

Feb. 9, 1943.

S. I. BOUSMAN

2,310,209

ADJUSTABLE ECCENTRIC

Filed March 31, 1942

2 Sheets-Sheet 1

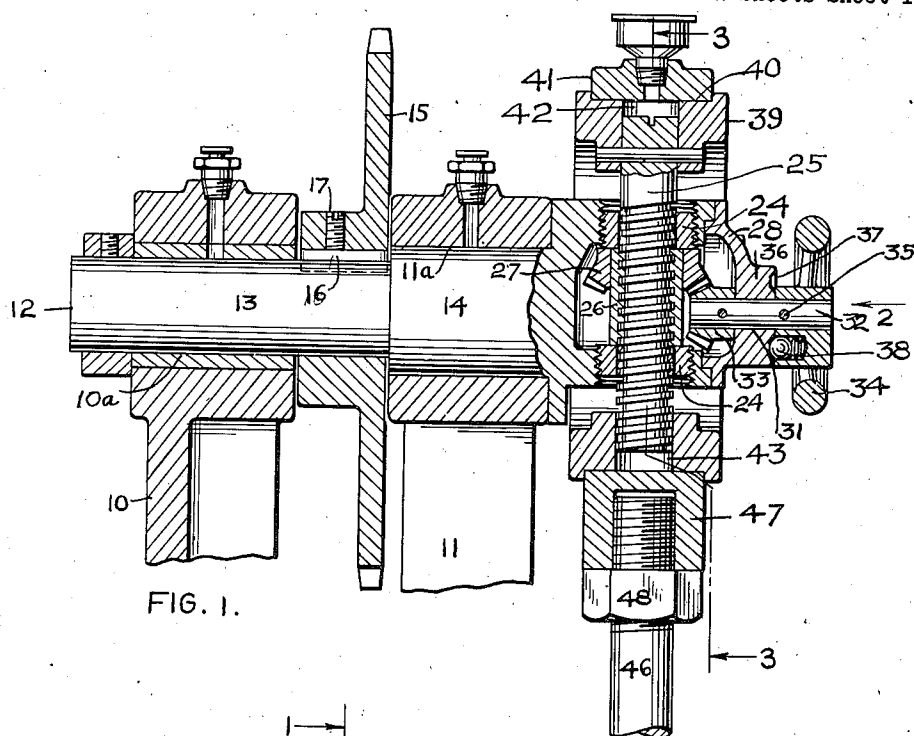


FIG. 1.

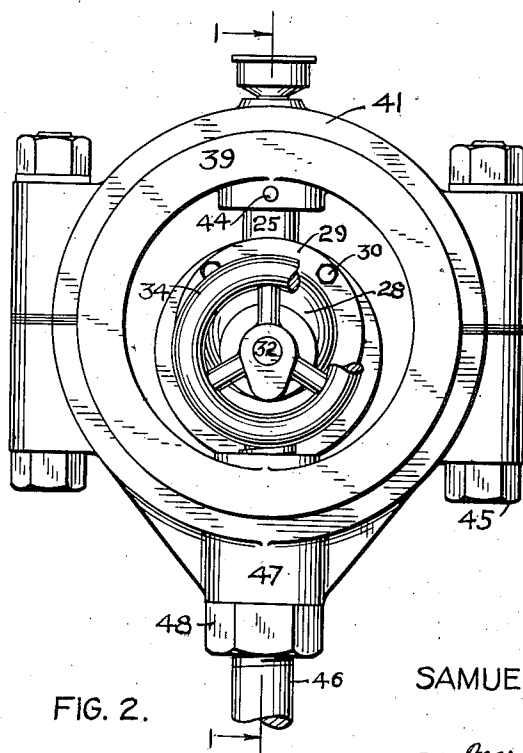


FIG. 2.

SAMUEL I. BOUSMAN,
INVENTOR.

