Feb. 17. 1925.

1,526,629

C. COLLINS

ADJUSTABLE VALVE OPERATING MEANS

Filed Oct. 9, 1922

2 Sheets-Sheet 1

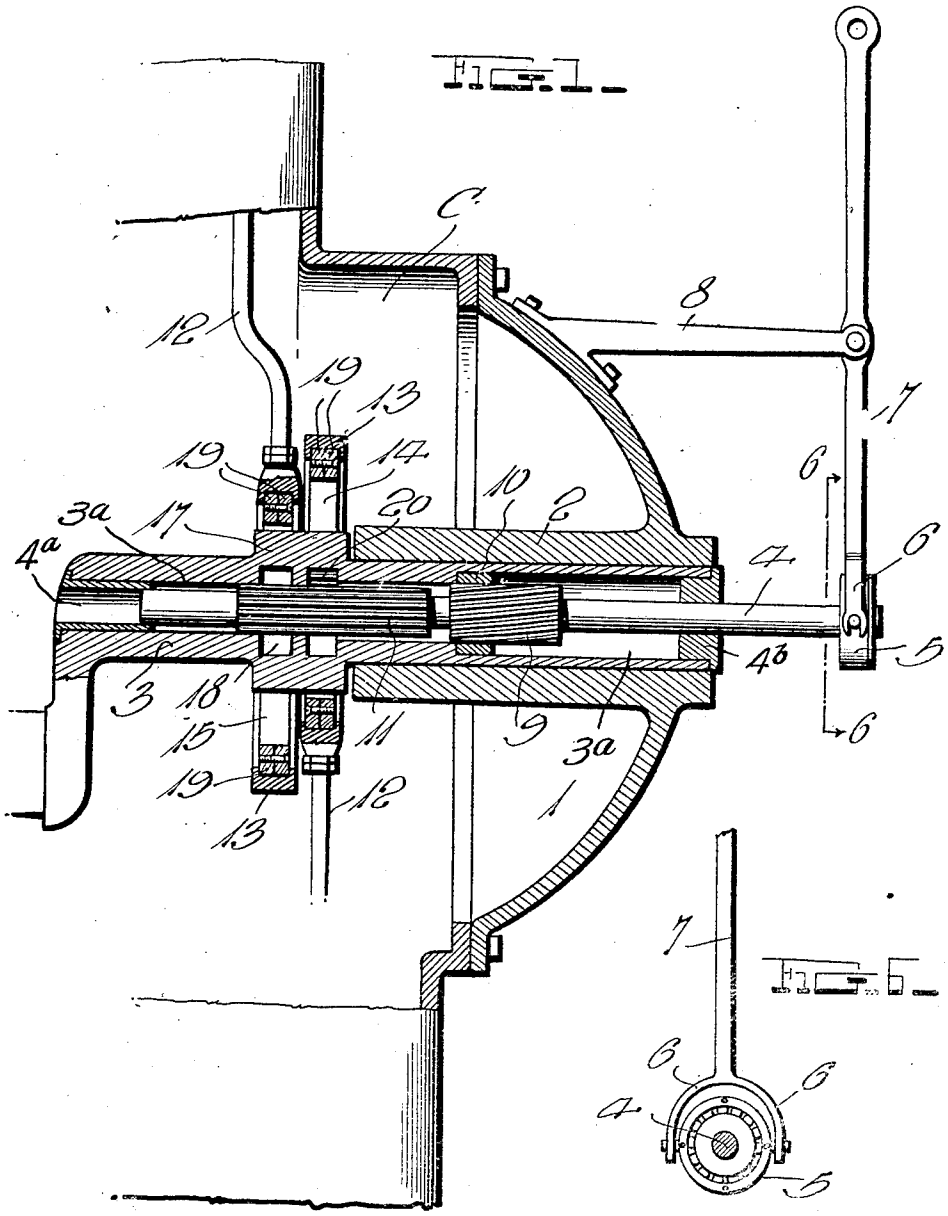


FIG. 1.

