

(No Model.)

J. S. CALKINS.

REDUCING WHEEL FOR STEAM ENGINE INDICATORS.

No. 535,811.

Patented Mar. 19, 1895.

Fig 1.

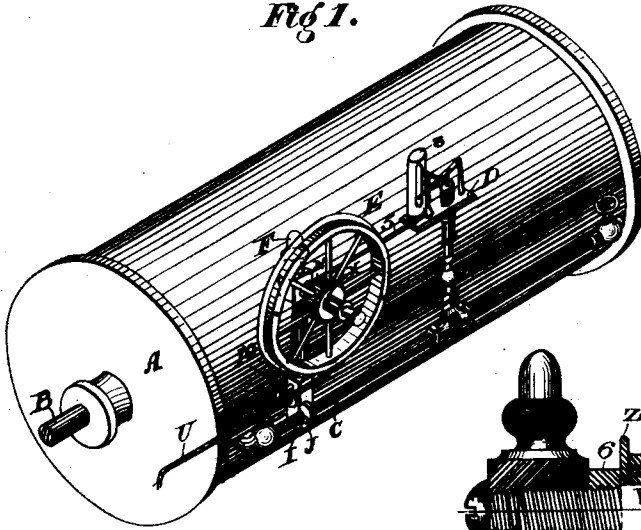


Fig 3.

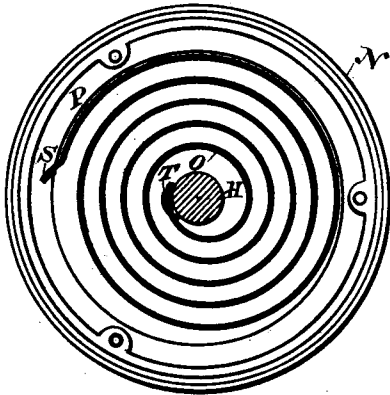
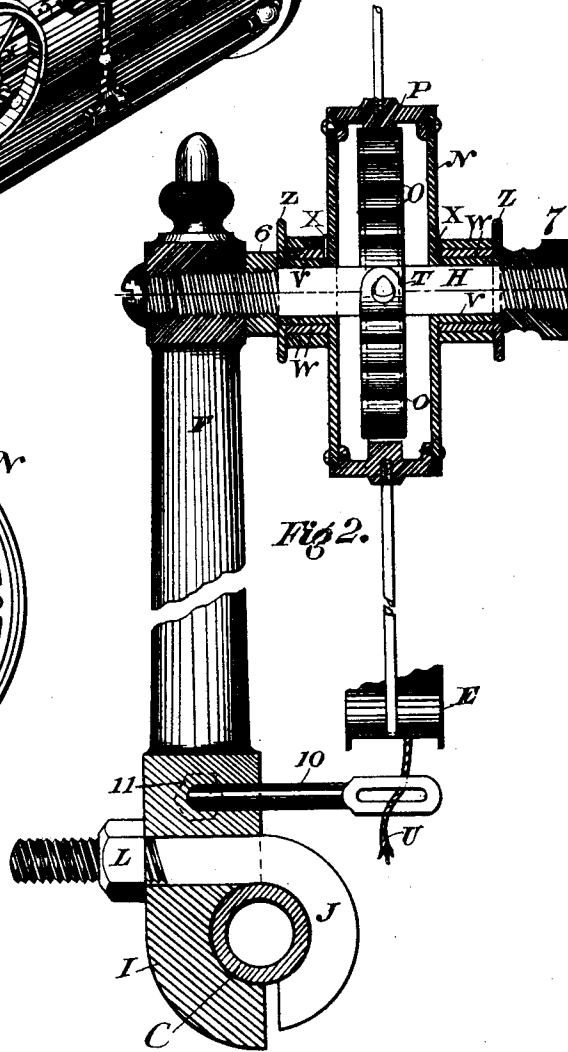


Fig 2.



Witnesses.

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REDUCING-WHEEL FOR STEAM-ENGINE INDICATORS.

SPECIFICATION forming part of Letters Patent No. 535,811, dated March 19, 1895.

Application filed March 26, 1894. Serial No. 505,216. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. CALKINS, a citizen of the United States, residing at Hastings, in the county of Barry, State of Michigan, have invented a new and useful Reducing-Wheel for Steam-Engine Indicators, of which the following is a specification.

This invention relates to reducing devices for steam engine indicators employing a spring-tensioned wheel which is actuated by the reciprocating parts of the engine by means of a cord attached to said wheel and reciprocating parts.

The object of the invention is to make the spring-tensioned wheel which is actuated by the reciprocating parts of the engine, reversible so as to be changed the other side to for right and left hand engines, thus obviating any change in the position of the spring or its tension, and not have to reverse the wheel-support.