BY *Martin E. Anderson*

ATTORNEY

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2 Sheets-Sheet 2

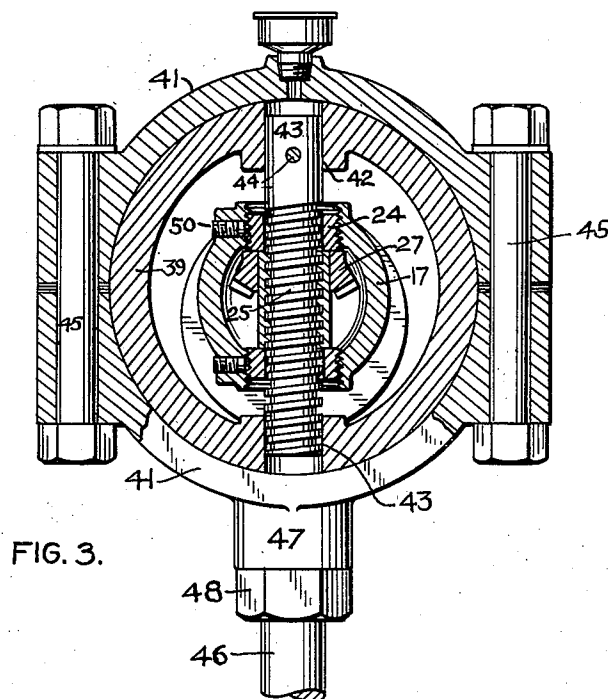


FIG. 3.

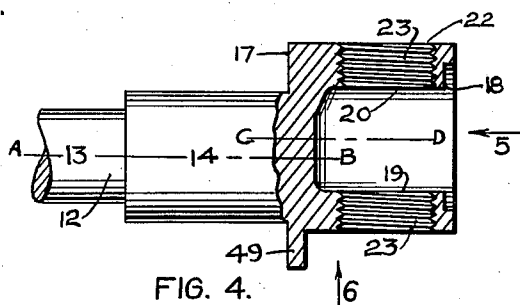


FIG. 4.

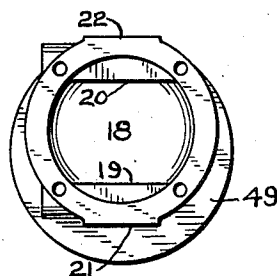


FIG. 5.

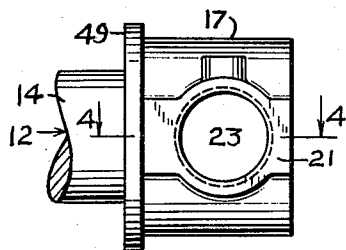


FIG. 6.

SAMUEL I. BOUSMAN,
INVENTOR.

BY *Martin E. Anderson,*
ATTORNEY

UNITED STATES PATENT OFFICE

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ADJUSTABLE ECCENTRIC

Samuel I. Bousman, San Francisco, Calif., assignor to Western Machinery Company, San Francisco, Calif., a corporation of Utah

Application March 31, 1942, Serial No. 436,999

4 Claims. (Cl. 74-571)

This invention relates to improvements in adjustable eccentrics.

In pumps and in other machines eccentrics are frequently employed and it is often desirable to be able to adjust the throw or eccentricity of such mechanisms.

Adjustable eccentrics are employed in various machines and applicant does not claim to be the inventor of such mechanism in its broadest sense but only of a specific embodiment thereof.

It is the object of this invention to produce an adjustable eccentric of a simple and substantial construction that can be applied to the end of a shaft and have readily accessible means for effecting adjustment.

Another object is to produce an adjustable eccentric in which the eccentric strap is formed from a single piece of metal.

A further object is to produce an adjustable eccentric in which the adjusting mechanism is formed in part by a threaded pin that does not rotate about its axis during the adjustment and which can therefore be removably attached to a one-piece eccentric disk after the latter is in its proper position and a still further object is to produce an adjustable eccentric in which adjustments for wear can readily be effected and which can therefore always be kept in such adjustment that it will operate silently and without knock.

