

(No Model.)

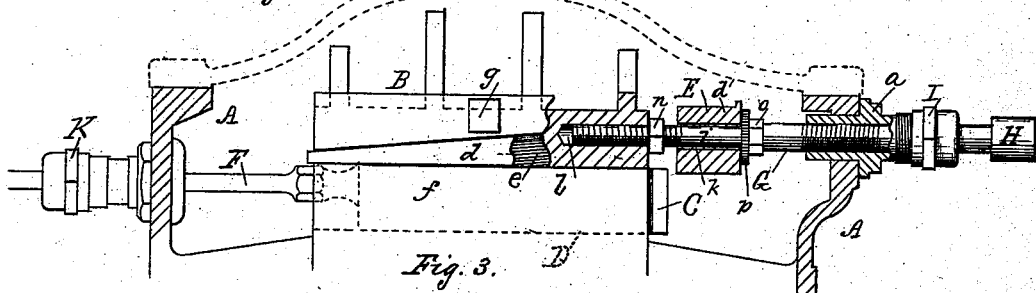
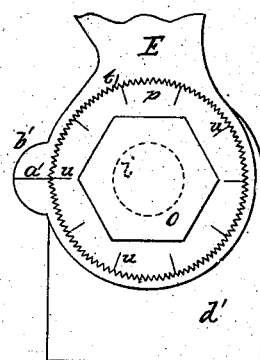
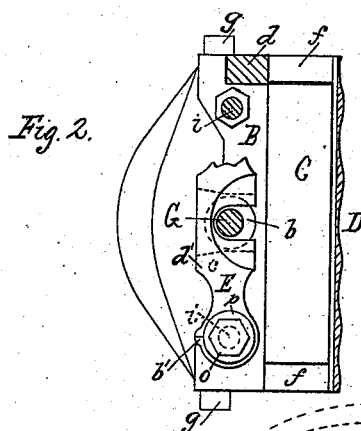
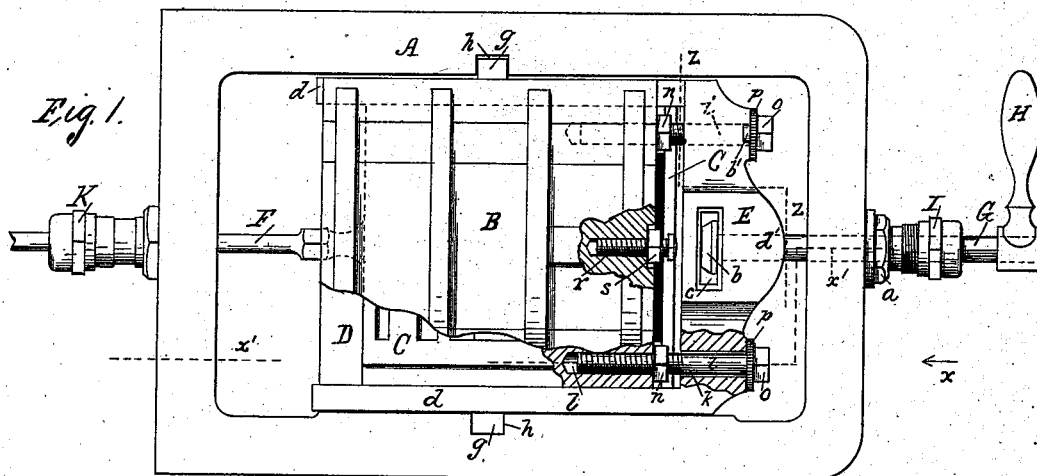
2 Sheets—Sheet 1.

D. A. WOODBURY.

ADJUSTING RELIEF PLATE WEDGES OF SLIDE VALVES.

No. 382,674.

Patented May 8, 1888.



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Fig. 5.

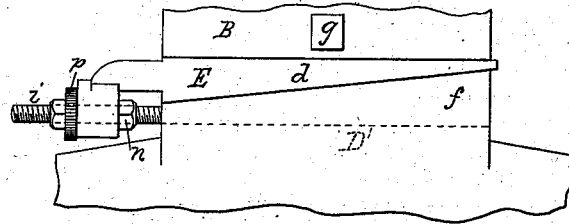


Fig. 6.

