

J. H. WOOLCOTT.
ADJUSTABLE VARIABLE SPEED MECHANISM.
APPLICATION FILED FEB. 14, 1919.

1,329,945.

Patented Feb. 3, 1920.

4 SHEETS—SHEET 1.

Fig. 1

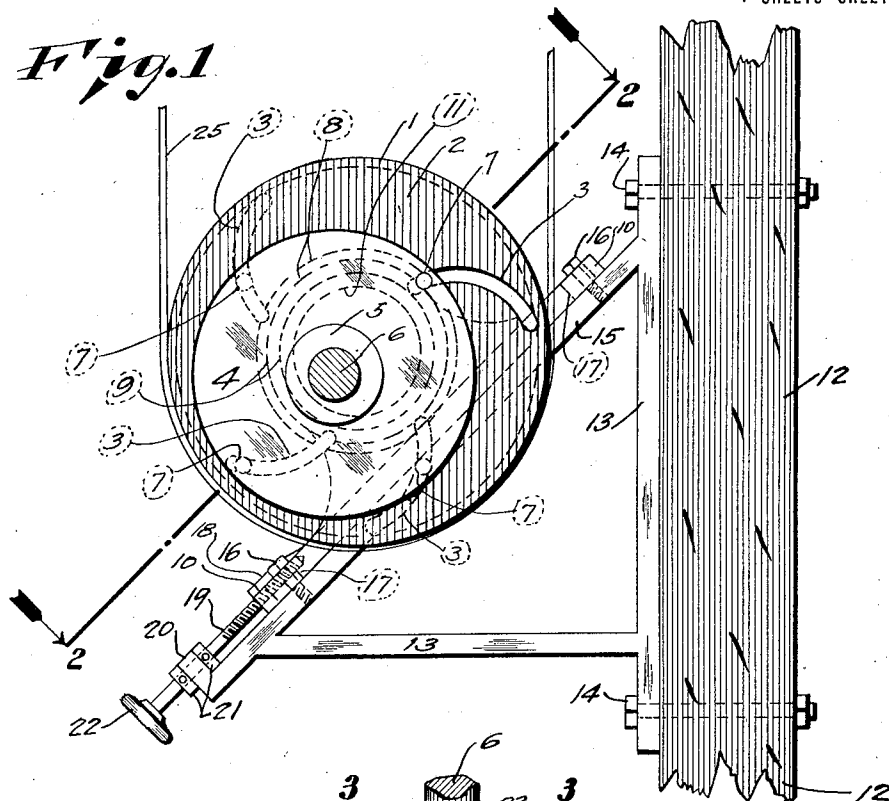


Fig. 2

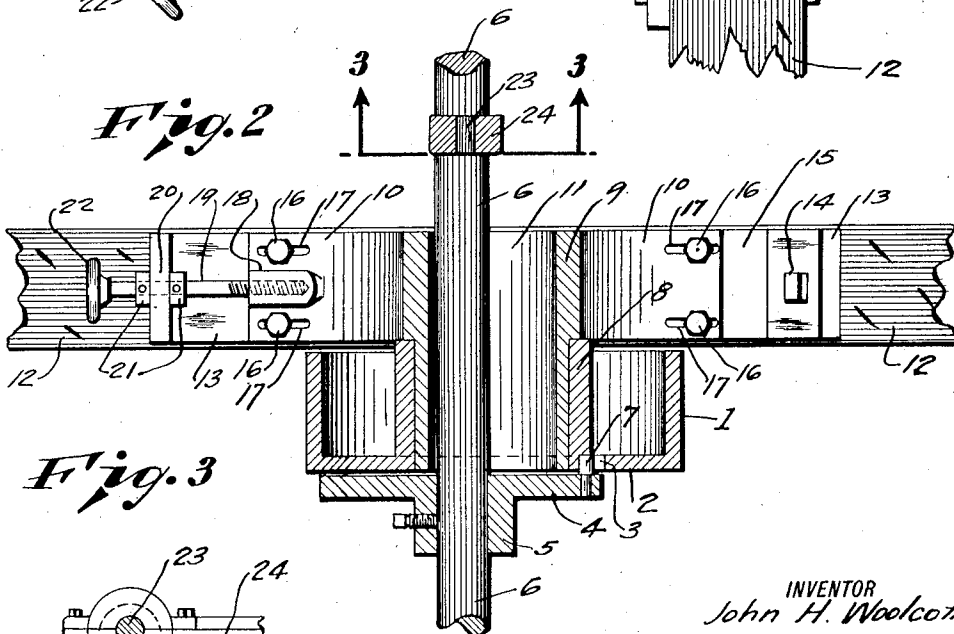
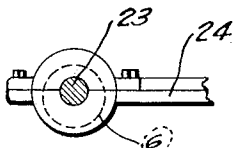


