

(No Model.)

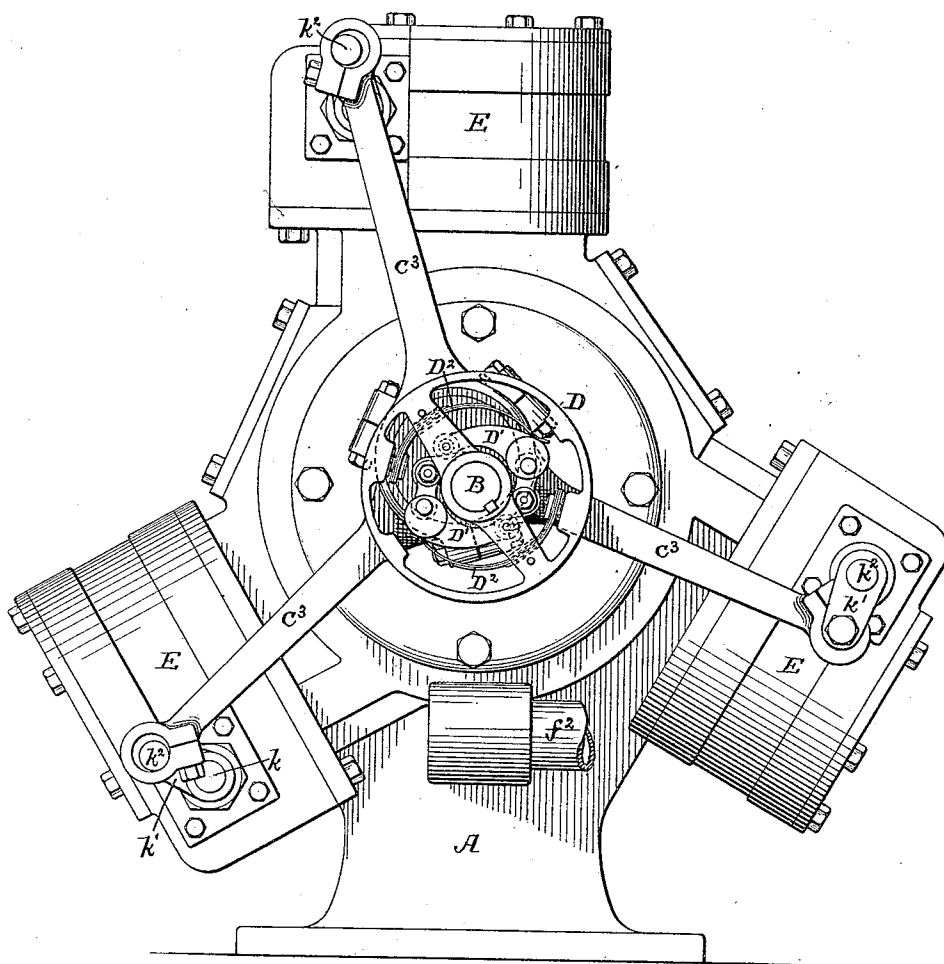
5 Sheets—Sheet 1.

N. J. TUBBS.
TRIPLE CYLINDER STEAM ENGINE.

No. 511,868.

Patented Jan. 2, 1894.

FIG. 1.



Witnesses
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Jas. I. Skidmore.

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By his Attorneys
Harrison & Harrison

(No Model.)