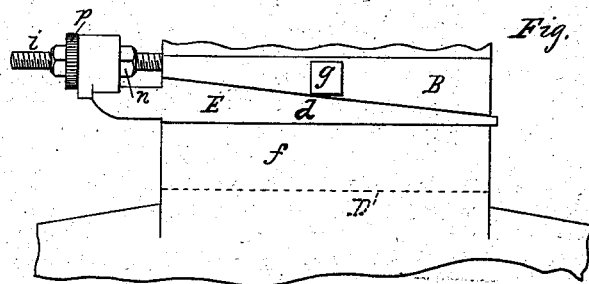


Fig. 7.

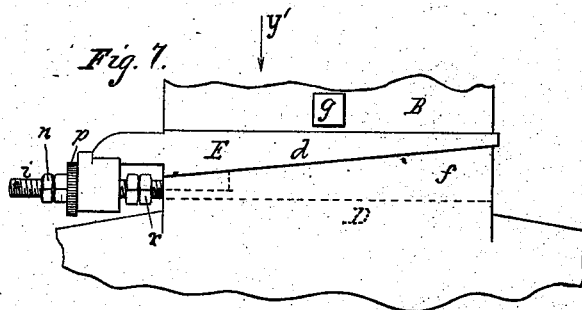
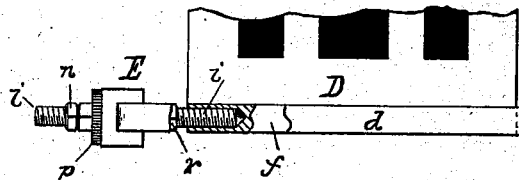


Fig. 8.



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UNITED STATES PATENT OFFICE.

DANIEL A. WOODBURY, OF ROCHESTER, NEW YORK.

ADJUSTING RELIEF-PLATE WEDGES OF SLIDE-VALVES.

SPECIFICATION forming part of Letters Patent No. 382,674, dated May 8, 1888.

Application filed May 7, 1887. Serial No. 237,495. (No model.)

To all whom it may concern:

Be it known that I, DANIEL A. WOODBURY, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Adjusting Relief-Plate Wedges of Slide-Valves, which improvement is fully set forth in the following specification, and shown in the accompanying drawings.

My invention herein shown and described relates mainly to a slide-valve operating in combination with a relief-plate and wedges for controlling the latter, but more particularly to the manner of adjusting the wedges with reference to the relief-plate. To hold the relief-plate so as to bear lightly against the valve requires a fine adjustment of the wedges. Heretofore several patents have issued to me relating to this subject—namely, Nos. 331,018, dated November 24, 1885; 331,858, dated December 8, 1885; 334,835, dated January 26, 1886; and reissued Patent, No. 10,661, dated November 10, 1885. In the inventions set forth in these patents the wedges have been adjusted with reference to a side of the steam-chest; but it is found that, owing to the differences in and variations of the expansion and contraction between the steam-chest and parts within it and a slight unavoidable looseness or yielding at the bearings of the relief-plate with the steam-chest, this manner of adjusting the wedges is not always reliable, for on account of these differences in the expansion and contraction of the parts and the looseness of the bearings of the relief-plate above mentioned the valve is liable at times to be too hardly or too lightly pressed by the relief-plate, as the case may be. It has also been found that when the two wedges are joined by a cross bar or head and the adjustment is controlled by a device having a bearing at a single point only thereagainst, there will be sufficient yielding to the parts under strain to admit of an inequality in the movements of the wedges, thereby allowing the relief-plate to bear more heavily upon one side of the valve than the other.

In my Patent No. 334,835, above cited, a device is shown the use of which is to cause a bearing near the head of each of the two joined wedges; but it is controlled from the wall of the chest, and is therefore subject to the difficulty growing out of the unequal expansion of the parts above mentioned.

The object of my present invention is to devise means by which the wedges may be adjusted directly by or from the corresponding inclined part upon which they respectively bear, for the purpose of eliminating from the matter of this adjustment of the wedges the element of uncertainty resulting from the unequal expansion and contraction and the looseness and yielding of the parts above mentioned.