Fig. 3



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4 SHEETS—SHEET 2.

Fig. 4

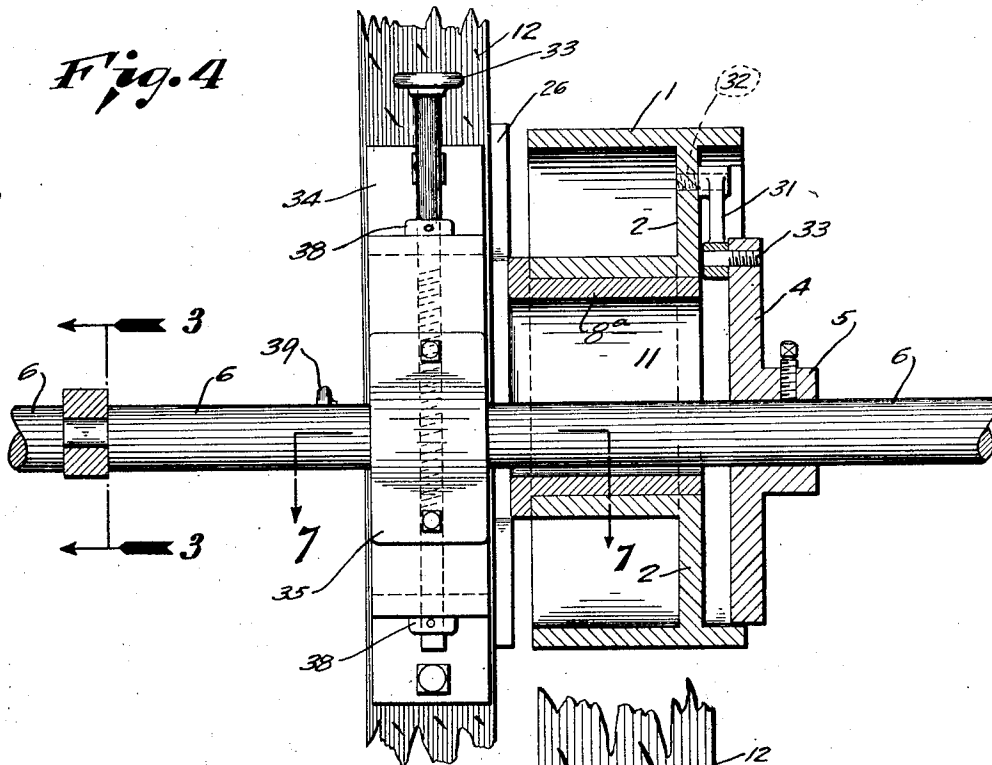
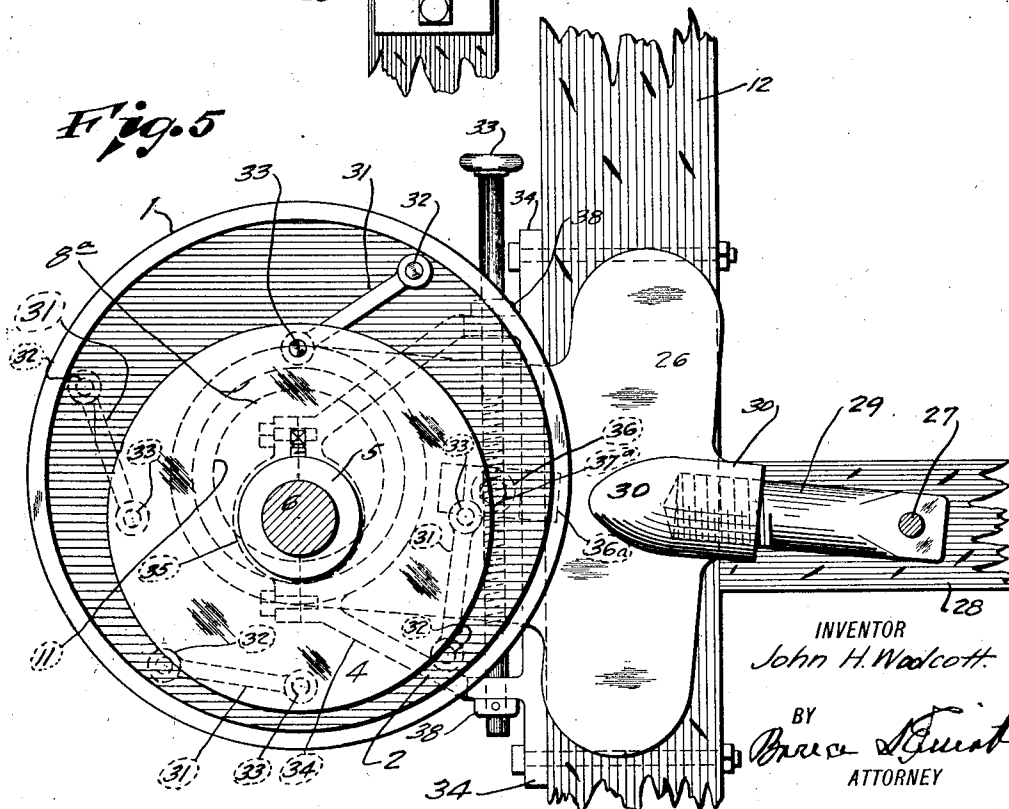