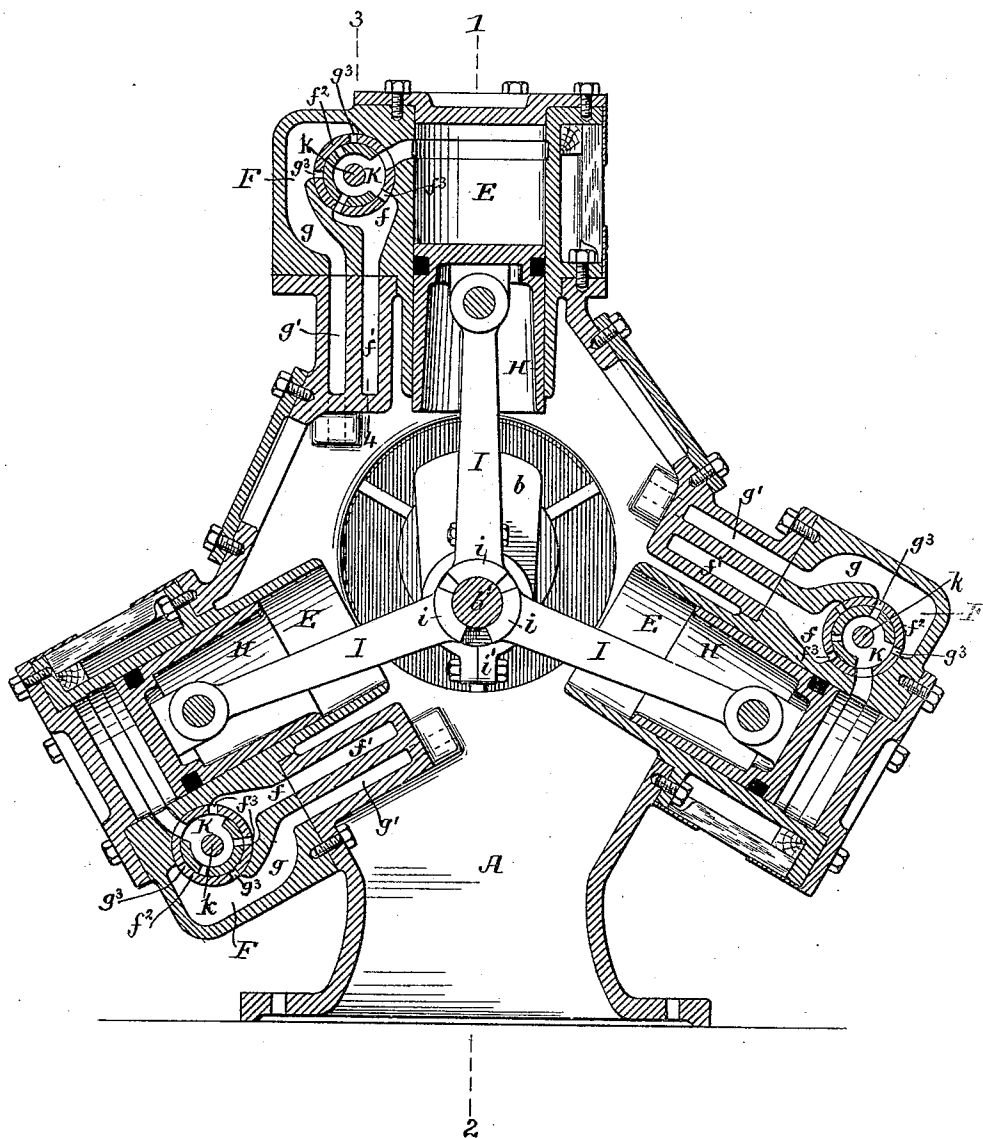
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FIG. 2.



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(No Model.)

