Jan. 29, 1952 P. C. MALMSTEN 2,583,864

ADJUSTABLE ECCENTRIC

Filed June 12, 1946 3 Sheets-Sheet 1

Fig. 1

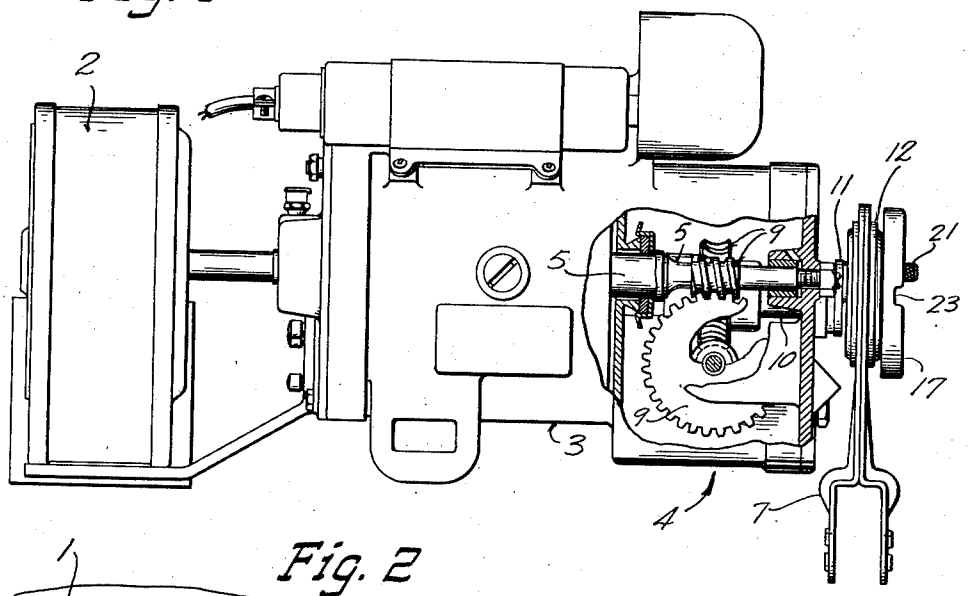
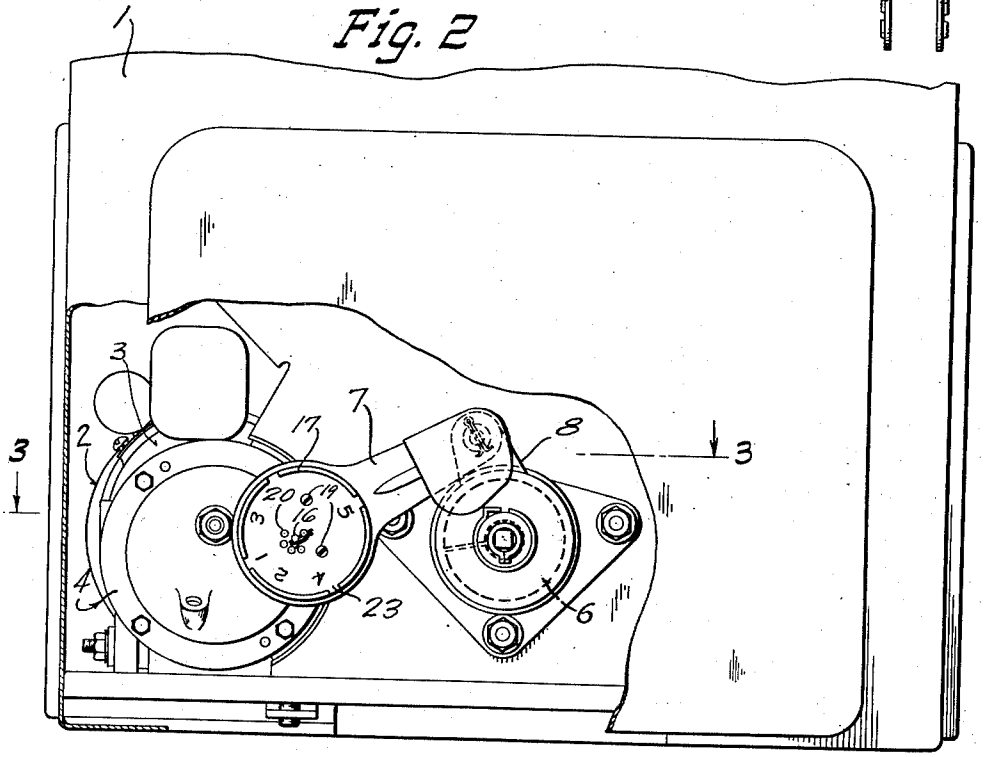