Fig. 5

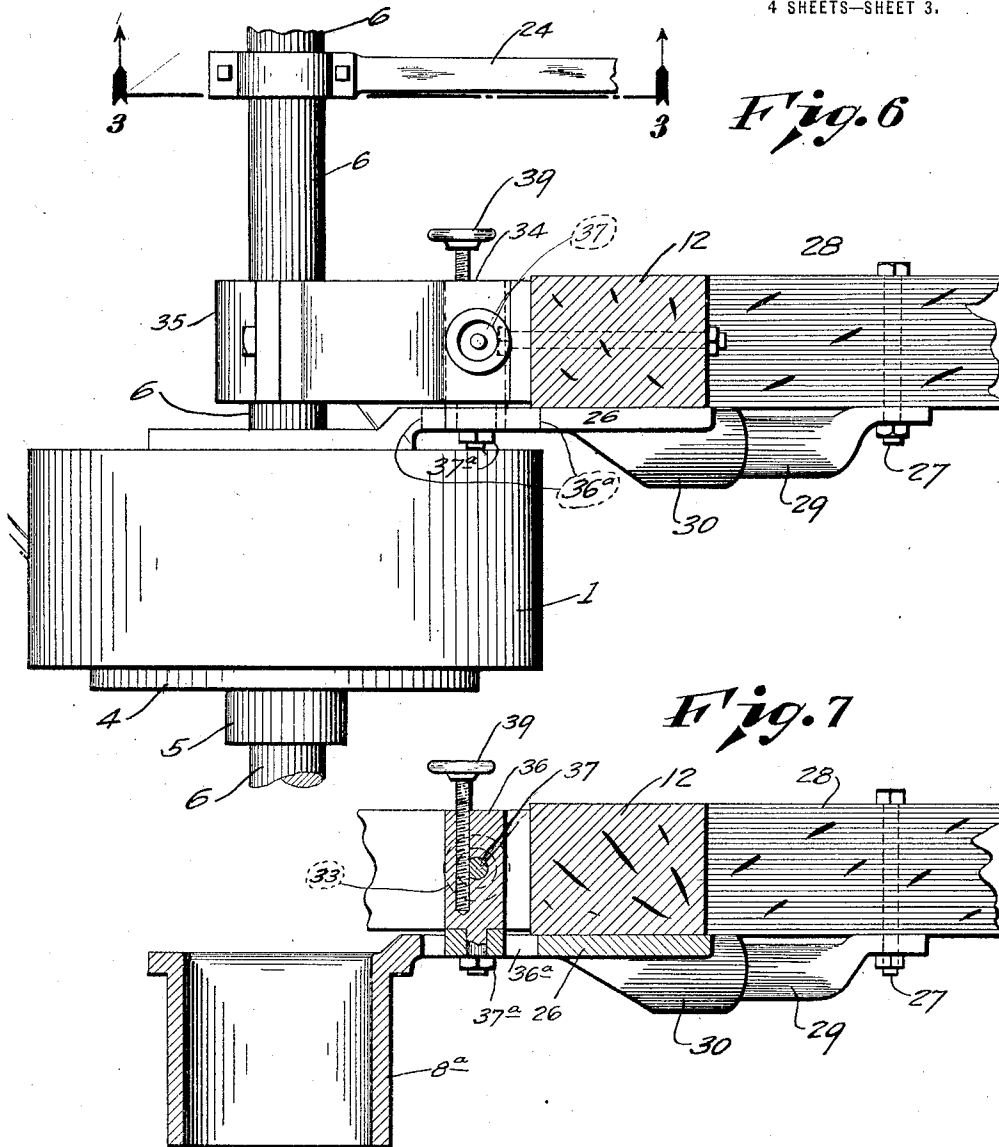


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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