Another object is to adapt the wheel-support for detachable attachment to the engine cylinder pipe with which the indicator is connected, at different locations in the same relative position in each.

A further object is to attach the cord-guide to the wheel-support in a reversible manner, so that when the wheel is reversed the cord-guide may be reversed also, for right and left hand engines.

A further object is to so arrange the indicator cord-pulleys in relation to the wheel, the spring therein, and the tension of the cord actuating the wheel, that the strain of each will be as near as possible on a line with each other.

A final object is to combine these different features in a complete reducing device for steam engine indicators.

In the drawings forming a part of this specification, Figure 1, is a perspective view of a steam engine cylinder showing the invention attached ready for use; Fig. 2, a vertical central section of the wheel, and its support with parts in section, enlarged, and a cross section of the pipe to which the support is attached; and Fig. 3, is an elevation of the spring-case of the wheel, with one side removed showing the spring, as looking from a point at the left of Fig. 2, and the wheel-axle being in cross section.

Referring to the lettered parts of the drawings, A represents a steam cylinder; B, the piston-rod, broken; C, the steam-pipe which connects with the interior of the cylinder A, at each end, and D is an indicator connected with, and supported by said pipe, all as heretofore employed.

The piston-rod B, in use of course connects with the reciprocating cross-head, not here shown.

The support of the spring tensioned wheel E, consists of the upright pillar F, detachably attached to the pipe C, of the cylinder A, and a reversible axle H, extending laterally from the upper end of said pillar F. The lower end of this pillar F, is formed into a fixed jaw I, adapted to fit against one side of the pipe C, and is provided with a movable jaw J, adapted to fit the opposite side of said pipe C. One end of the movable jaw J, passes through a hole in the fixed jaw I, and is clamped against the pipe C, and secured by a nut L, Fig. 2. The jaws are preferably made to open on the under side so the device can be set onto the pipe and be supported by it while setting the nut L.

While I prefer to attach the pillar F, bearing the axle H, and its wheel E, to the pipe C, for the reason that said pipe happens to be a desirable support for the purpose, still the attachment may be made to some extension of said pipe, or to any other suitable support to which the jaws I, J, can be clamped.

The central portion of the wheel E, around the axle H, is formed to constitute a hollow case N, for containing the spring O, Fig. 3, said spring surrounding the axle H, and one end being attached to the central interior rib P, of the case N, at S, and the other end being attached to the axle H, at T, Fig. 2, thus bringing the strain of the tension spring O, and of the cord U, which connects with the cross-head and the wheel E, on a line with each other and with the center of the wheel, thus preventing the strain having a canting effect on the wheel and its axle. Between the case N, and the rim of the wheel E, are spokes h, Fig. 2. The spring-case N, is provided with short laterally projecting collars V, one on each side, which collars form bearing portions of the wheel E, on the axle H. On these collars V each side of the wheel E, are placed pul-

leys W, of different sizes, that is, one of said pulleys is smaller than the other and they are concentric to each other and the collar. These pulleys W, are locked by pins X, projecting from the collars V, into little notches in the end of said pulleys, Fig. 2, so that said pulleys will partake of the same motion of the wheel E.

It should be borne in mind that the motions of the wheel E, are first to turn in one direction on its axis, and then to turn back in the opposite direction, thus alternating in unison with the movements of the reciprocating parts of the engine.

The inner pulleys W, or those next to the collars V, have a flange Z, at the outer edge to keep the indicator-cord 5, Fig. 1, on the pulley, and these flanges are deep enough to form flanges to the outer pulleys also when they are employed. These pulleys W, are held on the collars V, by nuts 6, and 7, which come against them. One of these nuts 6, is a jam nut on the inner end of the axle H, and locks said axle after it is screwed into the pillar F, and the nut 7, holds the wheel E, on said axle.

Both ends of the axle H, are threaded alike so as to be reversed, whichever end desired being screwed into the pillar F. This reversing is effected by removing the nut 7, loosening the jam-nut 6, then detaching the axle from the pillar, next removing the jam nut 6, and putting it on the other end of said axle, then attaching said other end of the axle to the pillar, and screwing the nut 7, onto that end of the axle which was detached from the pillar F, which end will then of course be the outer end. During this action of reversing the axle H, the wheel E, is not removed from said axle, and is hence reversed with said axle, bringing what was before the outside of the wheel next to the pillar F. The purpose of thus reversing the wheel E, may be more clearly explained as follows: In Fig. 1, the reciprocating parts of the engine would be at the left hand of the cylinder A, since the piston-rod projects out of said end, and the wheel E, in said figure, is shown adjusted and located for use therewith. Now if the reciprocating parts of the engine were at the other end of the cylinder A, the wheel E, would then have to be reversed the other side to, as explained, and the wheel-support or pillar would be detached from its present location, and be attached to the other end of the pipe C, in the same relative position to said pipe that it now occupies, which the engineer is enabled to easily and speedily do by virtue of the clamping jaws I, J, at the lower end of the pillar F. By this means the spring O, of the spring-case N, in the same position and tension serves in both cases.

