

(No Model.)

3 Sheets—Sheet 1.

R. BAYER.
ROTARY SLIDE VALVE.

No. 469,384.

Patented Feb. 23, 1892.

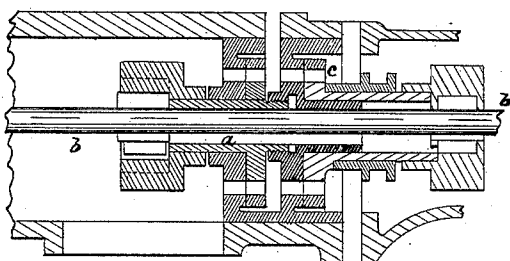


Fig. 1.

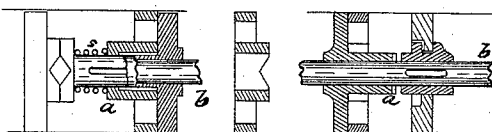


Fig. 2. Fig. 3. Fig. 4.

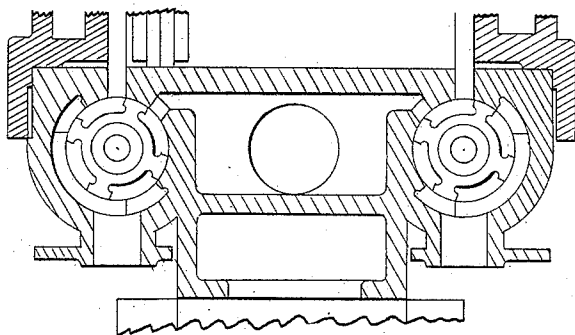


Fig. 5.

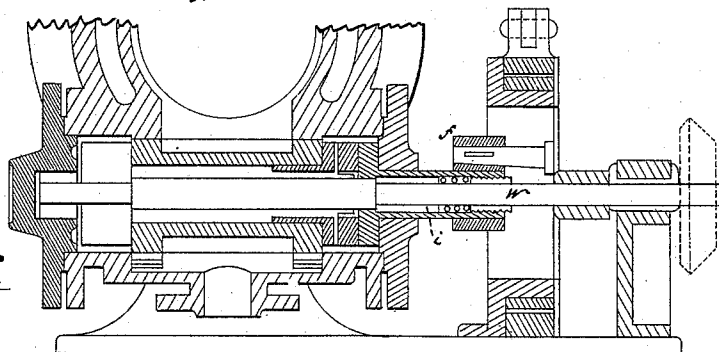


Fig. 6.

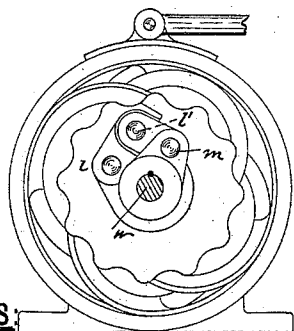


Fig. 7.

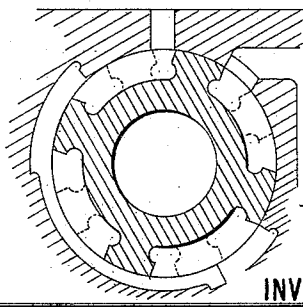


Fig. 8.

WITNESSES:

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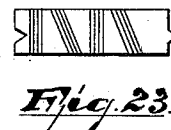
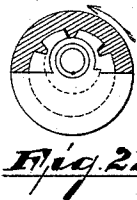
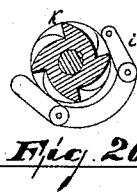
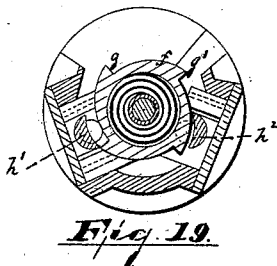
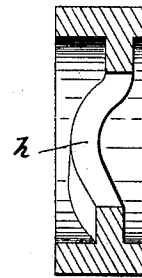
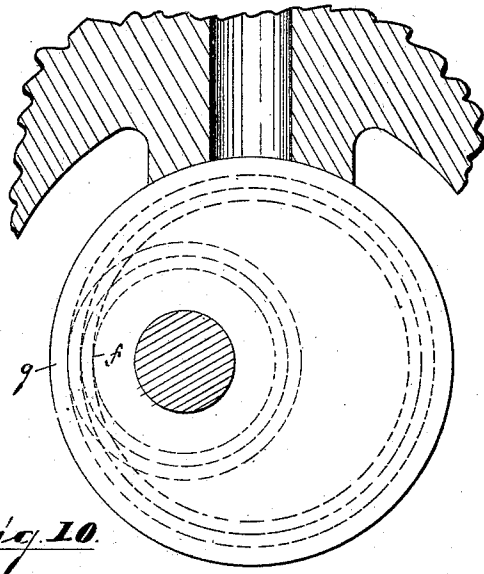
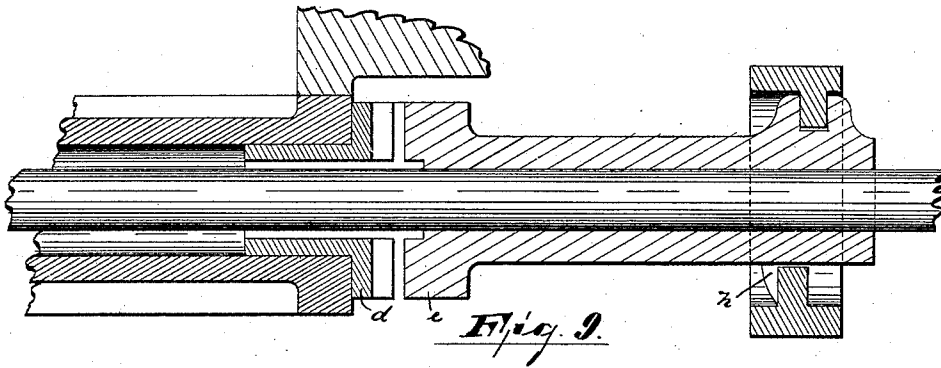
(No Model.)

3 Sheets—Sheet 2.

R. BAYER.
ROTARY SLIDE VALVE.

No. 469,384.

Patented Feb. 23, 1892.



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(No Model.)

3 Sheets—Sheet 3.

R. BAYER.
ROTARY SLIDE VALVE.

No. 469,384.

Patented Feb. 23, 1892.

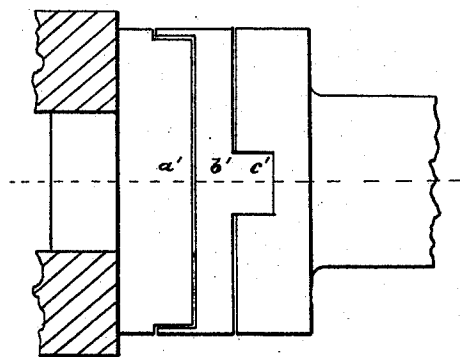


Fig. 12.

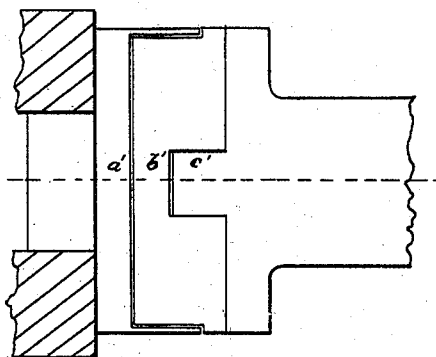


Fig. 13.

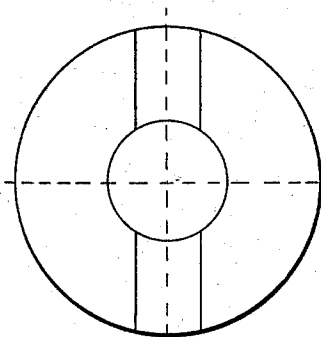


Fig. 15.

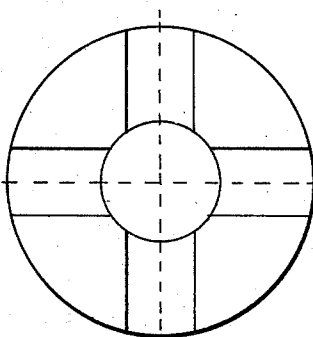


Fig. 16.

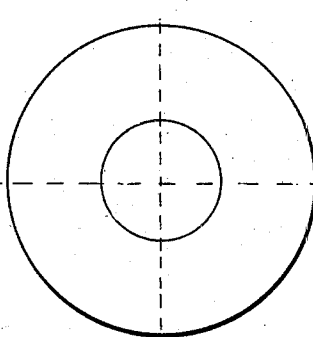


Fig. 17.

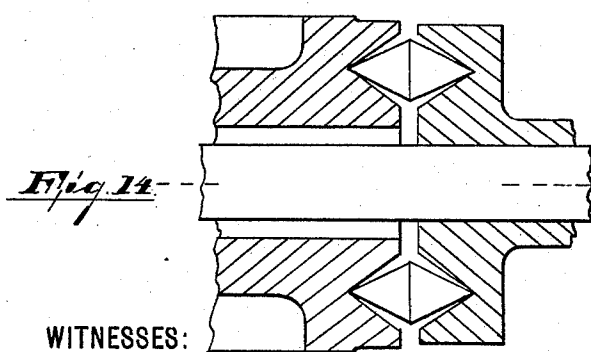


Fig. 14.