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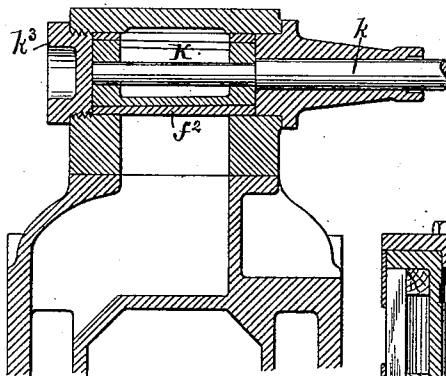
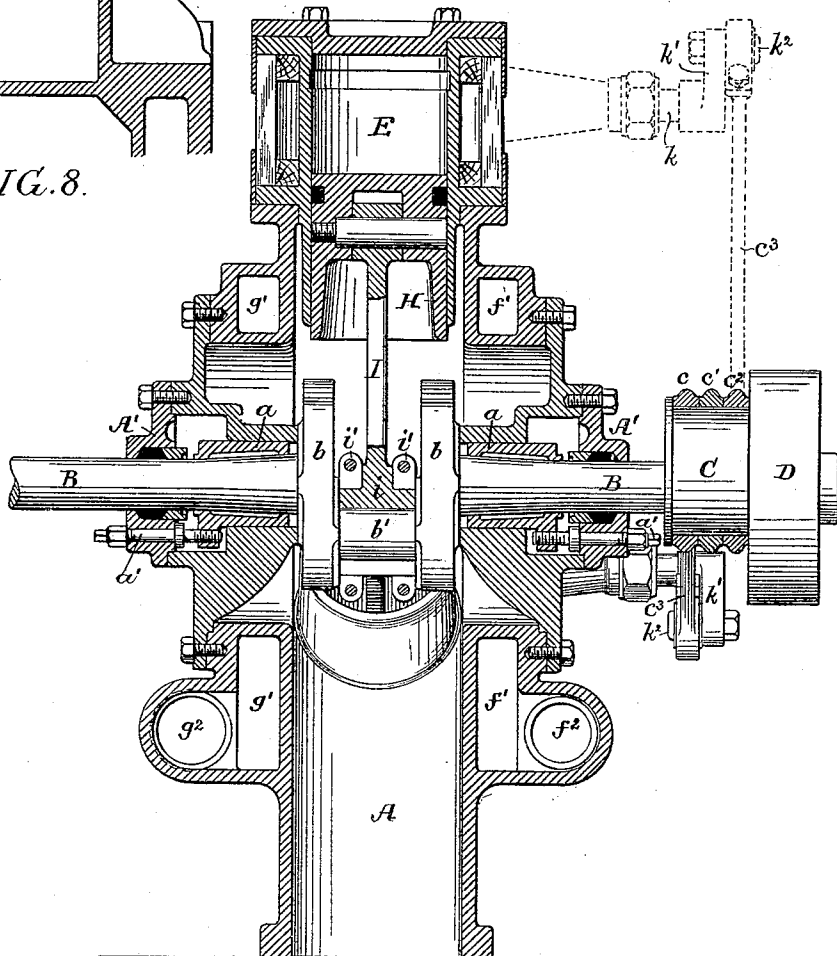


FIG. 8.

FIG. 3



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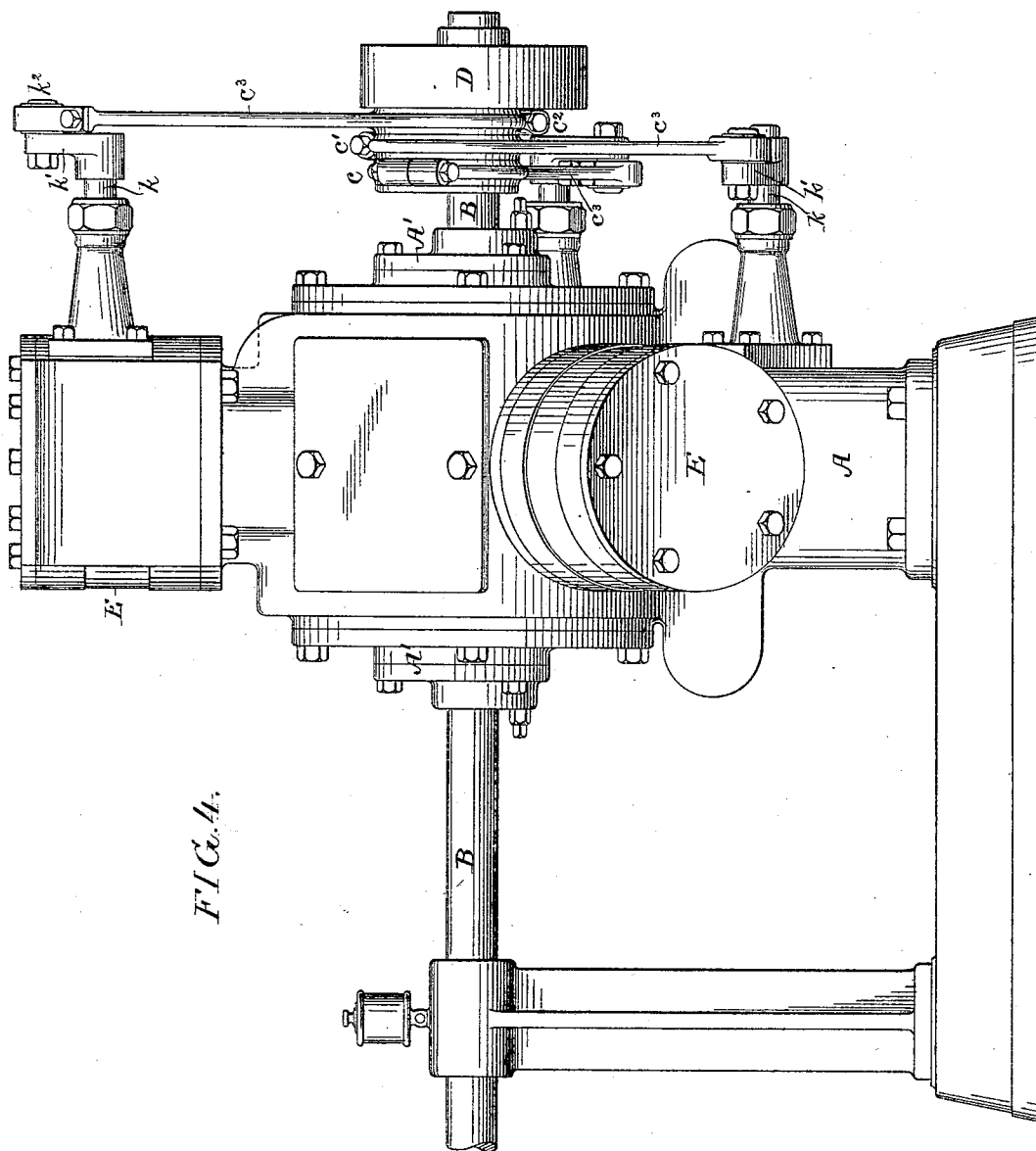
(No Model.)