To return to the indicator-cord 5, and the pulleys W. This cord 5, winds on the drum 8, of the indicator D, at one end, and on the pulley W, at one side of the wheel E, at the other end, Fig. 1. If two indicators were be-

ing used at the same time, (which may be done by employing an indicator for each end of the cylinder A, and locating the wheel and its support between them,) then two cords 5, would be employed, one leading from one indicator-drum to the pulley W, on one side of the wheel E, and another cord leading from the other indicator-drum to the pulley W, on the other side of the wheel. The drawings do not illustrate using two indicators at once, but this explanation shows one of the purposes of having pulleys W, on both sides of the wheel E.

Of course it will be understood that the object of employing pulleys of different sizes is to produce the required length card on the indicator-drum 8, in accordance with the particular stroke of the engine. To illustrate. If the engine has a forty-two inch stroke, the outer or larger pulleys would be employed, and if a sixty inch stroke then the inner or smaller pulleys would be used, the outer or larger pulleys of course being removed for the purpose.

In Figs. 1 and 2, a reversible cord-guide is shown at 10, to receive the engine-cord U, after it leaves the wheel E. This cord-guide 10, is elbowed through a hole in the jaw I, of the pillar F, and is held by a detachable nut 11, on the other side. This cord-guide is in effect attached to the wheel-support, and just at what point it is attached does not matter. When the wheel E, is reversed, and the location of the pillar F, changed in conformity thereto as before explained, then the reversible cord-guide 10, is reversed by removing the nut 11, turning the cord-guide over and inserting its elbowed end in the other side of the wheel support.

In the operation, proper tension is first given to the spring O, by rotating the wheel E, a few times on its axle H, after the pillar F, has been attached to the pipe C, and then the cord U, which is wound on the wheel is passed through the cord-guide 10, and attached to the reciprocating parts of the engine, as the cross-head would represent, and the cord 5, which winds on the indicator-drum 8, is attached to the pulley W, as explained. The engine is then started, and the wheel E, turns on its axis in one direction, and then back in the opposite direction, thus alternating in unison with the reciprocating movements of the cross-head of the engine, during which action the spring tension of the wheel E, of course causes one of its movements in taking up the alternate slack of the cords.

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

1. In a reducing device for steam engine indicators, a spring tensioned reversible wheel to which the engine cord is attached, a suitable support, and an axle upon which said wheel turns first in one direction and then the other, said axle being threaded alike at each end for detachable attachment to said sup-

port, thus making the axle reversible end for end to reverse the wheel the other side to, substantially as set forth.

2. The combination, of a spring tensioned reversible wheel to which the engine-cord is attached, a pillar, a detachable clamp at the lower end of the pillar for detachably attaching said pillar to some suitable support in proper position and location relative to the particular reversible position of the wheel, and an axle upon which said wheel turns, said axle being threaded alike at each end for detachable attachment to the pillar, substantially as set forth.

3. A reducing device for steam engine indicators, comprising a suitable support, an axle having each end adapted for detachable attachment to said support, thus making the axle reversible, and on said axle a spring tensioned wheel to which the engine-cord is attached, and pulleys of different sizes attached to the sides of said wheel and partaking of its movements, substantially as set forth.

4. The combination, of a spring tensioned, reversible wheel to which the engine-cord is attached, a suitable support adapted for detachable attachment to the engine a reversible cord-guide, and an axle upon which said wheel turns, said axle being threaded alike at each end for detachable attachment to said

support thus making it reversible end for end to reverse the wheel the other side to, substantially as set forth.

5. A reducing device for steam engine indicators, comprising a suitable support, an axle threaded alike at each end for detachable attachment to said support, thus making the axle reversible, a spring-tensioned wheel on said axle, to which wheel the engine-cord is attached, said wheel being provided with lateral hub-projections, a jam-nut on the axle next to its support, and a nut on the outer end of said axle, said nuts keeping the wheel and pulleys in place, substantially as set forth.

6. A reducing device for steam engine indicators, comprising a pillar, a detachable clamp at the lower end of said pillar, a reversible cord-guide, an axle threaded alike at each end for detachable attachment to said pillar thus making the axle reversible, on said axle a spring tensioned wheel to which the engine-cord is attached, and indicator-cord pulleys attached to the sides of the wheel and partaking of its movements, substantially as set forth.

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Witnesses:

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