Fig. 2



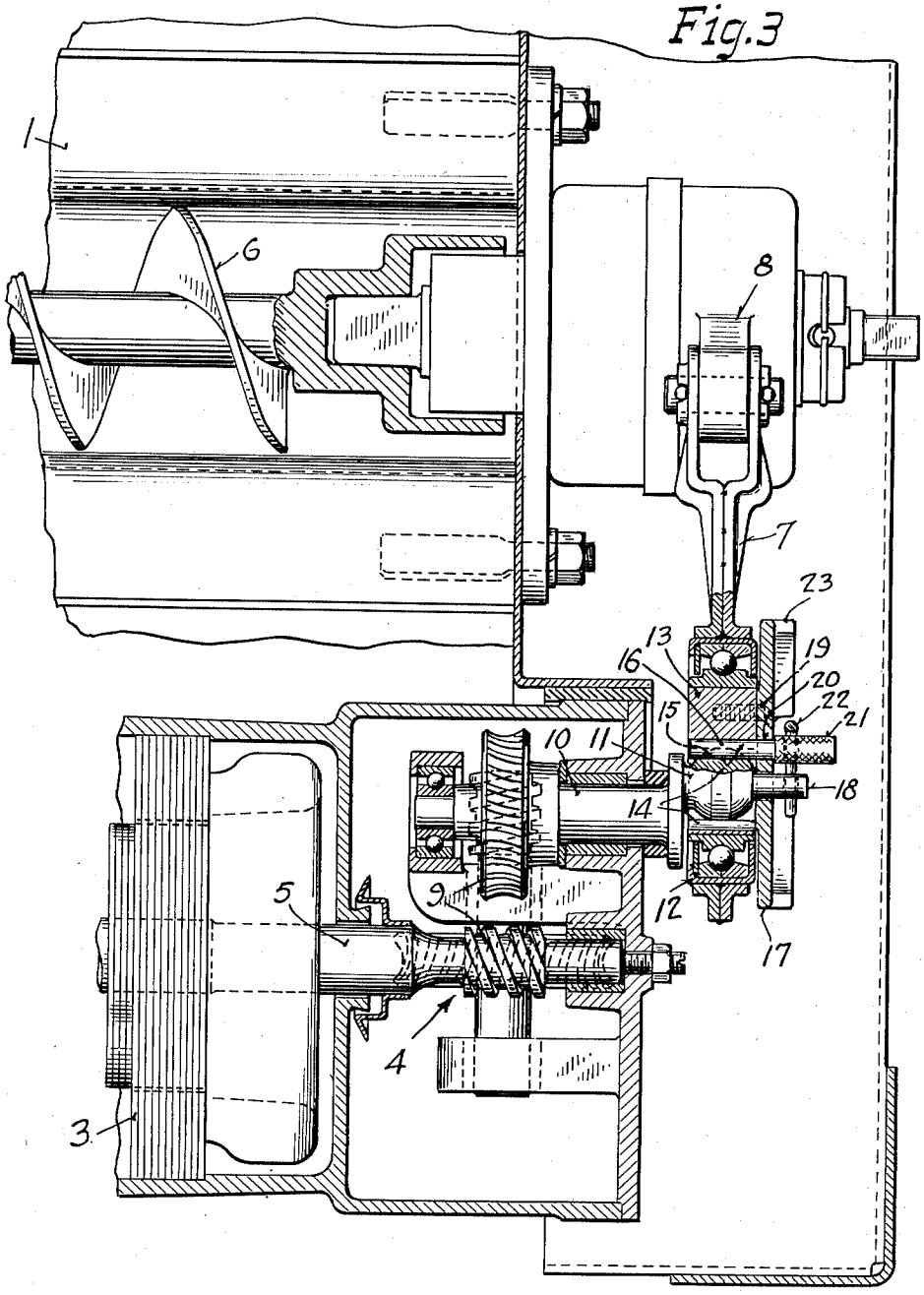
INVENTOR.
Philip C. Malmsten
BY
Edwin C. Andrus
Attorney