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N. J. TUBBS.
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Patented Jan. 2, 1894.

FIG. 5.

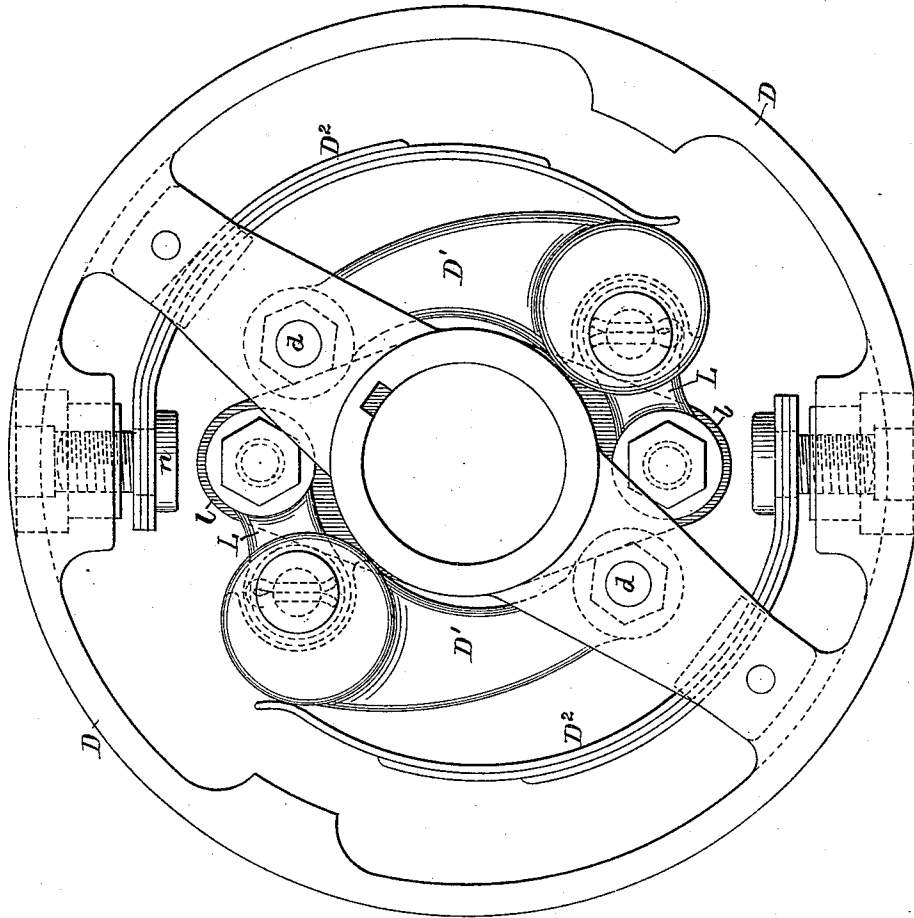


FIG. 6.

