(No Model.)

W. UHLMEYER.

PRESSURE INDICATING DEVICE FOR STEAM ENGINE CYLINDERS.

No. 584,429. Patented June 15, 1897.

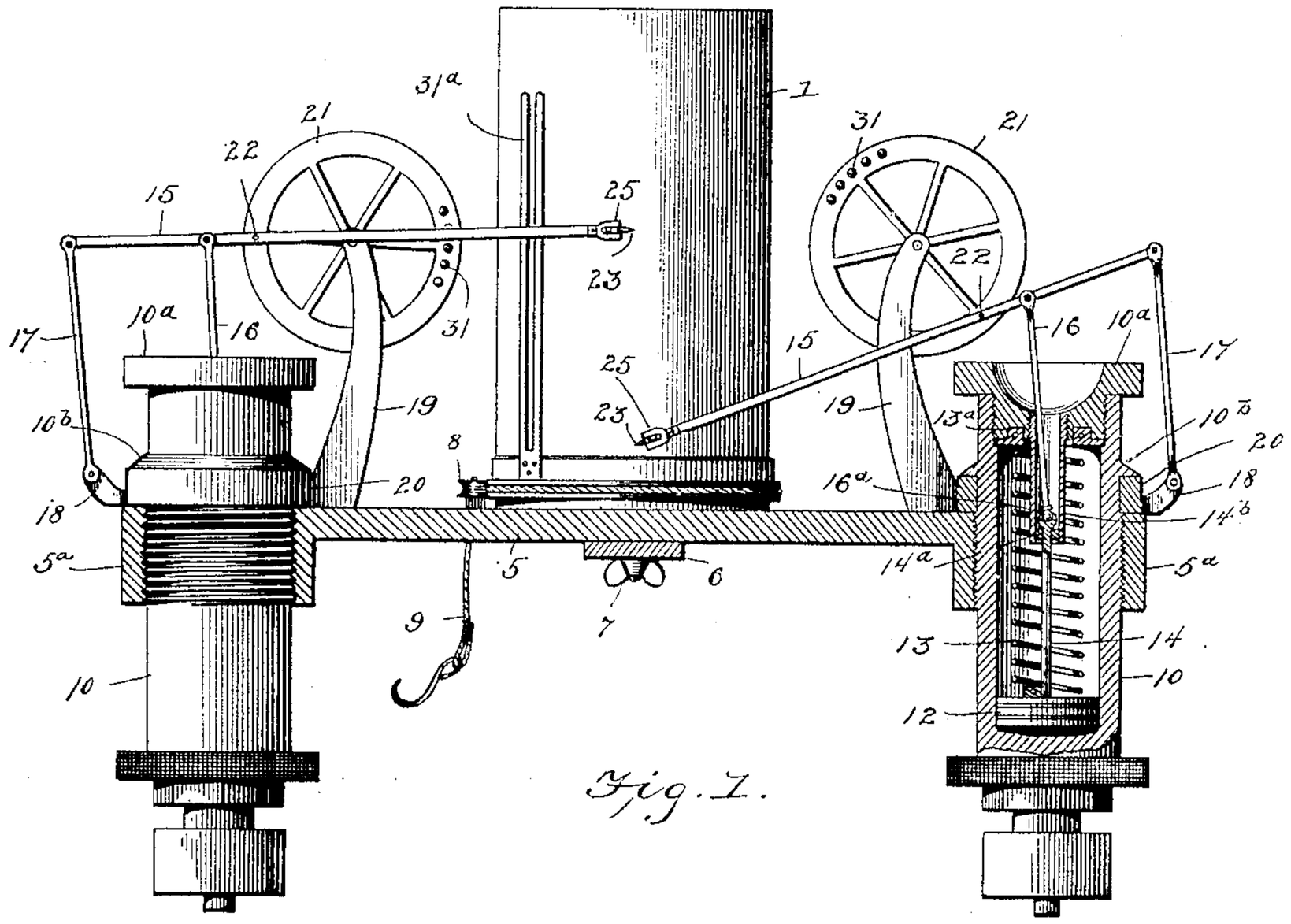

Fig. 1.