Jan. 29, 1952 P. C. MALMSTEN 2,583,864

ADJUSTABLE ECCENTRIC

Filed June 12, 1946 3 Sheets-Sheet 2

Fig. 3



INVENTOR.
Philip C. Malmsten
BY Elvin C. Audrus
Attorney.

Jan. 29, 1952 P. C. MALMSTEN 2,583,864

ADJUSTABLE ECCENTRIC

Filed June 12, 1946 3 Sheets-Sheet 3

Fig. 4

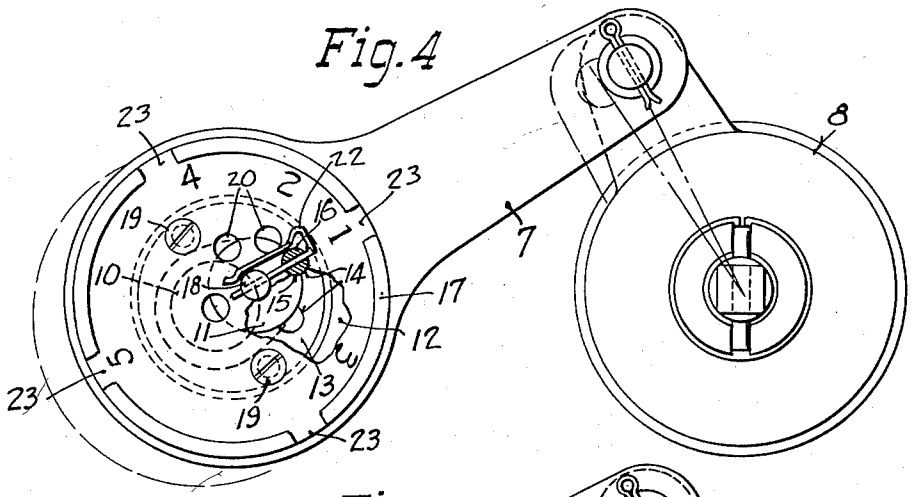


Fig. 5

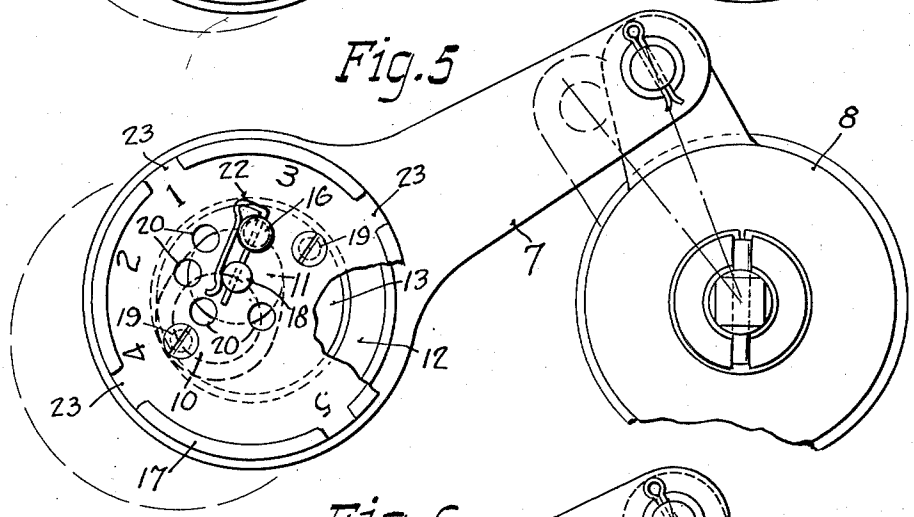
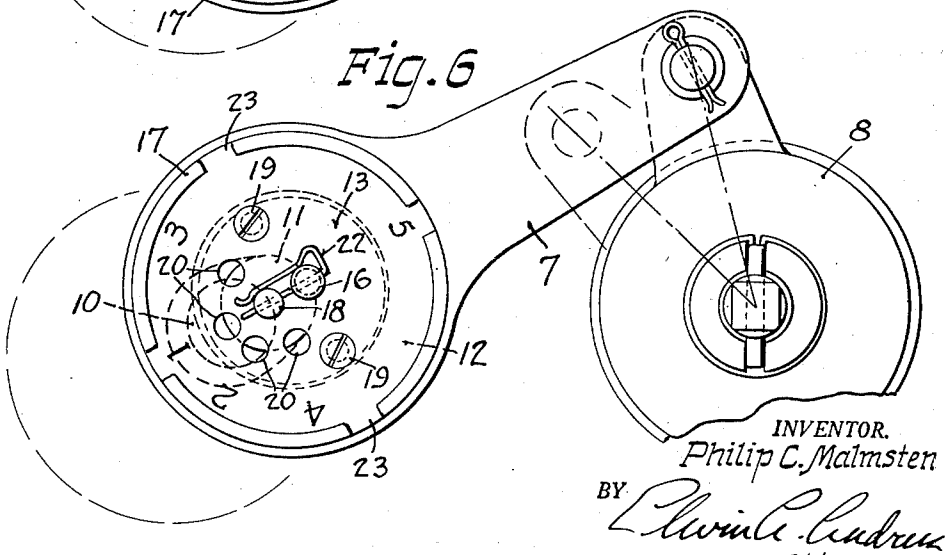


Fig. 6



INVENTOR.
Philip C. Malmsten
BY
Alvin C. Andrus
Attorney.

Patented Jan. 29, 1952 2,583,864

UNITED STATES PATENT OFFICE

2,583,864

ADJUSTABLE ECCENTRIC

Philip C. Malmsten, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis., a corporation of New York

Application June 12, 1946, Serial No. 676,268

1 Claim. (Cl. 74—571)

1

This invention relates to an adjustable eccentric and has particular reference to an adjustment which regulates the rotation of the stoker feed screw to obtain different rates of feed of coal to the furnace.

One object of the invention is to provide a readily accessible and simple adjustment for regulating the stroke of the feed screw of a stoker.

Another object is to provide an intermittently driven stoker feed screw with a plurality of adjustments of the stroke for different feedings of coal as may be demanded by the weather or other operating conditions.

These and other objects of the invention will appear hereinafter in connection with the following description of an embodiment of the invention illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevational view of a stoker power unit assembly with the connecting rod disconnected from the clutch and parts broken away and sectioned;

Fig. 2 is an elevational view of the end of a stoker with part of the casing broken away and showing the connecting rod secured to the clutch;

Fig. 3 is a section taken on line 3—3 of Fig. 2;

Fig. 4 is a diagrammatic view of the setting for the shortest stroke;

Fig. 5 is a similar view of the setting for an intermediate stroke; and

Fig. 6 is a diagrammatic view of the setting for the longest stroke.