FIG. 6.

Inventor

C. COLLINS

Witness
H. Woodard

By H. B. Williamson

Attorneys

Feb. 17, 1925.

1,526,629

C. COLLINS

ADJUSTABLE VALVE OPERATING MEANS

Filed Oct. 9, 1922

2 Sheets-Sheet 2

FIG. 2.

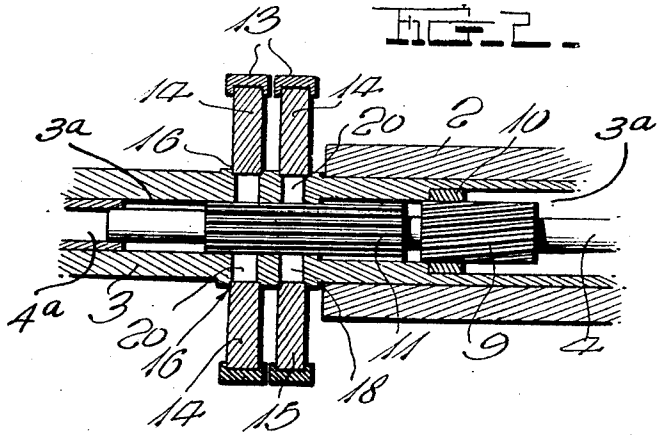


FIG. 3.

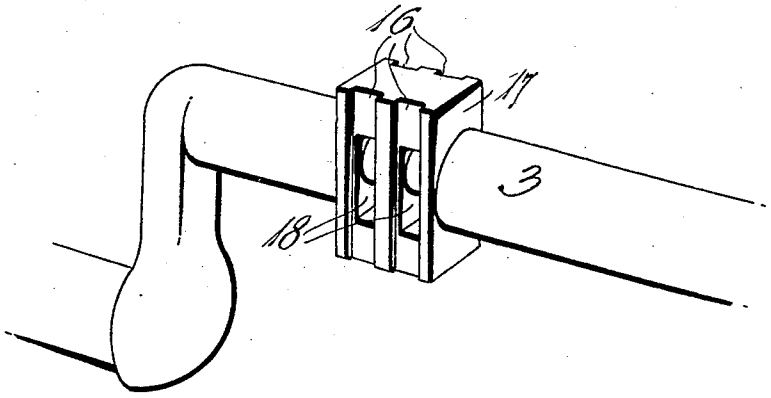


FIG. 4.

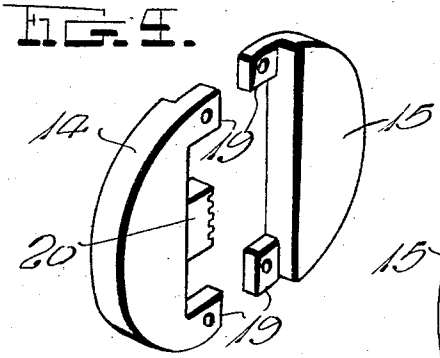
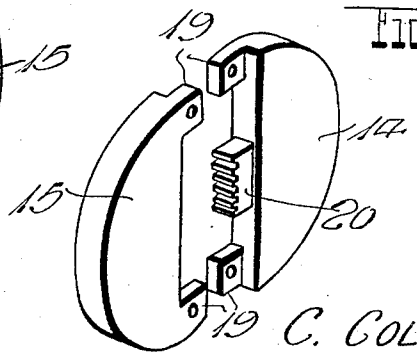


FIG. 5.



Witness
H. Woodard

Inventor
C. COLLINS

By H. B. Williamson & Co

Attorneys

Patented Feb. 17, 1925. 1,526,629

UNITED STATES PATENT OFFICE.

CALHOUN COLLINS, OF BAKERSFIELD, CALIFORNIA.

ADJUSTABLE VALVE-OPERATING MEANS.

Application filed October 9, 1922. Serial No. 593,373.