The above and any other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail and for this purpose reference will be had to the accompanying drawings in which the invention has been illustrated in its preferred form, and in which:

Figure 1 is a diametrical section taken on line 1-1, Figure 2;

Figure 2 is an end view looking in the direction of arrow 2 in Figure 1;

Figure 3 is a transverse section taken on line 3-3, Figure 1;

Figure 4 is a side elevation of the eccentric shaft, a portion thereof being a section taken on line 4-4, Figure 6;

Figure 5 is an end view looking in the direction of arrow 5, in Figure 4; and

Figure 6 is a fragmentary side elevation looking in the direction of arrow 6, in Figure 4.

In the drawings reference numerals 10 and 11 indicate portions of a pump frame. The pump has not been illustrated because the invention relates to the adjustable eccentric and is en-

tirely independent of the machine with which it is employed. The frame members 10 and 11 are provided with bearings 10a and 11a in which is journaled a shaft 12. This shaft has been shown as having a cylindrical portion 13 that is journaled in bearing 10a and a cylindrical portion 14 of somewhat larger diameter that is journaled in bearing 11a. A sprocket wheel 15 is shown positioned between the bearings 10a and 11a and held in position by a feather key 16 and a set screw 17. The end of the shaft 12, to the right as shown in Figure 1, is enlarged to form an eccentric head that has been designated by reference numeral 17 and which is illustrated in detail in Figures 4, 5 and 6. Referring to Figure 4, line A-B designates the axis of shaft 12 and line C-D designates the axis of the opening 18 in head 17. The inner wall of opening 18 is provided with chordal abutment surfaces 19 and 20 shown more particularly in Figure 5. The abutment surfaces are parallel and preferably perpendicular to a plane containing the axes A-B and C-D. Head 17 is preferably cylindrical on its outer surface and is provided with flattened surfaces 21 and 22 that are parallel respectively to surfaces 19 and 20. The wall portions between surfaces 19 and 20 and between surfaces 20 and 22 are provided with openings 23, Figure 4, that are axially aligned and positioned with their common axis in a plane containing axes A-B and C-D. At least one of the radial openings 23 is threaded. In Figure 4, both openings 23 have been shown threaded and positioned in each opening 23 is an adjustable abutment sleeve 24. Sleeves 24 are provided with cylindrical unthreaded openings for the reception of a pin 25 that is provided on its outer surface with square threads, as shown in the drawings. A nut 26 is positioned between the inner ends of the abutment sleeves 24 and is threaded for cooperation with the threads on pin 25. A bevel gear 27 is secured to one end of the nut 26, preferably by a pressed fit, so as to be nonmovably connected with the nut. Opening 18 is closed by means of a cap or bracket 28 having a flange 29 that is perforated for the reception of the cap screws 30. Cap 28 has a bearing 31 that is in axial alignment with axis A-B. A shaft 32 is rotatably mounted in bearing 31 and has attached to its inner end a bevel gear 33 that is positioned to cooperate with bevel gear 27. A hand wheel 34 is secured to the outer end of shaft 32 and held against movement relative to the shaft by means of a pin 35. The hub portion 36 of cap 28 is provided with a depression or a plurality of depres-

sions 37 with which the spring pressed ball 38 cooperates to form stops that hold the parts in adjusted position. Surrounding head 17 is an eccentric disk 39. This disk is formed from a single piece of metal and is provided on its outer surface with a circular depression 40 for the reception of the eccentric strap 41. Eccentric disk 39 has two axially aligned openings 42 and 43 of the proper size to receive the ends of threaded pin 25. The upper end of pin 25, when seen as in Figure 3, has an unthreaded cylindrical portion 43 and this end of the pin and the corresponding part of the eccentric disk are perforated for the reception of a holding pin 44. Pin 44 prevents the threaded pin from moving either axially or rotatably in opening 42. The eccentric strap 41 is made in two parts which are held in assembled relation by means of bolts 45. A connecting rod 46 is threadedly secured to the hub 47 that projects downwardly from the lower half of the eccentric strap. A lock nut 48 serves to hold the connecting rod in adjusted position. Head 17 is provided with a flange 49 that is concentric with the axis of shaft 12.

