(No Model.)

C. E. VAUGHN.

VALVE MECHANISM FOR ENGINES.

No. 491,670. Patented Feb. 14, 1893.

FIG. 1.

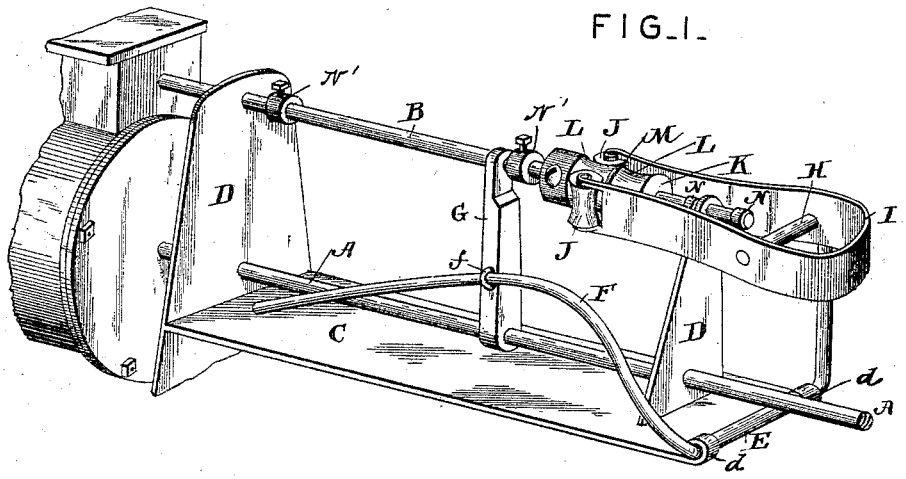


FIG. 2.

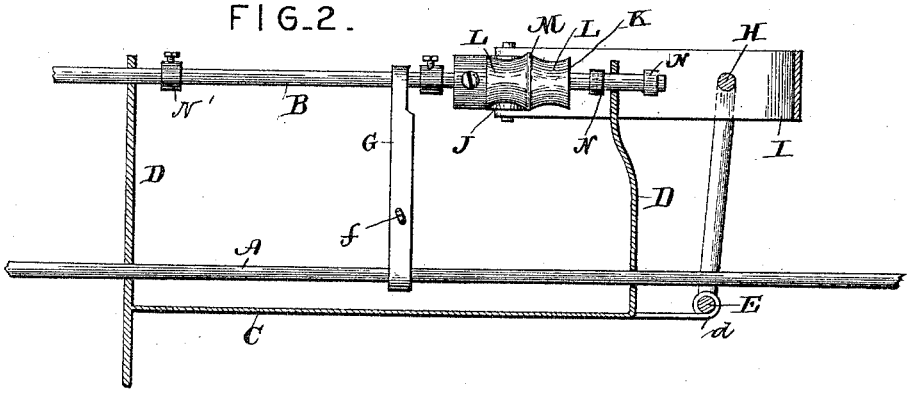


FIG. 3.

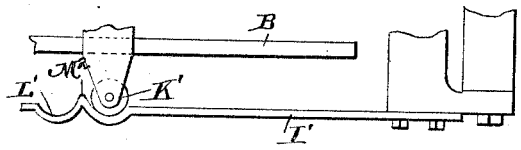
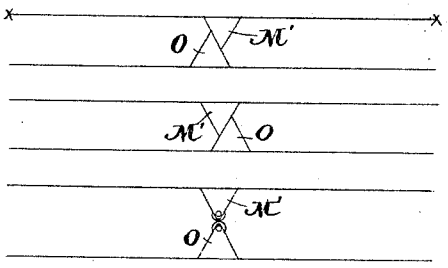


FIG. 4.



Witnesses

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VALVE MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 491,670, dated February 14, 1893.

Application filed May 3, 1892. Serial No. 431,738. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE EUGENE VAUGHN, a citizen of the United States, residing at East Palestine, in the county of Columbiana and State of Ohio, have invented a new and useful Valve Mechanism for Engines, of which the following is a specification.

