said ratchet, is mounted by its pivot 6 on the loose ring *u*; the purpose of these parts being to enable the operator to effect the desired forward movement of the diagram barrel with the same hand and from the same position whereby the clutch is slid backward or forward to lock or unlock the cord pulley. All of this work is done through the loose ring *u*.

The pawl 2, is constructed with an extension 3, which may serve as a handle for the operator in making a connection between the pawl 2, and ratchet 1, and also to maintain the pawl in its free position, thus preventing it from engaging with the ratchet while in motion. This is accomplished by means of the pin 5 and spring 4, which pin constantly bears upon the inner surface of the pawl extension 3.

The operation of the device is as follows: The clutch bolt P being drawn back and free, as shown in Fig. 2, the pawl 2 is engaged with the ratchet 1, by the operator and the loose ring or collar *u* turned slightly backward, this movement being transmitted through pawl 2, ratchet 1, the fixed hub G, to which the ratchet is secured, shaft R, and worm *r* to the diagram barrel, producing the same effect in giving an increased tension to the cord in turning the barrel as if the more inconvenient device described in my aforesaid patent were employed. With these parts held in this po-

sition, the clutch engagement is made by moving the loose collar inward in the same manner as practiced in said former application. Upon the proper engagement of the clutch bolt P, at the desired beginning of the stroke, the pawl is instantly disengaged, which is due to the rotary motion imparted to the ratchet 1, causing the ratchet to move away from contact with pawl 2, which being mounted upon the loose ring *u*, is forced to its free or normal position by the action of the inclined portion of the teeth of the ratchet. The pawl is held in its free position by the contact of the pin 5 and spring 4, upon its extension 3, without removing the hand from the loose ring *u*, and invariably at the commencement of the stroke. It will thus be seen that the entire essential manipulation of the attachment is effected through the medium of the collar or hand ring *u* which only necessitates the use of but one hand of the operator, and also avoids the incidental disarrangement of the diagram paper which might be caused by the device described in my aforesaid patent.

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

1. In steam engine indicating mechanism the cord-pulley and clutch devices which slide into and out of engagement with the said pulley, in combination with a rotary ring which slides with the said clutch devices, and a pawl and ratchet for engaging the said ring with the said devices in order that their shaft and the diagram barrel may be slightly turned through the medium of the said wheel with-

out turning the cord pulley, substantially as set forth.

2. In combination with a diagram barrel and its shaft a cord-pulley shaft geared thereto, a cord-pulley loose on the said shaft, clutch mechanism for locking the said pulley to the said shaft, and means for engaging at will and turning the said mechanism and shaft while disengaged from the said cord pulley, in order that the diagram barrel may be given a slight rotary motion independent of the said pulley for the purpose set forth.

3. In combination with the cord-pulley and its shaft and clutch mechanism connecting the same, including a sliding collar G, a part adapted to be grasped by the fingers and having independent rotary motion but provided with devices for engaging and turning the said collar and thereby the said clutch mechanism at will in order that the diagram barrel may be slightly rotated without turning the cord pulley, substantially as set forth.

4. A cord-pulley shaft for steam engine indicating mechanism, in combination with a cord pulley which is loose on the said shaft, clutch devices for engaging the said shaft with the said pulley, a loose ring turning on but sliding with the said mechanism, and a pawl and ratchet arranged to connect at will the said ring to the said devices, substantially as and for the purpose set forth.

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Witnesses:

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