To all whom it may concern:

Be it known that I, CALHOUN COLLINS, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented certain new and useful Improvements in Adjustable Valve-Operating Means; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved valve actuating means and one object of the invention is to provide valve actuating means for use in connection with a steam engine, the valve actuating means including eccentric elements carried by the crank shaft and adjustable so that the operation of the valve with respect to the rotation of the crank shaft may be controlled.

Another object of the invention is to provide improved means for moving the eccentric radially of the shaft and to so construct the adjusting means that it may include a shaft which extends longitudinally through one end portion of the crank shaft and have a spur gear element meshing with rack portions upon the eccentrics.

Another object of the invention is to so construct the adjusting means that the shaft which extends through the crank shaft may have a worm portion engaging with a cooperating worm element carried by the crank shaft to impart rotary movement to the adjusting shaft when moved longitudinally of the crank shaft.

Another object of the invention is to so construct the eccentrics that they may be easily removed and after being cleaned or repaired, easily and quickly put back in place.

Another object of the invention is to provide improved means for permitting the eccentric to be readily moved radially of the crank shaft but prevented from having movement longitudinally thereof or circumferentially thereof.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view showing a fragment of an engine with the improved mechanism associated therewith.

Figure 2 is a sectional view through a portion of the crank shaft taken longitudinally and at right angles to the view shown in Fig. 1.

Figure 3 is a perspective view of the crank shaft.

Figure 4 is a perspective view of one of the eccentrics.

Figure 5 is a perspective view of the second eccentric.

Figure 6 is a sectional view through the shifting shaft taken along the line 6—6 of Fig. 1.

This valve operating mechanism is for use in connection with an engine which includes a crank case indicated in general by the letter C and having at its side a bearing 1 including a centrally disposed and longitudinally extending bearing sleeve 2 through which extends the end of the crank shaft 3. This crank shaft 3 has its end portion bored or hollow as at 3^a so that the adjusting shaft 4 may be received therein and have its outer end portion extending into the bearing 5 which is pivotally engaged by the forks 6 at the lower end of the adjusting lever 7, which is pivotally mounted by means of a bearing bracket 8 carried by the bearing cup 1. It will thus be seen that when the lever 7 is moved upon its pivot, the adjusting shaft 4 may be moved longitudinally of the crank shaft 3. Since the adjusting shaft 4 is mounted in a bearing 5 it will be readily seen that this adjusting shaft may rotate with the crank shaft and at the same time be moved longitudinally of the crank shaft. The shaft 4 is rotatably mounted in bearings 4^a and 4^b in the bore 3^a, and said shaft is provided with a worm 9 which extends through and has its teeth meshing with the teeth of a worm gear or ring 10 mounted within the hollow crank shaft. The engagement of the teeth of the worm 9 with the teeth of the worm gear 10 will cause the shaft 4 to have rotary movement independent of the rotation of the shaft 3 when the shaft 4 is moved longitudinally by means of the lever 7. Therefore, the elongated spur gear 11 which is provided upon the shaft 4 near the worm 9 will be rotated in the hollow crank shaft for imparting movement to the valve adjusting eccentrics, as will be hereinafter brought out.

In order to open and close valves of a

conventional structure, there has been provided the usual valve adjusting rods 12 which extend radially of the crank shaft and are connected with collars 13 which fit about eccentrics carried by the crank shaft 3. Each of these eccentrics include disks 14 and 15 which fit into seats 16 formed in opposite sides of the block 17 formed upon the hollow end portion of the crank shaft adjacent the inner end of the bearing sleeve 2. This block 17 is provided with inwardly extending passages or pockets 18 which communicate with the central passage of the hollow crank shaft. Therefore, when the eccentric-forming disks 14 and 15 are put in place as shown in Figs. 1 and 2 and connected by fasteners which pass through the ears 19, the two rack-forming arms 20 which extend from the disks 14 may extend into the hollow crank shaft and have their teeth meshing with the elongated spur gear 11. It should be noted that the disk 14 of one eccentric is upon the opposite side of the shaft 4 from the disk 14 of the second eccentric so that when the shaft 4 is rotated by the action of the worm 9 and worm gear 10, the two eccentrics will be moved in opposite directions to each other. Therefore the valve actuating rods will be moved in opposite directions to each other but each will be moved in the proper direction to either open or close the valve control band and the two valves will be opened or closed the same amount.