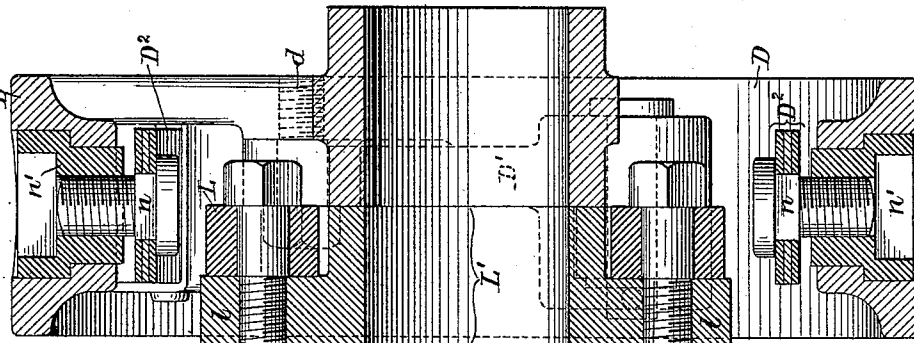
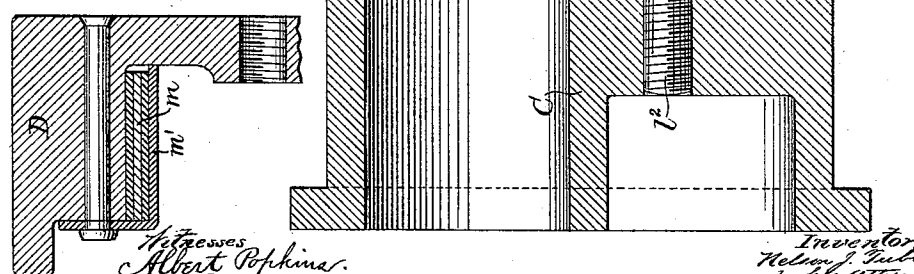


FIG. 7.



Witnesses
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UNITED STATES PATENT OFFICE.

NELSON J. TUBBS, OF FRONT ROYAL, VIRGINIA.

TRIPLE-CYLINDER STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 511,868, dated January 2, 1894.

Application filed February 23, 1893. Serial No. 463,350. (No model.)

To all whom it may concern:

Be it known that I, NELSON J. TUBBS, a citizen of the United States, residing in the city of Front Royal, Warren county, State of Virginia, have invented certain new and useful Improvements in Triple-Cylinder Steam-Engines, of which the following is a specification.

The object of my invention is to construct a three cylinder, single acting steam engine in such a manner that it will be compact, made of few parts readily set up, and in which the steam and exhaust passages are in the frame of the engine.

Referring to the accompanying drawings:— Figure 1, is a side view of my improved three cylinder steam engine. Fig. 2, is a vertical sectional view; and Fig. 3, is a transverse sectional view on the line 1—2, Fig. 2. Fig. 4, is an end view. Figs. 5, 6 and 7, are views of the governor; and Fig. 8, is a sectional view on the line 3—4, Fig. 2, showing one of the valves in section.

A is the frame of the engine, having bearings *a a* for the crank shaft B, having two disks *b b*, between which is mounted the crank *b'*. This crank shaft is tapered from each disk, and the bearing is tapered to fit the shaft; the bearings can be taken up by the screw studs *a'*, which, when turned, move the bearings toward or from the crank portion of the shaft.

Beyond the bearings are heads *A'*, containing the stuffing boxes, and to these heads are adapted the studs *a'*, as will be readily seen on referring to Fig. 3.

On the shaft B is an eccentric C, on which are mounted three eccentrics *c, c', c''*, which control the movement of the three valves of the engine.

D is the governor which is attached to the eccentric, and adjusts it upon the shaft as described hereinafter.

E are the three cylinders of the engine, formed preferably of castings, fitted to the frame of the engine, as shown in Fig. 2; these castings also contain the valve chamber F, and steam inlet port *f*, and outlet port *g*. The steam inlet port *f* is connected to an annular passage *f'* in the frame A, as clearly shown

in Fig. 3, this passage being connected to the steam inlet pipe *f''*.

The exhaust passage *g* is connected to a passage *g'*, in the frame of the engine opposite to the passage *f'*, and is connected to the exhaust pipe *g''*, as clearly shown in Fig. 3.

Working within the cylinders E are pistons H, of the cup form, connected to the crank *b'* of the shaft B by connecting rods I. These rods have heads *i* shaped as shown in Fig. 2, and bound together and to the rod by two ring couplings *i'* one situated on each side of the connecting rod, as clearly shown in Fig. 2 and 3. Thus the rods have free movement to allow for the different positions of the pistons at the same time always having a good bearing upon the crank shaft.