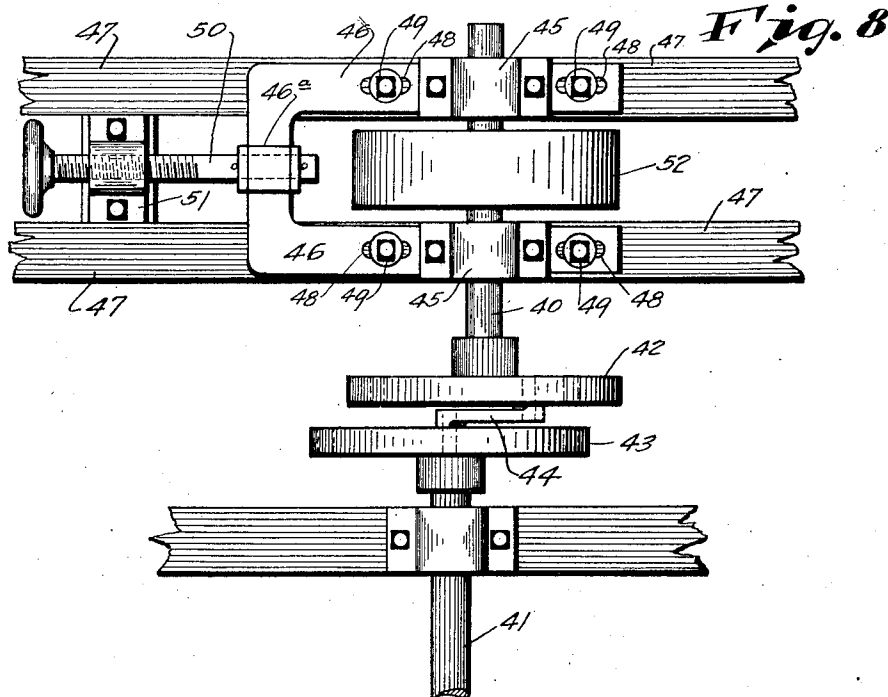
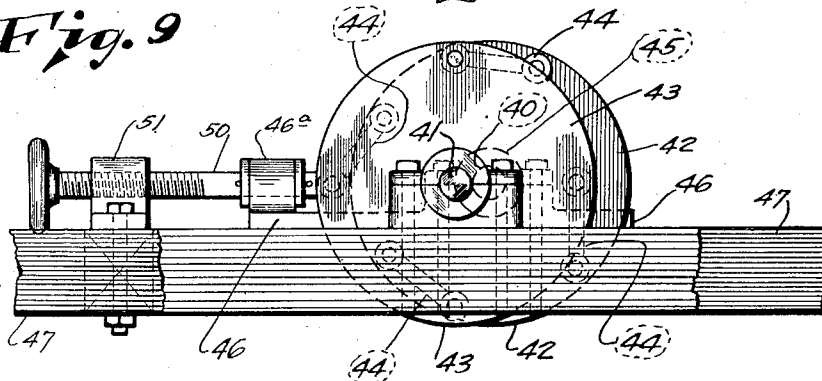


Fig. 9



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UNITED STATES PATENT OFFICE.