The drawings, in general, show a hopper 1 of a stoker to the one side of the lower outer portion of which is secured the drive unit comprising the fan 2, the motor 3 and the transmission mechanism 4. The transmission mechanism 4 is driven off from the rear end of the drive shaft 5 of motor 3 and intermittently rotates the stoker feed screw 6 through the connecting rod 7 and the clutch unit 8 to feed coal to the furnace, not shown, from the bottom of hopper 1 through which feed screw 6 extends. The length of the stroke of rod 7 determines the rate of feed of screw 6 and the invention is particularly directed to apparatus for regulating the stroke of rod 7 and the feed rate.

The transmission mechanism 4, in general, comprises the gears 9 and the crank shaft 10 which is driven by gears 9 from the motor drive shaft 5 at a reduced speed. Shaft 10 extends parallel to shaft 5 and projects from the rear end of the housing of transmission mechanism 4.

The crank 11 of crank shaft 10 is offset from the shaft and is located outside the rear housing

2

of transmission mechanism 4 within the bearing 12. The bearing 12 is press fitted inside the crank end of the connecting rod 7 which is formed of two corresponding half members longitudinally welded together.

The bearing 12 is eccentric in that the center of the bearing is offset from the center of the crank 11 which is disposed within the eccentric crank opening in the inner race 13 of the bearing.

The inner race 13 has a plurality of radially semi-circular grooves 14 which extend longitudinally through the inner bearing surface thereof.

The crank 11 has a semi-circular groove 15 which extends longitudinally in the outer periphery of the crank. Groove 15 is complementary to each of grooves 14 and when bearing 12 is rotated, as will be described, to place groove 15 in registry with one of the grooves 14, a longitudinal aperture is formed therewith between the crank and race 13 to receive the pin 16. Pin 16 locks the crank and bearing together for rotation and actuation of rod 7.

The cover or dial plate 17 is located over the outer end 18 of transmisison shaft 10 which projects outwardly from crank 11. Plate 17, which corresponds in diameter to bearing 12, is secured to the inner race 13 of bearing 12 by screws 19 so that race 13 and plate 17 rotate together.

Plate 17 has a plurality of apertures 20 in the face thereof. Apertures 20 correspond in number and are each horizontally aligned with a groove 14 in bearing race 13. The center of plate 17 is offset from the center of crank 11 or end 18 of transmission shaft 10 in the same manner as the center of bearing 12 is offset from the center of the crank.

The locking pin 16 previously described extends through one of the apertures 20 and thence into the aperture between crank 11 and bearing race 13 which is formed when one of the semi-circular grooves 14 of the race registers with the semi-circular groove 15 of the crank. Pin 16 is enlarged at the outer end 21 and may be knurled to provide for grasping by the operator for ready insertion and removal.

When pin 16 is lodged in position as described the pin locks the crank and bearing together. Pin 16 is locked against axial movement by the lock pin 22 which extends on the outside of dial plate 17 through transverse apertures in the outer end 21 of pin 16 and the outer end 18 of transmission shaft 10.

The apertures 20 of dial plate 17 are shown as five in number and are designated with nu-

merals 1, 2, 3, 4 and 5. The apertures 20 and grooves 14 may be greater or fewer in number as may be desired. The numerals, for example, indicate that when pin 16 is located in aperture 20 designated as 1 and the axially aligned aperture formed by a groove 14 and groove 15, then the connecting rod 7 rotates feed screw 6 at a stroke feeding 10 pounds of coal from hopper 1 to the furnace in one hour. If pin 16 is located in the aperture designated with the numeral 5, and the axially aligned aperture formed by a groove 14 and groove 15 in registry, then the feed screw is rotated, for example, to feed fifty pounds of coal in one hour from the hopper to the furnace.

Dial plate 17 is provided primarily for the purpose of rotating the bearing race 13 of bearing 12 to the feed position and for designation of rates of coal feed thereon that may be radially observed by the operator. The operator grasps plate 17 and rotates the same to rotate bearing race 13 therewith so that a groove 14 of the race will register with the notch 15 of the crank to give the coal feed desired and as indicated on the cover plate 17 with the numerals as described. Plate 17 is constructed with vertical indentations 23 for insertion of a suitable tool by the operator should that be necessary to rotate the plate and bearing race 13.