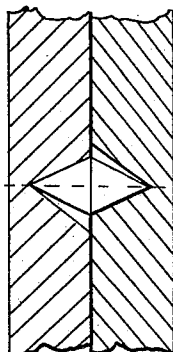


Fig. 18.

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Joseph H. C. Co.
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INVENTOR:

Rudolf Bayer
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UNITED STATES PATENT OFFICE.

RUDOLF BAYER, OF MUNICH, GERMANY.

ROTARY SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 469,384, dated February 23, 1892.

Application filed May 6, 1891. Serial No. 391,708. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF BAYER, engineer, a subject of the Emperor of Germany, residing in the city of Munich, in the Kingdom of Bavaria, Empire of Germany, have invented an Improved Rotary Slide-Valve or Means for the Adjustment, Regulation, or Distribution of Steam or other Gases or Fluids to Steam, Gas, or other Engines, Pumps, or Motors, of which the following is a specification.

My invention relates to a steam, gas, or other fluid distributor or regulator for compressed-air or other motors wherein the effective force or power is distributed and effectively employed by means of certain parts which are caused to rotate regularly or irregularly and at stated intervals or constantly connected and moved by a rotating axle. My method or system also permits the speed to be regulated by a centrifugal regulator or other like means. The connection of the various parts of the distributor is not a fixed one, but may be made constant or at stated intervals through the medium of tappets, springs, or other intermediate or intervening parts.

The main or characteristic part of my invention is a rotary slider or adjuster, either plain, tubular, or conical; but, according to the form of slide chosen, the connection between the slide and axle must be suitably disposed and arranged.

In the accompanying drawings, Figure 1 is a longitudinal section of one arrangement of my apparatus, showing the bore of the slide *c* and spindle *a*, which is suitably widened, so that the axle *b* can pass eccentrically through it. Thus the slide compensates for the wearing of the slide on its surface without requiring complicated gearing.

The plain or plate slide will generally be so applied that the axle of the gear simply goes through the slide and its rod or connection, as shown in section in Figs. 2, 3, and 4, where *b* shows the axle of the gear and *a* the plate slide with its spindle or tube.

In case of a tube slide the connection is not direct. It is effective only partly on the circumference by means of couplings, which transfer each rotation of the axle to the slide, at the same time allowing the latter to alter the seat of the axle, especially in the direction of the seat, as shown in section in Figs. 5, 6, and 7.

In Fig. 10 the periodical rotation of the slide is effected through the application of peculiar gearing or wheels fitted out of center. A tappet-cam can be arranged between the axle and slides, in which an interior or toothed curb is formed, and a cog-wheel *f* of the slide catches at the points *g f*. The axle is of course eccentrically placed in the slide, as shown. The surface, with its opening, will wear with the slide within certain limits, so that the slide neither loses its catching capacity nor its firm attachment in position.

In the several views at Figs. 9, 12, 13, 15, 16, 17, and 18 the slide and parts of a crossed grooved coupling are shown, wherein *a'* can join the slide *b'* and *c'* the axle, the latter being either firmly or turnably jointed to the axle, as in Figs. 14, 17, and 18, exhibiting different views of a coupling with nuts, in which *d'* belongs to the slide attached to the axle, as before referred to. It is evident that many more couplings of a similar kind may be arranged, according to the particular purpose; but the principle is that plain as well as tubular slides are so arranged that they can turn either constantly or at stated intervals under any circumstances will compensate for the wearing under the pressure of steam, gas, or fluid or of springs. The stated intervals can be effected by various means, the purpose or object of which is to create a rotating slide or precision.

In order to avoid the shocks which would naturally accompany rotations changed from periodical to constant, or vice versa, the following method is provided, as shown in Fig. 9. On the axle *b'* is a tube with clutch attached, with groove and spring regularly turning with the axle or allowing same to be moved to and fro in the direction of the axle. The end of the slide shows a pair of clutches *d*, the slide itself being shown in cross-section and is hollow. The axle goes through the same and carries a tube turning with the axle, but, being moved lengthwise with its clutches, alternately enters into the clutches *d* and so moves the slide, and when drawn out of the clutches leaves the slide in its normal position. A periodical turning of the slide is thus effected, enabling it to disengage itself from the center without losing its effect. This movement is caused by a forked link, which when the axle rotates touches a zigzag-shaped rib *h*, and the tube is thereby caused to move

to and fro, periodically catching the slide with its end or point and dropping or leaving it respectively. The clutches *e* catch the opposite clutches *d*, and it is immaterial in the construction whether a tube slide, as shown in detail in Fig. 9, or a plate slide, as shown in Fig. 5, be used. The ring with the zigzag rib is shown separately in part in Fig. 11.