Assuming now that the apparatus above described is constructed in the manner shown, it is evident that whenever the handwheel is rotated about the axis of shaft 32, it will rotate bevel gear 27 and turn the nut 26 relative to pin 25. Since nut 26 is held against longitudinal movement by the abutment sleeves 24, pin 25 will move axially, thereby shifting the eccentric disk 39 with respect to the axis of shaft 12. The eccentric is so constructed that disk 39 can be moved into a position in which its outer surface is concentric with shaft 12 or into a position in which the outer surface is eccentric with respect to the shaft. The amount of this adjustment will depend on the size and specific relationship of the parts. Whenever the ends of the nut and the cooperating abutment surfaces of sleeves 24 wear to any appreciable extent the sleeves can be rotated, thereby bringing them into proper adjustment with the nut; and in this manner adjustments can be effected to compensate for wear with the result that the eccentric will rotate noiselessly and without knocking. Sleeves 24 are secured in adjusted position by means of set screws 50 as shown in Figure 3.

Particular attention is called to the fact that in this construction the eccentric disk can be made in one piece and that adjustments for wear can readily be effected in the manner above described.

Having described the invention what is claimed as new is:

1. An adjustable eccentric comprising a hollow head having aligned transversely extending openings, an eccentric disk encircling the head, the eccentric disk having openings in alignment with the transverse openings, a threaded pin extending through the head and positioned with its ends in the openings in the eccentric disk, means interconnecting the pin and the disk to prevent both rotary and axial movement of the pin in the disk openings, a nut positioned in the hollow head and operatively connected with the pin, thrust abutments engaging opposite sides of the nut for resisting movement in the direction of the axis of the pin, at least one of said thrust abutments being threadedly connected with the head to effect adjustment for wear and means for

turning the nut whereby the eccentric disk and the pin can be moved relative to the head to change the eccentricity of the disk.

2. An adjustable eccentric comprising a hollow head mounted for rotary movement about an axis, one end of the head having an opening positioned to enclose the axis of rotation, the wall surrounding the opening having aligned transverse openings whose common axis intersects the axis of rotation, at least one of the transverse openings being threaded, a threaded abutment sleeve positioned in the threaded opening, a threaded pin extending through the sleeve and the other transverse opening, an eccentric disk encircling the head, said disk having axially aligned openings for the reception of the ends of the threaded pin, means interconnecting the pin and the eccentric disk to prevent both rotary and axial movements, a nut positioned in the opening in the head and threadedly connected with the threaded pin, a bevel gear on the nut, abutment means on opposite sides of the nut, one of said abutments comprising the threaded sleeve, and means for turning the nut comprising an axially extending shaft, a bevel gear carried thereby, and means for turning the shaft.

3. An adjustable eccentric comprising, in combination, a hollow head mounted for rotation, the wall of the head having aligned radial openings whose common axis intersects the axis of rotation, the radial openings being threaded, a threaded abutment sleeve in each opening, a threaded pin extending through the transverse openings, a nut positioned in the hollow head and operatively connected with the threaded pin, a bevel gear connected with the nut, means for turning the nut, comprising an axially extending shaft and a gear in operative engagement with the gear on the nut, an eccentric disk surrounding the head, said disk having axially aligned openings for the reception of the ends of the threaded pin, and a holding pin extending through the aligned openings in the disk and the threaded pin to prevent the latter from turning and from moving axially relative to the eccentric disk.

4. An adjustable eccentric comprising in combination, a shaft having one end enlarged to form a head and provided with an opening positioned eccentrically with respect to the shaft axis, the head wall having axially aligned radial openings whose common axis lies in a plane containing the axis of the shaft and the center of the hub opening, a threaded pin extending through the radial openings, an eccentric disk enclosing the head, said disk having diametrically aligned openings for the reception of the ends of the threaded pin, one end of the pin and the eccentric disk having aligned openings, a holding pin in the last named openings, a nut on the threaded pin, positioned in the head opening, opposite sides of the nut abutting the inner surface of the head wall, a bevel gear on the nut, a removable cap for the head opening, a shaft mounted for rotation in the cap, and a bevel gear on the inner end of the last named shaft, in operative engagement with the gear on the nut, whereby when the gear carrying shaft is rotated the nut will turn on the threaded pin and shift it axially.

SAMUEL I. BOUSMAN.