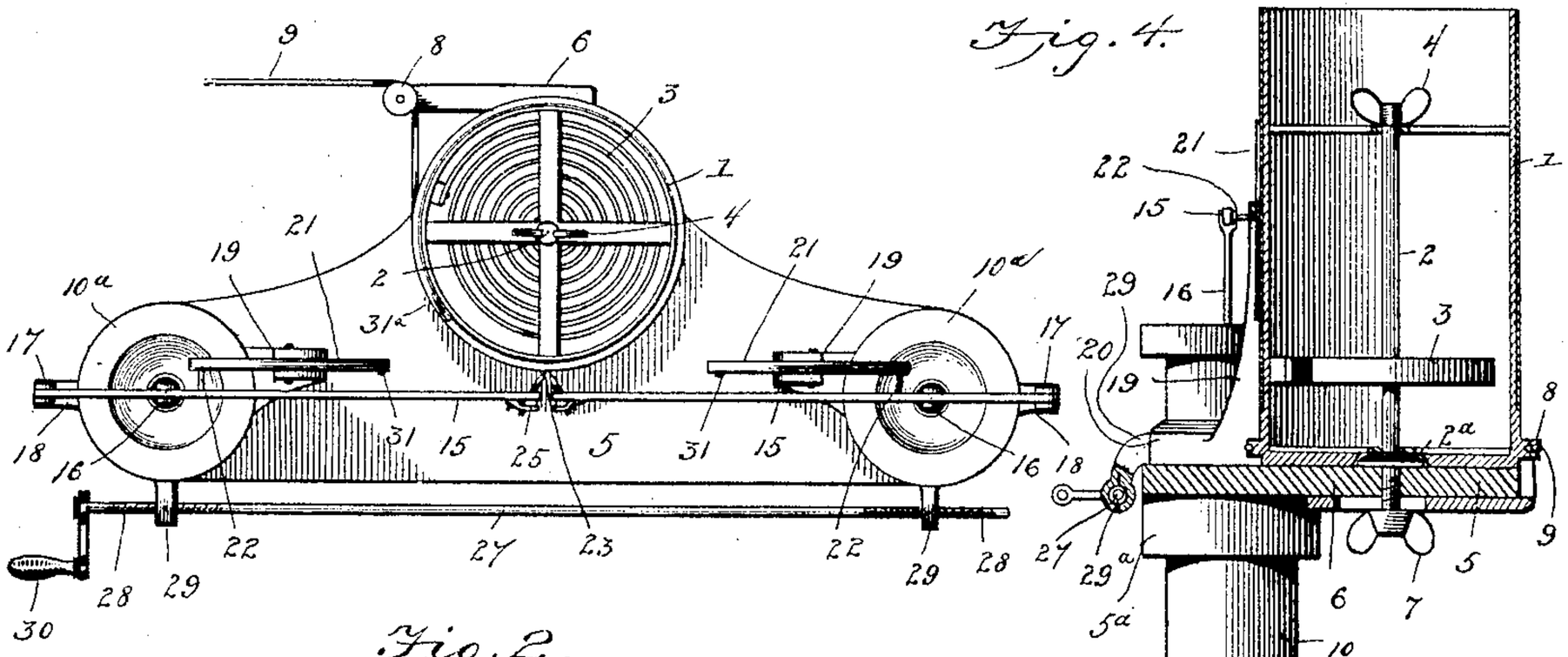

Fig. 2.

Fig. 4.

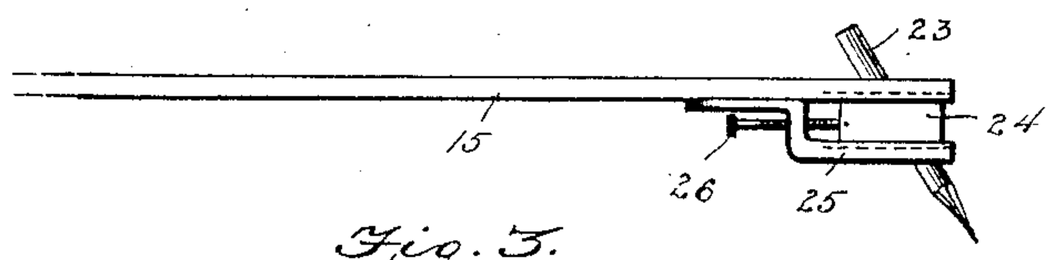

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM UHLMEYER, OF ST. PATRICK, MISSOURI.

PRESSURE-INDICATING DEVICE FOR STEAM-ENGINE CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 584,429, dated June 15, 1897.

Application filed June 26, 1896. Serial No. 597,047. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM UHLMEYER, a citizen of the United States, residing at St. Patrick, in the county of Clark and State of Missouri, have invented a new and useful Pressure-Indicating Device for Steam-Engine Cylinders, of which the following is a specification.