In this invention the wedges and the corresponding inclined parts act with reference to each other only in the matter of this adjustment of the wedges. The invention is herein-after fully described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a view looking into the steam-chest, the cover thereof being omitted to show the parts within, a part of the relief-plate being broken away, and with a part of the wedge longitudinally sectioned along the parallel axes of one of the adjusters and the stop-screw; Fig. 2, a view of the parts seen in the direction indicated by arrow *x* in Fig. 1, the wedge being in part broken away, and with one of the adjusters and the actuating-rod in part transversely sectioned upon the dotted line *z z* in Fig. 1; Fig. 3, a view of the parts seen as indicated by arrow *y* in Fig. 1, the steam-chest, wedge, and a part of the relief-plate being sectioned on the dotted line *x' x'* in Fig. 1, portions of the relief-plate and wedge being broken away. Fig. 4, drawn to a much larger scale, shows the head and notched disk of the lower adjuster or tie for the wedge, seen in the direction in which Fig. 2 is seen, it being drawn to show more fully the form of said notched disk; and Figs. 5 to 8, inclusive, show modifications in the manner of connecting the wedge with the other parts and the manner of adjusting the wedge, Fig. 8 showing the parts seen in Fig. 7, viewed as indicated by arrow *y'*.

Referring to the parts, A represents the steam-chest, B the relief-plate, C the valve, D the cylinder, E the wedge, F the valve-rod, G the actuating-rod for the wedge, and H the actuating-lever, all of which parts are substantially like the corresponding parts shown in the various patents above referred to. The actuating-rod and valve-rod pass through stuffing-boxes I and K, at opposite

ends of the steam-chest, in the usual manner, the former rod being threaded in a nut, *a*, rigid with the steam-chest, for the purpose of moving the wedge longitudinally, as described in the patents above mentioned, the rod being connected with the wedge by means of a head, *b*, placed in a cavity, *c*, in the wedge-head.

The wedge *E* is formed with tapering parts or wedges proper, *d*, interposed between projections *f*, extending out from the cylinder and the relief-plate, which projections may be made separate from the cylinder, as shown in said reissued Patent No. 10,661, or cast in one piece with the cylinder, as herewith shown. The inclined surfaces of the wedge may be turned toward the cylinder, as shown in Figs. 5 and 8, or toward the relief-plate, as shown in Figs. 3 and 6, as may be convenient. When turned toward the relief-plate, the latter is formed with inclined bearings to meet the taper sides of the wedges, corresponding tapering cavities *e* being formed in its sides, in which to receive the parts *d*. If turned toward the projections *f*, the latter are cut down and formed with surfaces inclined to correspond to the taper of the wedge, the straight parts of the wedge in this case bearing against the relief-plate, which is formed without the cavities *e*.

The wedges proper, *d*, may be separate, as shown in Figs. 5 to 8, or joined by a rigid cross-head, *d'*, as shown in Fig. 1. In either case the ties or adjusters *i* are passed through the head of the wedge and into the part acting with the wedge formed with corresponding inclined surfaces or bearings for the wedges, which, as above stated, may be either the relief-plate or projections *f*. As shown in the figures on Sheet 1, the ties are formed with heads *o* and fitted with screw-threads in threaded sockets *l* in the relief-plate, jam-nuts *n* being provided to bear against the relief-plate. The ties are made to turn or slide freely in the wedge, and by turning them farther into the relief-plate by applying a wrench to the heads *o* the wedge will be drawn toward the relief-plate, or by turning them in the opposite direction allows the wedge to be moved farther away therefrom.

In the figures shown on Sheet 2 the ties are fixed rigidly into the parts acting with the wedges—that is to say, the parts having inclined surfaces corresponding to the inclines of the wedge—and, as in the other case, being fitted to move freely in the heads of the respective wedges.

In the constructions shown on Sheet 2 the wedge is moved by means of nuts upon the tie brought to bear against opposite faces of the wedge-head.

Attention is especially called to the fact that the adjustments of the wedge effected by these ties in all the forms shown are wholly independent of the steam-chest. The wedge in either case, with all the contiguous parts being acted upon alike by the steam, must expand and contract together, and thus not interfere with the fine adjustment of the wedge.

The looseness also of the bearings at *g* between the relief-plate and steam-chest, that may occur from wear or other causes, is by these constructions rendered powerless to interfere with or effect the adjustments. If the wedge is tied to the relief-plate, as in one case, (see Fig. 6,) both must move together, and the relation of the valve and relief-plate will not be altered; or if tied to the projections *f* (see Figs. 5 and 7) the relief-plate, resting against the straight parts of the wedge, which are parallel with the cylinder-face, will not move toward or from the valve by any motion upon said wedge. A screw, *r*, Fig. 1, threaded in the relief-plate, with its head in position to meet the cross-head *d'* of the wedge, serves as an adjustable stop to prevent the wedge being driven too far under the relief-plate when forced forward by the rod *G* to raise the relief-plate off the valve. A jam-nut, *s*, is provided to hold this screw in any position of adjustment. In the forms shown in Figs. 7 and 8 this adjustable stop *r* consists of jam-nuts between the head of the wedge and the part tied to the latter by the tie *i*.