JOHN H. WOOLCOTT, OF HARRISBURG, ILLINOIS.

ADJUSTABLE VARIABLE-SPEED MECHANISM.

1,329,945.

Specification of Letters Patent.

Patented Feb. 3, 1920.

Application filed February 14, 1919. Serial No. 276,979.

To all whom it may concern:

Be it known that I, JOHN H. WOOLCOTT, a citizen of the United States, residing at Harrisburg, in the county of Saline and State of Illinois, have invented new and useful Improvements in Adjustable Variable-Speed Mechanism, of which the following is a specification.

This invention relates to mechanical movements, and has for its general object to provide means for adjusting the relation between two eccentrically disposed members forming part of the driving connection to a driven shaft, and the motion of which driven shaft is designed to be converted into a reciprocating motion, whereby to vary the speed of reciprocation during each cycle of movement of said shaft, and also to regulate the amount of such variation of speed.

The invention is capable of various embodiments and applications, but is especially designed and adapted to be used for producing a vibrating or reciprocating motion for sieves or shakers for the purpose of bolting and grading materials, such as the ground product of cereals. When thus applied the invention enables the operator at will to regulate the flow of material on either a level or inclined sieve, to carry any thickness of stock or material desired on said sieve, and to make the stock or material travel in either direction desired. Such objects are attained by introducing an adjustable differential speed-producing connection in the length of the drive shaft which produces the reciprocating motion, whereby the rapidity of the vibratory movement will be varied either as respects the movement of the vibrated member in either direction or in different phases of its movement in the same direction.

The accompanying drawings illustrate three different embodiments of the invention all of which involve the underlying principle herein claimed.

In the drawings:

Figure 1 is a broken view in side elevation illustrating a preferred embodiment of the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Figs. 2, 4 and 6;

Fig. 4 is a view partly in front elevation and partly in section of a modified construction;

Fig. 5 is a view in side elevation looking from the right hand side of Fig. 4;

Fig. 6 is a plan view of the parts shown in Fig. 4;

Fig. 7 is a fragmental sectional plan view of Fig. 4 taken substantially on the line 7—7 of said figure and viewed in the direction of the arrows;

Fig. 8 is a top plan view of another modified construction; and

Fig. 9 is a view in side elevation of the parts shown in Fig. 8.

The preferred embodiment is illustrated in Figs. 1, 2 and 3, in which the numeral 1 indicates a driving pulley which is provided with an inwardly extending annular flange 2 having cut therein a curved slot 3. The slot 3 is eccentrically disposed with reference to the pulley, its inner end beginning at a point removed from the center of the pulley and its outer end terminating near the periphery of the pulley, as shown in Fig. 1. The numeral 4 indicates an annular disk having a hub 5 secured on the driven shaft 6. Secured near the periphery of the disk 4 is a pin 7, which extends inwardly from the face of the disk and into the slot 3, with which it has sliding connection. The flange 2 of the pulley is provided with an inwardly extending annular hub 8, which is rotatably mounted on a hollow cylindrical bearing 9 which is carried by and projects laterally outward from a bearing-plate 10. The shaft 6 extends through the opening 11 in the bearing 9, said opening being of considerably larger diameter than said shaft to permit of a wide range of movement of the bearing relative to the shaft. The numeral 12 indicates any suitable support, such as a beam or wall, on which is fixedly secured a bracket 13 by means of bolts 14, or otherwise. The bracket 13 provides a flat supporting member 15, and the bearing plate 10 is adjustably secured in position on said supporting member by means of set-screws 16 passing through slots 17, provided near opposite ends of the bearing-plate, and screwed into the supporting member 15. By loosening the set-screws 16 the bearing-plate 10 can be moved in one direction or the other and secured in its adjusted position by screwing up said set-screws, as will be understood. To effect this adjustment of the bearing-plate, I provide the same at one end with an enlargement 18 having a screw-threaded aperture which re-