This invention relates to valve actuating mechanism; and it has for its object to provide an improved mechanism for operating valves of reciprocating engines, and particularly those acting independently of the ordinary crank and fly wheel, such as direct acting steam pumps and water motors. And the main and primary object of the invention is to provide means which not only simplifies the construction of ordinary valve motions, but also at the same time attains a positive motion, absolutely avoiding any dead point and also giving a gradual start to the piston after reversing for the purpose of giving easy seating to the valve in pumping devices and analogous machines.

With these and many other objects in view which will readily appear to those skilled in the art, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings;—Figure 1 is a perspective view of a valve actuating mechanism connected with the piston and valve rod of an ordinary direct acting engine. Fig. 2 is a vertical longitudinal sectional view of such mechanism. Fig. 3 is a detail plan view of a preferred modification of the same. Fig. 4 is a detail view illustrating the principle involved in the preferred construction of the mechanism.

Referring to the accompanying drawings:—A represents the piston rod of an ordinary direct acting engine while directly above the same, and working in the valve chest of said engine is the parallel valve rod B connected with any suitable reciprocating valve for admitting the steam at each end of the cylinder alternately. The said piston rod and valve rod may work through any suitable supporting frame C, which serves to carry and support the valve operating mechanism and as illustrated is provided with the upwardly extending arms D; but the construction of such frame is immaterial and is varied to suit the particular case. Journaled or fulcrumed at *d* upon said frame adjacent to one of the arms thereof is the short rock shaft E carrying at one end the long curved lever F which passes through the eye *f* connected to the operating arm G mounted upon and carried by, the reciprocating piston rod A said arm having an upper perforated end loosely sliding over the valve stem. It can be readily seen as the said piston rod reciprocates that the eye *f* carried by the arm G rides over the curved or bowed lever F and raises and lowers the same during each stroke so that the short rock shaft E is oscillated and rocks the arm H carried upon the opposite end thereof. Loosely connected with the upper end of the arm H is the U-shaped spring yoke I loosely connected with said arm and reciprocated in a line with the direction of travel of the valve rod and parallel with the piston rod. The opposite spring ends of the spring yoke I, normally press toward each other and therefore toward the valve rod B which the same embrace and are provided at such ends with the deeply grooved or concaved anti-friction rollers J forming wedges and are adapted to contact with opposite sides of or clasp between their embrace the grooved wedge block K secured to said valve rod. The said grooved wedge block K is provided with the parallel grooves L parallel with each other and separated by the intermediate sharply inclined ridge M forming the wedge and against and over which the opposite spring-pressed wedges J are designed to bear and pass, to throw the valve in either direction as will be readily seen. In order to regulate the proper throw of the valve carried by the valve rod D the said fixed wedge block is so constructed that the distance from the summit of the ridge M thereof to the bottom of the groove *l* is somewhat less than the full travel of the valve, but of such a distance or length as is sufficient to carry the valve past the dead point. Now it will be readily seen that at the limit of either stroke of the piston rod, the spring-pressed wedge rollers J closely fit and embrace one of the grooves in said valve rod wedge block. As the piston rod moves in either direction the curved lever is raised or lowered accordingly and therefore causes the spring yoke to be either drawn away from or toward the valve chest. Supposing the piston to be starting upon its outward travel it will be readily seen that the spring yoke is

shoved in a reverse direction and causes the wedge rollers at the outer ends thereof, to first move the valve to the limit of its travel and then commence to climb the intermediate ridge M and this movement is regulated by the limiting stops N upon said valve rod and working on either side of one of the standards D, and thus a gradual full induction of steam and an easy start is given to the piston. By the time the piston has reached the limit of its outstroke, the spring pressed rollers pass over the summit of the ridge and on account of the incline thereof sharply draw the valve rod out and reverse the valve, and upon the instroke of the piston rod the said rollers commence to again travel toward the ridge and draw the valve out to its full limit of movement before again passing over the ridge and throwing the valve back again as already described.