The ties *i* are in each case provided with a disk, *p*, preferably formed with notches *t*, and, as a matter of convenience, further provided with radial lines *u*, leading from said notches, which lines may be spaced and numbered to suit convenience. As shown in the figures on Sheet 1, these disks are rigid with the ties *i*, and adjacent to these disks at *b'* the wedge is marked with lines *a'*, to act conjointly with the notches of the disks. By means of these disks the ties or adjusters may be set exactly alike to accurately adjust the wedge. If there are, for instance, one hundred equal notches formed in the disks and the adjusters be turned through a distance corresponding to one notch, the wedge would be moved to the amount of one one-thousandth of an inch, assuming the lead of the threads of the adjusters to be ten to the inch.

In the figures shown on Sheet 2 the tie is threaded its whole length and fixed rigid in the part having the incline corresponding to that of the wedge, passing freely through the head of the wedge, as stated. In this construction the serrated disk is internally threaded to fit and turn upon the tie like a nut, bearing upon the outside of the head of the wedge. A jam-nut, *n*, is placed to bear either against the opposing face of the head, as shown in Figs. 5 and 6, or against the outer surface of the disk, as shown in Figs. 7 and 8. This latter manner is necessitated where the stop-nuts *r* are placed upon the tie between the head of the wedge and the part tied thereto.

In case the forms in Figs. 5 and 6 are used, the actuating-rod *G*, with its stuffing-box and other associated parts, may be dispensed with, the wedge being adjusted and clamped rigidly to its counterpart by means of the jam-nut *n* and the threaded disk *p*. In this case there is no relative longitudinal motion of the wedge and its counterpart after the adjustment is

made in any particular case, like there is in the forms shown in the figures on Sheet 1 and Figs. 7 and 8, Sheet 2, where stops are provided to arrest the motion of said wedge, as above described.

5 In all the manners of construction herein shown the threaded tie and jam-nut are used, they being the most simple, convenient, and direct device for the purpose of tying the parts
10 together; but any of the forms or modifications in the means for controlling the adjustment of the wedges shown and described in my Patent No. 334,835, above mentioned, may be substituted for these, if arranged so as to take hold
15 upon or directly connect the wedges and the parts having the corresponding oppositely-inclined surfaces.

In lieu of the jam nut a friction-collar might be used, or a spring held to engage the notches
20 of the serrated disk would prevent its turning, and thus answer the purpose for which the jam-nut is used; but I prefer the forms herein shown, as being more simple and in which the adjustment of the wedge or wedges is less liable to become impaired, either from use or
25 from the operations of unskilled persons who may chance to have the engine in charge.

The important part of my invention rests in the matter of joining by adjusting ties the
30 wedges with their counterpart—that is to say, the part, whichever it may be, formed with inclined bearings to meet the inclines of the wedges, it being the cylinder in one case and the relief-plate in the other.

35 What I claim as my invention is—

1. In combination with a relief-plate and cylinder, wedges interposed between said cyl-

inder and relief-plate for controlling the latter, and adjusting-ties connecting said wedges on the one hand and said relief-plate or cylinder on the other hand, said ties having bearings at one end in said wedges and at the other end in said relief-plate or cylinder, substantially as shown and described.

2. In combination with a relief-plate and cylinder, interposed wedges, adjusting-ties connecting said wedges and said relief-plate or cylinder, and marked adjusting-disks.

3. A relief-plate and cylinder in combination with wedges for controlling said relief-plate, adjusting-ties connecting said wedges and said relief-plate or cylinder, and an adjustable stop for said wedges.

4. A relief-plate and cylinder, in combination with interposed wedges and adjusting-ties for said wedges and said relief-plate or cylinder, said adjusting-ties being held to have free longitudinal motion in said wedges or in said relief-plate or cylinder.

5. In combination with a relief-plate and cylinder, wedges interposed between said cylinder and relief-plate for controlling the latter, and ties for said wedges, said ties having bearings at one end in said wedges and at the other end in said relief-plate or in said cylinder, and held to turn on their respective axes without moving longitudinally in their bearings at one end and to be free to move longitudinally in their bearings at the other end, substantially as described and shown.

D. A. WOODBURY.

Witnesses:

E. B. WHITMORE,
M. L. McDERMOTT.