My invention relates to a pressure-indicating device for steam-engine cylinders, and has for its object to simplify and improve the construction of devices of this class, to provide means whereby the pressure applied to each side of the piston is recorded successively upon the same medium, and to provide simple and efficient means for adjusting the parts whereby the pointers actuated by the pressure at different sides of the piston may be arranged at the desired interval and may be caused to press with the desired tension upon the recording medium.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a longitudinal section of a pressure-recording device constructed in accordance with my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail view of one of the pointers and the arm or lever by which it is supported. Fig. 4 is a vertical transverse section of the drum and contiguous parts.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a drum mounted for rotation upon an axis 2, which forms an arbor for actuating-spring 3, said arbor terminating at its upper extremity in a thumb-nut 4, which is exposed through the upper end of the drum for operation in order to wind the spring. This drum is arranged upon a base 5, to which is attached an arm 6 by means of the axis 2 and a thumb-nut 7, which engages the axis, said arm supporting a pulley 8, traversed by a drum-cord 9, of the ordinary construction. Said arm 6 may be arranged at any desired adjustment by means of the nut 7, which also serves to lock the arbor with the spring at the desired tension, for which purpose said arbor is provided with a shoulder 2^a to bear upon the upper surface of the base 5, while the thumb-nuts 7 bear against the under surface thereof. Also supported by the base are tubes 10, adapted to be arranged in communication with opposite ends of a cylinder, (not shown,) and in these tubes operate plungers 12, provided with depressing or return springs 13. The stem 14 of each plunger is provided at its upper end with an enlargement or guide-rod 14^a, operating in a tubular guide 14^b, which is threaded in a central opening in the cap 10^a of the tube 10, and the upper ends of the return-springs 13 are connected to rings 13^a, which are disposed in the tubes 10 beneath the caps 10^a, whereby after the removal of the caps said rings and attached springs may be removed from the tubes.

A marking-lever 15 is connected at an intermediate point by means of a link 16 with each of the plunger-stems, and is connected at its outer end by means of a link 17 with a bracket 18, said link 16 extending into the guide-tube 14^b and having a ball-and-socket or other universal connection 16^a with the upper end of the plunger-stem 14, whereby the link is capable of both lateral and rotary movement with relation to the stem. Also mounted upon upstanding arms 19, carried by a collar 20, are compensating wheels 21, to which the marking-levers are connected pivotally, as at 22, the function of these compensating wheels being to cause the contiguous extremities of the operating-levers to traverse straight vertical paths adjacent to the surface of the drum, which is covered by a card or sheet of paper forming a recording medium. The bracket 18 and the arm 19 are carried by and preferably integral with the collar 20, which encircles the tube and rests upon the upper surface of the base 5, said tube, which is threaded in a sleeve 5^a at the extremity of the base, being provided with a lateral annular projection or shoulder 10^b to bear upon the upper edge of the collar 20. Thus the collar which carries the marking-lever, compensating wheel, and connections is swiveled upon the base concentric with the tube 10, said parts, as will be understood, being duplicated at the opposite end of the base.

Mounted upon the extremity of each mark-

ing-lever is a marker consisting in the construction illustrated of an inclined pencil 23, fitted in a carrier-block 24, mounted in a guide 25 on said lever, and in connection with the carrier is arranged an adjusting-screw 26 for adjusting the marker. This construction provides for arranging the markers at the desired interval upon the surface of the recording medium, and the inclination of the pencils arranges their marking extremities at points beyond the outer ends of the carrier-blocks, whereby said marking extremities may be arranged as close together as desired.

From the above description it will be seen that inasmuch as the collars 20 are swiveled upon the base the pressure of the markers upon the surface of the recording medium may be varied by turning said collars, and in order to provide for the adjustment of said pressure with accuracy I employ a tension-rod 27, provided with right and left screw-threads 28, contiguous to its extremities and engaging pendent ears 29 on the collars, said rod being provided at one end with an operating-handle 30. By rotating the tension-rod the collars may be turned in either direction to bring the points of the markers into contact with the surface of the recording medium with any desired pressure or remove the same when the device is not required. In order to allow freedom of movement of the collar without straining the tension-rod, I provide the ears 29 with swiveled nuts 29^a.

As above indicated, the compensating wheels serve to cause a direct longitudinal movement of the extremities of the marking-levers, and hence of the markers, without the use of slots and similar connections, and in order to compensate for the weight of the parts connected with the marking-lever I preferably provide each compensating wheel with a plurality of removable weights 31, consisting, in the construction illustrated, of screws threaded into sockets in the rim of each wheel at points approximately diametrically opposite the connection 22 of the marking-lever therewith. Any desired number of these weights may be employed in order to secure the desired uniformity of movement, and when operating rapidly said weights may be wholly removed in order to obviate as far as possible the inertia of the device. The recording medium is secured to the drum by means of spring clamping-fingers 31^a or their equivalents.

The operation of this device is similar to that of other machines designed for analogous purposes, and it will be seen that an important advantage thereof resides in the fact that the pressures applied successively to opposite sides of a plunger are recorded upon the same medium, and hence are in position for accurate comparison. Furthermore, this arrangement materially simplifies the construction of devices of this class.