ceives an adjusting screw 19. This adjusting screw is mounted in a flange 20 at one end of the bearing member 15 and is held in a relatively stationary position in said flange by means of collars 21 secured on said screw on opposite sides of the flange. The outer end of the screw is provided with a hand wheel 22 for turning it. The shaft 6 is suitably machined to provide a crank 23 on which crank is mounted the end of a thrust-bar 24, Fig. 3, and shown in connection with a modification in Fig. 6. This thrust-bar will be connected at its opposite end portion to the device to be reciprocated, or agitated, such device, however, not being shown. The pulley 1 is driven by a belt 25, and when so driven the engagement of the pin 7 in the slot 3 will cause the disk 4 and consequently the shaft 6 to be rotated. In Fig. 1 I have shown various positions occupied by the pin 7 in the slot 3 as the pulley 1 rotates. In the position shown in full lines, the pin is at, or near, the inner end of the slot 3, and in this position the shaft 6 will be rotated at the slowest of the various speeds afforded by the connection described. In the next position, shown by dotted lines immediately under the former, the pin 7 will have advanced to near the center of the slot 3, and will hence be moving the disk 4 and shaft 6 at a higher speed than in the first position described. In the next position, to the left, the pin 7 has moved outward to near the other end of the slot 3, and hence the maximum of speed is being imparted to the disk 4 and shaft 6. In the final and fourth position shown the pin 7 has been moved inward beyond the center of the slot 3, reducing the speed of the disk 4 and shaft 6 to that corresponding substantially to the speed attained by the second position of the parts illustrated. Only four positions of the pin in the curved slot are shown, but it will be understood that the pin changes its position constantly during the revolution of the pulley, with respect to the slot 3. The positions illustrated, however, are sufficient to make clear that there will be a maximum high speed, and a minimum low speed, with variations in speed in the ascending order from the minimum to the maximum and variations in speed in the descending order from the maximum to the minimum. These variations in speed are, of course, reflected in the rotation of the shaft 6, which in a given cycle of movement will have a maximum and a minimum velocity of speed of rotation and ascending and descending variations of speed corresponding to the motions of the disk 6. Such variations in motion will in turn be reflected by the crank 23, and finally by the thrust-bar 24. Thus the bar 24 may be caused to move rapidly outward and slowly inward; or, by adjusting the bearing-plate 10 to an extreme position in

the opposite direction to that at which it was adjusted to produce the foregoing motion, the said thrust bar may be caused to move at a slow speed outward and at a fast speed inward. By such extreme adjustments, the direction of flow of stock on the sieve agitated by the bar may be changed at will. In other words, if the adjustment is such as to cause the shaft 6 to lie on one side of the center of the bearing 9, the fast movement of the thrust-bar 24 will be in one direction; and if the adjustment causes the shaft 6 to be positioned on the other side of the center of the bearing 9, the fast movement of said thrust-bar will be in the opposite direction. With the shaft located at the center of the bar 9 there will be no variation in the speed of throw of the thrust-bar, as the shaft 6 will then be revolved at a uniform speed. Adjustments of the bearing 9 in either direction to cause the center of the pulley 1 to approach, or recede from, respectively, the center of the shaft 6, will vary the speed or movement of said shaft, and the amount of such variation during each cycle of movement will be determined by the degree of the adjustment.

In Figs. 4 to 7, I have shown a modification in the manner of producing the motion and of adjusting the variations in the speed of the shaft. In this construction the pulley 1 is mounted as before on a hollow bearing 8^a, which in this case is mounted on the outer end of a lever 26, which is pivotally mounted at 27 on a fixed support 28. Part of the lever 26 is in the form of a bar 29, one end of which is pivoted at 27 and the other end screw-threaded in a boss 30 on said lever. In this construction the pulley 1 is connected to the disk 4 through the medium of a link 31, one end of which is pivotally connected to a pin 32 secured on the flange 2 and the other end of which is pivotally mounted on the end of a pin 33 secured near the outer periphery of the disk 4. Mounted on the support 12 is a bracket 34, which supports a bearing for the shaft 6, the numeral 35 indicating the cap plate for said bearing. Mounted on the side of the lever 26 is a lug 36 (Fig. 7) which is provided with a screw-threaded aperture to receive an adjusting screw 37, which is in turn rotatably mounted in flanges on the bracket 34 and prevented from vertical movement thereon by collars 38 (Fig. 5). The numeral 39, (Fig. 7) indicates a locking screw which enters the end of the lug 36 and engages a flat side of the screw 37 to prevent it from turning. By unscrewing the locking screw 39 and turning the screw 37 in one direction or the other, the lever 26 may be raised or lowered to vary the position of the center of the bearing 8^a with reference to the center of the shaft 6, which, of course, makes a corresponding change in the rela-