If found necessary buffer collars N′ may be adjustably secured to the stem B, so that the arm G sliding over said stem may contact therewith at the point at which the motion is to reverse, to give an added start to the motion to cause the stem to act promptly.

The principle involved in the alternate reciprocation of the valve stem or rod is clearly illustrated by the typical diagram of Fig. 4. It will be seen by reference to said figure that the ridge or wedge M intermediate of the grooves of the tappet, is represented by a single cone shaped wedge M′ which may be of course duplicated and moves in a straight line back and forth with the line x—x corresponding to the valve rod, while working over each face of said cone and yieldingly contacting therewith is a reversely turned cone O corresponding to the spring pressed rollers, which cone rides back and forth over the summit of the cone M′ and therefore reciprocates the valve rod. It will also be seen that the said cone shaped blocks or wedges may be provided with anti-friction rollers at their apices as illustrated in Fig. 4. Furthermore it will be noted that the modification illustrated in Fig. 3 will most readily suggest itself to those skilled in the art. In such figure instead of the spring yoke I loosely connected with the rock arm, a corresponding spring yoke I′ is used having the outer wedge ends provided with the parallel grooves L′, separated from each other by the intermediate inclined ridge M^2 corresponding to the grooved and ridged wedge block, while the valve rod carries a deeply grooved or concaved wedge roller K′ corresponding to the rollers J and which engages said grooves and rides over the summit of the ridge M^2 as the spring arm I′ is reciprocated to correspond with the movement already described.

It is to be observed that the principle involved in the present application may be employed and used in a variety of different mechanical constructions without departing from the spirit of my invention, and such modifications as will readily suggest themselves and any changes of construction that may be necessary, I reserve the right to use.

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

1. In a valve mechanism for engines, a fixed concaved wedge secured to the valve rod, and a corresponding reciprocating concaved wedge yieldingly contacting with the sides of said fixed concaved wedge and connected with the piston rod, substantially as set forth.

2. In a valve mechanism for engines, a fixed inclined wedge connected with the valve rod, and corresponding wedge rolls yieldingly contacting with the sides of said fixed wedge and connected with the piston rod, said wedge rolls riding over the ridge of the fixed wedge from side to side, substantially as set forth.

3. In a valve mechanism for engines, a fixed wedge block connected with the valve rod and having parallel grooves and an intermediate inclined ridge between said grooves, and adjacent wedge rolls pressing into said grooves and yieldingly riding over the intermediate ridge from one of the grooves to the other to reciprocate the valve stem or rod, substantially as set forth.

4. In a valve mechanism for engines, the combination with the reciprocating piston and valve rods; of a fixed inclined wedge carried by said valve rod, spaced buffers adjustably secured to the valve rod, an operating arm carried by the piston rod and sliding upon said valve rod between said buffers and provided with an eye on one side of the same, a suitably supported rock shaft having a curved or bowed lever arm passing through said eye and an upwardly extending rock arm, and a reciprocating spring yoke connected with said rock arm and carrying at its ends opposite wedge rolls yieldingly contacting with said fixed wedge, substantially as set forth.

5. In a valve mechanism for engines, the combination with the reciprocating piston and valve rods; of a fixed wedge block secured to the valve rod and provided with deep parallel grooves and an intermediate inclined ridge between said grooves, an operating arm carried by said piston rod and provided with an eye, a rock shaft having a curved or bowed lever arm passing through said eye and an upwardly extending rock arm, and a reciprocating spring yoke connected with said rock arm and carrying at its opposite ends grooved wedge rollers yieldingly contacting with said fixed wedge and working over the intermediate ridge from one of said grooves to the other to sharply reciprocate the valve stem, substantially as set forth.

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

C. EUGENE VAUGHN.

Witnesses:
W. S. EMMONS,
T. E. RALEY.