A further advantage of the apparatus embodying my invention resides in the fact that simple compensating devices are employed both for preserving parallelism of the record-markers and uniformity of movement. Furthermore, the means for adjusting the markers both as to distances from each other and pressure upon the recording medium insures a satisfactory record under all conditions.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a steam-pressure recorder, the combination with a plunger exposed to fluid-pressure, and a recording medium, of a marking-lever loosely mounted at one end and intermediately connected with the stem of the plunger, and a compensating wheel peripherally connected to the marking-lever and weighted at the side opposite to its point of connection therewith, for counterbalancing the weight of the marking-lever and its connections, substantially as specified.

2. In a steam-pressure recorder, the combination with a plunger exposed to fluid-pressure and a recording medium, of a marking-lever loosely mounted at the end remote from the marker and connected at an intermediate point with the plunger, a compensating wheel peripherally connected to the marking-lever, and removable weights carried by the compensating wheel, substantially as specified.

3. In a steam-pressure recorder, the combination of duplicate recording devices having plungers adapted to be exposed to fluid-pressure at opposite sides of a cylinder-piston, and provided at contiguous points with markers, a common recording medium adapted to be traversed by said markers in contiguous parallel lines, means for operating the recording medium, and connections between the recording devices for simultaneously adjusting the same to vary the positions of the markers with relation to the recording medium and the pressure of said markers upon the same, substantially as specified.

4. In a steam-pressure recorder, the combination with a recording medium and means for operating the same, of duplicate swiveled supporting devices arranged at an interval and capable of partial rotation, duplicate oppositely-disposed marking-levers mounted upon the supporting devices and having plungers adapted to be exposed to fluid-pressure at opposite sides of a cylinder-piston, said marking-levers carrying markers at their contiguous ends, a common recording medium arranged midway between said supporting devices and adapted to be traversed by the markers in contiguous parallel paths, means for operating the recording medium, and a common adjusting device connecting the supporting devices whereby they may be simultaneously turned in opposite directions to vary the positions of the markers with rela-

tion to the surface of the recording medium, said adjusting device consisting of a tension-screw oppositely threaded in ears on the supporting devices, substantially as specified.

5. In a steam-pressure recorder, the combination with a recording medium and means for operating the same, of a base-plate, tubes fitted in openings in the base-plate and adapted to be exposed to pressure applied to opposite sides of a cylinder-piston, plungers operating in said tubes, collars swiveled exteriorly upon the tubes between the base-plate and shoulders on the tubes, compensating wheels mounted upon arms supported by said collars, marking-levers connected intermediately to the plunger-stems and terminally by means of links to said collars, and also connected intermediately to the compensating wheels, and adjusting devices connecting the collars, whereby the latter may be turned simultaneously in opposite directions to vary the pressure of the marking devices upon the recording medium, substantially as specified.

6. In a steam-pressure recorder, the combination with a recording medium and means for operating the same, and plungers adapted to be exposed to fluid-pressure applied to opposite sides of a cylinder-piston, of oppositely-disposed marking-levers operatively connected with said plungers and provided at their contiguous ends with terminal guides, carriers mounted in said guides and adapted to be adjusted longitudinally of the levers, means, as screws, for adjusting the carriers, and markers, as pencils, disposed in inclined positions upon the carriers with their marking extremities projecting beyond the outer ends of the guides, whereby the markers may be adjusted by means of the carriers to cause their extremities to traverse contiguous lines on the surface of the recording medium, substantially as specified.

7. In a steam-pressure recorder, the combination with a recording medium and means for operating the same, and plungers adapted to be exposed to fluid-pressure applied to opposite sides of a cylinder-piston, of duplicate oppositely-disposed marking-levers operatively connected with said plungers, markers mounted upon the contiguous ends of the marking-levers and adapted to traverse contiguous lines upon the surface of said recording medium, the markers being movable longitudinally of the levers, and means for adjusting the markers longitudinally of the levers to vary the distance between the lines traversed thereby upon the surface of the recording medium, substantially as specified.

8. In a steam-pressure recorder, the combination with a recording medium and means for operating the same, and plungers adapted to be exposed to fluid-pressure applied to opposite sides of a cylinder-piston, of duplicate oppositely-disposed marking-levers operatively connected with said plungers and carrying longitudinally-adjustable markers adapted to traverse contiguous lines upon the surface of said recording medium, said marking-levers being angularly adjustable in a direction perpendicular to the plane of the recording medium to vary the interval between the markers and the surface of the recording medium, means for securing the markers upon the levers at the desired adjustment, and connections between the marking-levers, whereby they may be simultaneously adjusted in opposite directions to secure the desired position of the markers with relation to the plane of the recording medium, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM UHLMEYER.

Witnesses:
JOHAN UHLEMAYER, Sr.,
JOHN UHLMEYER, Jr.