tion of the pulley to said shaft. When the adjustment has been made the locking screw 39 is screwed into position and the lever 26 thereby held in its adjusted position. In order to permit of the adjustment of the lever 26, the lug 36 may be slidably mounted in a groove 36^a in said lever and be clamped in adjusted positions by a clamping nut 37^a. In Fig. 5 I have shown four positions assumed by the link 31 in the revolution of the pulley 1, these positions corresponding to the relative positions of the pin 7 and slot 3 shown in Fig. 1. It will readily be seen that by adjusting the lever 26 to vary the position of the pulley 1 relative to the disk 4, the link connection between said pulley and disk will effect the same variations in speed of the shaft 6 during each cycle of movement as described with reference to the pin and slot connection shown in Fig. 1.

In Figs. 8 and 9 I have shown another embodiment of the invention. In this construction the driven shaft is in two parts indicated, respectively, by the numerals 40 and 41, said shafts being normally out of alignment with each other. The shaft 40 is provided at its outer end with a disk 42 and the shaft 41 on its inner end with a corresponding disk 43, these disks being pivotally connected by a link 44 in the same manner as described in connection with the construction shown in Fig. 5 with reference to the disk 4 and pulley 1. The driven shaft-member 40 is mounted in bearings 45, on a carriage 46, which, for convenience, is provided in the form of a U-shaped casting, the legs of which rest upon the tops of parallel supports 47. The legs of the casting 46 are provided with slots 48 through which bolts 49 pass and engage in the supports 47. The head of the carriage 46 has rotatably mounted, in a lug 46^a thereon, an adjusting screw 50, which has screw-threaded connection with a fixed bearing 51 supported on and mounted between the supports 47. Mounted on the shaft-member 40, and located between the supports 47, is a pulley 52, which will be driven by a belt in the usual manner. By loosening the bolts 49 and turning the adjusting screw 50 the carriage may be moved in one direction or the other, to vary the relation of the centers of the disks 42, 43, to each other, and thereby effect the variation in speed of the shaft 41

by the same principle of operation as previously described.

The embodiments of my invention above described, and illustrated in the drawings, will make it clear that my invention is not confined to the particular construction shown in any of these embodiments; and while I have shown in Figs. 1 and 2 a preferred construction, and have illustrated two modified constructions for the purpose of making a full disclosure of the invention, it will no doubt be found possible to provide further embodiments than those I have shown. Except as specified in the claims, therefore, I do not wish to be understood as limiting my invention to either of the embodiments illustrated in the drawings for producing an adjustable variable speed of a driven shaft.

I claim:

1. Variable speed adjusting mechanism comprising a shaft, a hollow bearing surrounding said shaft and adjustable relative to the center thereof, a driving pulley rotatably mounted on said bearing, a driven member secured to said shaft, and a differential connection between said pulley and said driven member.

2. Variable speed adjusting mechanism comprising a shaft, an adjustable support, a hollow bearing mounted on said support and surrounding said shaft, a driving pulley rotatably mounted on said bearing, a driven member secured to said shaft, a differential connection between said pulley and said driven member, and means for locking said support in adjusted positions to vary the relation of said bearing to the center of said shaft.

3. Variable speed adjusting mechanism comprising a shaft, an adjustable support, a hollow bearing mounted on said support and surrounding said shaft at a distance therefrom; a driven member connected to said shaft, a pulley mounted on said bearing, a pin-and-slot connection between said pulley and said driven member, and means for locking said support in adjusted positions to vary the relation between the center of said pulley and the center of said shaft.

In testimony whereof I have hereunto set my hand.

JOHN H. WOOLCOTT.