K are the valves; these valves are shells connected to rods *k* which have at the outer end cranks *k'* provided with pins *k''*, to which are attached the arms *c''* connected to their respective straps on the eccentric C, so that as the eccentric moves, the valves have a rocking motion within the bushing *f''*. This bushing *f''* has ports *f'''* forming communications with the live steam inlet passage *f*, and ports *g'''* forming communication with the exhaust steam passage *g*, and the valve has passages aligning with these passages in the bushings at certain portions of the stroke for the purpose of admission and exhaust of steam, to and from the cylinder.

While each valve is mounted independently upon the eccentric, it can be detached without detaching the other valves, but when mounted upon the eccentric will move with precision, and in time with the other valve.

I will now explain the governor for adjusting the position of the eccentric in respect to the shaft, referring particularly to Figs. 5 and 6. Within the governor ring D, shown in Fig. 3, are pivoted two levers *D'*, at *d* to the spokes of the ring D. These levers are weighted at their outer ends, and springs *D''* secured to the ring bearing against the outer ends of the levers, tending to force them toward the center of the shaft. Pivoted to the levers are links L pivoted to projections *l* of a ring *L'*, loose upon the shaft. This ring *L'* is secured to the eccentric C by bolts *l''*, as

clearly shown in Fig. 6, so that if the speed of the engine is increased the levers will tend to fly out against the action of the springs, and turn the eccentric upon the shaft, cutting off sufficient of the steam to reduce the speed of the engine. The springs D^2 are confined to the ring at m , by a strap m' , shown in Fig. 7, which is secured to the ring by a bolt or rivet m^3 as clearly shown in said figure. The extreme inner end of the spring is adjustably secured to the ring by means of a set screw n , which passes into a nut n' , set into a recess in the ring D , so that by adjusting this set screw more or less tension can be given to the springs, and consequently, the governor can be regulated as required. This adjustment is effected by turning the socket nut n' by means of a wrench outside of the governor rim. The valves K , can be readily removed from their bushings for the purpose of repair or cleaning, by simply removing the plug k^3 , shown in Fig. 8, and uncoupling the rod k from the eccentric and withdrawing the valve through the opening. The valve and bushing are tapered so that a snug fit is insured. By making the frame as described, I am enabled to inclose the cylinders, cranks and connecting rods so as to prevent the accidental displacement of any of the parts, and furthermore, the surfaces are kept free from dust. Openings are made, however, on each side of the frame, and these openings are provided with doors so that in case of repairs access may be had to the interior of the engine.

I claim as my invention—

1. In a steam engine, the combination with the cylinder, provided with steam inlet and exhaust passages, of a rotary valve having three ports, one larger than the others controlling the cylinder passage, and a steam inlet and exhaust passage in the valve bushing the said bushing being provided with five ports, two for inlet and two for exhaust steam,

and one larger than the rest, communicating with the cylinder, with means for operating said valve, substantially as described. 45

2. The combination in a three cylinder single acting engine, of the frame, the cylinders mounted in said frame, crank shaft, connecting rods and pistons for each cylinder, valves for admitting steam to, and exhausting steam from, the cylinders, passages in one side of the case for the live steam, and a passage in the opposite side of the case for the exhaust steam, and mechanism for operating the said valves, substantially as described. 55

3. The combination of the cylinders, a valve for each cylinder, said valve being of the oscillating cylindrical type, a bushing for said valve, ports in the bushing and ports in the valve, a stem on said valve, connected to the valve mechanism, said valve being adapted to be removed from its seat, with a cap closing the opening through which the valve can be removed, substantially as set forth. 65

4. The combination in a three cylinder single acting engine, of the three cylinders mounted as described, a frame supporting said cylinders, a shaft mounted on said frame, connecting rods and pistons inclosed within the frame, annular steam chambers or passages within the casing on each side, one for the exhaust and one for the live steam, passages extending from the side passages to the valve chest of each cylinder, independent valve for each cylinder, an eccentric, independent eccentric rods mounted on said eccentric, and connected to their respective valves, substantially as described. 75

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 80

NELSON J. TUBBS.

Witnesses:

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C. A. NICKERSON.