The center of bearing 12, as previously described, is eccentric to the center of crank 11 which also is eccentric to the center of transmission shaft 10. By adjusting the center of bearing 12 to different locations radially about the center of crank 11 by operation of dial plate 17, the radial distance between the center of bearing 12 and the center of transmission shaft 10 is varied to determine the length of the stroke of connecting rod 7. This results in different rates of feed of screw 6.

Figs. 4, 5 and 6 illustrate three rates of feed. In Fig. 4 bearing race 13 has been rotated by movement of dial plate 17 so that pin 16 can be inserted through the aperture formed by registry of crank groove 15 with a groove 14 of race 13. Since at this position of the center of bearing 12 under the setup shown in the drawings the radial distance is the least between the center of shaft 10 and the center of bearing 12, the throw of the crank in the bearing actuates connecting rod 7 in its shortest stroke and the rod rotates screw 6 in the least amount of feed of coal.

Fig. 5 illustrates an intermediate rate of coal feed under which pin 16 extends through the aperture designated with the numeral 3 on dial plate 17 and is disposed in the aperture formed by registry of a groove 14 of bearing race 13 and groove 15 of crank 11 to lock the bearing race and crank together for rotation.

Fig. 6 illustrates the greatest feed of coal. In Fig. 6 bearing race 13 has been rotated by movement of dial plate 17 so that pin 16 can be inserted through the aperture 20 designated with the numeral 5 and into the aperture formed by registry of crank groove 15 with a groove 14 of race 13. Since at this position of the center of bearing 12, under the setup shown in the drawings, the radial distance is the greatest between the center of shaft 10 and the center of bearing 12, the throw of the crank in the bearing actuates connecting rod 7 in its longest stroke and the rod rotates screw 6 in the greatest amount of feed.

By employing the double eccentric arrangement described and varying the relationship of the two eccentrics to determine the radius of the crank movement applicant provides a novel mechanism for varying the feed rates of a stoker.

Various embodiments of the invention may be employed within the scope of the accompanying claim.

I claim:

An eccentric for adjusting the length of stroke of a member connected at one end to a driven shaft and at the other end to a power driven transmission shaft to rotate the driven shaft therefrom, which comprises a crank extending axially from said transmission shaft in eccentric relation thereto and having a relatively short shaft extending axially therefrom, a bearing secured within the transmission end of said connecting member and having an offset crank opening in the inner race thereof to receive said crank and dispose the center of the bearing eccentric to the center of said crank, said inner race of the bearing having a plurality of semi-circular grooves extending longitudinally through the bearing surface thereof and circumferentially spaced from each other to dispose the same at different radial distances from the center of the bearing, a longitudinally extending groove provided in the outer periphery of said crank and formed complementary to the grooves in the bearing race, a plate assembled over said short shaft of the crank and secured to said bearing for rotating the same to locate different grooves in the bearing race in registry with the crank groove and with apertures through the plate axially aligned with the grooves in the bearing race, a removable pin extending through an aperture in the plate and disposed in the aperture formed by registering a groove of the bearing race with the groove of the crank to lock the crank and bearing race together for rotation for different throws of the crank, and a lock pin extending through the removable pin and short shaft of the crank to lock the removable pin against axial movement.

PHILIP C. MALMSTEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
41,403	Stiles	Jan. 26, 1864
95,174	Wells	Sept. 21, 1869
247,281	Wendt	Sept. 20, 1881
486,152	Wilson	Nov. 15, 1892
669,499	Aldrich	Mar. 12, 1901
1,417,844	Knapp	May 30, 1922
1,418,874	Knowlton	June 6, 1922
2,308,974	Harper	Jan. 19, 1943
2,463,103	Guetjen	Mar. 1, 1949