In Figs. 2, 3, and 4 the zigzag form of rib is substituted by a ring shown as provided with shoulders. The tube on the axle is moved through the shoulder into the clutches *r* of the slide and pressed out of them by the spring *s*, thus alternately catching and dropping the slide connection. In both cases the control of the steam or gas "phases" in transit is perfect from the outside and during action as regards the reversing of the slide. A similar principle is shown in the views Figs. 5, 6, and 8.

In other constructions the alternately catching and dropping of three slides may be effected by means of springs arranged or adjusted in the core of the axle and catching with its outer end the slide or that part which is jointed or connected to the slide. It is evident that, the axle being regularly rotated, the slide may irregularly run ahead or behind and yet the tension of the spring will remain the same.

Fig. 8 shows the tube slide in cross-section for the steam or other pressure to enter the same and to occupy the several positions of expansion and compression. The slide action thus effects a quarter-rotation, one up and one down stroke, and repeats the connection or position between axle and slide, or the tube slide may be substituted for a plate slide.

Figs. 19, 20, and 21 are sectional views wherein the slide guides its spindle through the cover outside the slide, in which a steam-tight disk *f* is wedged upon the axle, which carries in its interior (see Fig. 19) the driving-spring and on its outside teeth *g* and *g'*, which stop the disk when the latter is pushed by the spring in its endeavor to rotate it by the trunnions *h'* and *h*². These trunnions are so placed that *h'* stops the slide *h*² in both opening and closing, and both are so formed as to free the disk *f*, and in consequence the slide. Thereupon the disk, with the corresponding tooth, catches the other trunnion and remains there till released, when the first action again takes place, and so on. The trunnions have at their sides arms *e*, which are pressed upon the shoulder *k* by means of springs or other suitable means for giving tension. These shoulders are directly fixed on the axle and rotate with the latter, lifting alternately the arms *i*, Fig. 20, and consequently turning the trunnion *h* and catching and dropping the slide, while simultaneously the tension-power of the springs is continually renewed. If the shoulders *k* are made broad and slanting in the manner of the regulating-shoulders of the valves of steam-engines and arranged like them, the engine

could be regulated at will during action through the mere to-and-fro motion of the shoulder.

Another variation of mechanism is shown in Figs. 5, 6, and 7, where a tube slide is employed divided in four parts, as before described. (See Fig. 8.) The slide-spindle is worked and pushed as a driving-spindle through the stop mechanism and the slide to the core of the spring, which on being turned becomes more compressed or wound up. This spring is with its outer end thus directly fixed to the slide and turns according to the direction the axle is turned, causing the slide to move spasmodically or give impulse from its position, and is kept in tension through the axle *w*. The catching and dropping of the slide is effected by means of the following mechanism, (shown in Fig. 6:) The right end of the slide shows one of the before-mentioned couplings. On the free end a tube *i* covers the axle *w* steam-tight. On the tube *i* is an arm *f*, fixed through a stud on an eccentric point of the axle, which can also be done by fixing a true eccentric instead. Around this eccentric point is an oscillating connection, as seen in cross-section in Fig. 7, which acts against a firm ring of teeth, touching one tooth after another, according to the position in which the slide is intended to be caught. The end *i'* of the connection *i* may carry a roller to guard the point *i'* when it touches the aforesaid ring *i* and again is connected with the tension-rod *n*, which is rotated by the crank-stud *m*, and this crank, being connected with the axle *w*, causes the entire combination to revolve. The teeth of the ring are radiated or bent toward the center of a circle. The entire mechanism is capable of being so arranged and operated as to give forward and backward motion. Instead of one particular form of spring being used I may employ two separate springs twisted so as to act in reverse conditions and suiting the rotation or operation either in one direction or the other.

Figs. 22 and 23 illustrate another mode or method which may in some cases be adopted instead of that shown in Figs. 19, 20, and 21.

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

A valve for steam or other engines or motors, consisting of a rotary slide, said slide being either plain, tubular, or conical in shape and adapted to be rotated regularly or irregularly, a hollow spindle carrying said slide, and an axle eccentrically located in said spindle and adapted to rotate the same, all parts being arranged to operate substantially as described, and for the purposes set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

RUDOLF BAYER.

Witnesses:

C. HOENSTEIN,
G. COX.