When this valve operating mechanism is in use, it is assembled as shown with the disks 14 and 15 seated in the seats 16 and positioned within the rings 13 carried by the valve rods 12. When the engine is in operation, the crank shaft 3 rotates and the eccentrics will rotate with the crank shaft to impart the necessary reciprocating movement to the valve operating rods 12 and as the crank shaft rotates, the shaft 4 will turn with it and of course will turn at the same rate of speed with its outer end turning in the bearing 5. When it is desired to adjust the valves, the lever 7 is moved to impart longitudinal movement to the adjusting shaft 4. As this shaft 4 moves longitudinally of the crank shaft 3, the worm 9 passes through the worm gear 10 and causes the shaft 4 to be rotated. As the shaft 4 rotates, the elongated spur gear 11 which meshes with the teeth of the rack 20 will cause the eccentric to be moved radially of the crank shaft. Each of the eccentrics will be moved the same amount and therefore the two rods 12 will be moved longitudinally the same amount and the valves controlled thereby either opened or closed the same amount. Of course, if the device were in use in connection with an engine having a single cylinder, it would only be necessary to provide one of the eccentrics. It will also be understood that each end of the crank shaft could be provided with similar valve-operating means and that if desired each end portion of the crank shaft could be provided with additional blocks 17 so that additional valves could be operated when the mechanism is used in connection with an engine having a large number of cylinders.

I claim:

1. In a structure of the character described, a rotary shaft having a longitudinally extending passage, a block carried by and rotatable with said shaft, said block having opposite sides provided with seats and having a side passage communicating with the passage of said shaft, an adjusting rod extending longitudinally in the passage of said shaft and having a worm and an elongated pinion intermediate its length, a worm gear rigid in said shaft and extending about and in engagement with the teeth of said worm to impart rotary movement to said rod when the rod is moved longitudinally, an eccentric slidable radially of said shaft and fitting in the seats of said block and having a rack-forming arm extending through the side passage and meshing with the elongated pinion, and means for moving said rod longitudinally to cause rotation thereof by the worm and worm gear and cause said pinion to impart movement to the eccentric radially of said shaft.

2. In a structure of the character described, a rotary shaft having a longitudinally extending passage, a block carried by and rotatable with said shaft, said block having opposed parallel sides and having a side passage communicating with the passage of the shaft, an adjusting rod extending longitudinally in the passage of said shaft and having a worm and an elongated pinion, a worm gear rigid in said shaft and extending about and in engagement with the teeth of said worm to impart rotary movement to the rod when said rod is moved longitudinally, an eccentric slidable radially of said shaft and slidably engaged with the flat sides of said block, said eccentric having a rack-forming portion extending through the aforesaid side passage into mesh with said elongated pinion, and means for moving said rod longitudinally to cause rotation thereof by the worm and worm gear, causing said pinion to impart radial movement to the eccentric.

3. A device of the class described comprising a shaft having an integral block between its ends, an eccentric around the shaft and block and connected with the latter for radial sliding, said shaft having a longitudinal bore and a lateral passage from said bore through said block, bearings at the ends of said bore, a ring within the bore between the ends of the latter and provided with internal worm teeth, a shaft

in the bore having its ends slidably and rotatably received in said bearings, said last named shaft having an elongated worm meshing with said worm teeth and an elongated pinion extending across said lateral opening, a rack on the eccentric received in said lateral opening and meshing with said pinion, and means connected with the outer end of said last named shaft for longitudinally sliding the same.

In testimony whereof I have hereunto affixed my signature.

CALHOUN COLLINS.