J. H. KAUFFMAN.

GEAR TRANSMISSION.

APPLICATION FILED JULY 16, 1919.

1,369,442. Patented Feb. 22, 1921.

Fig. 1.

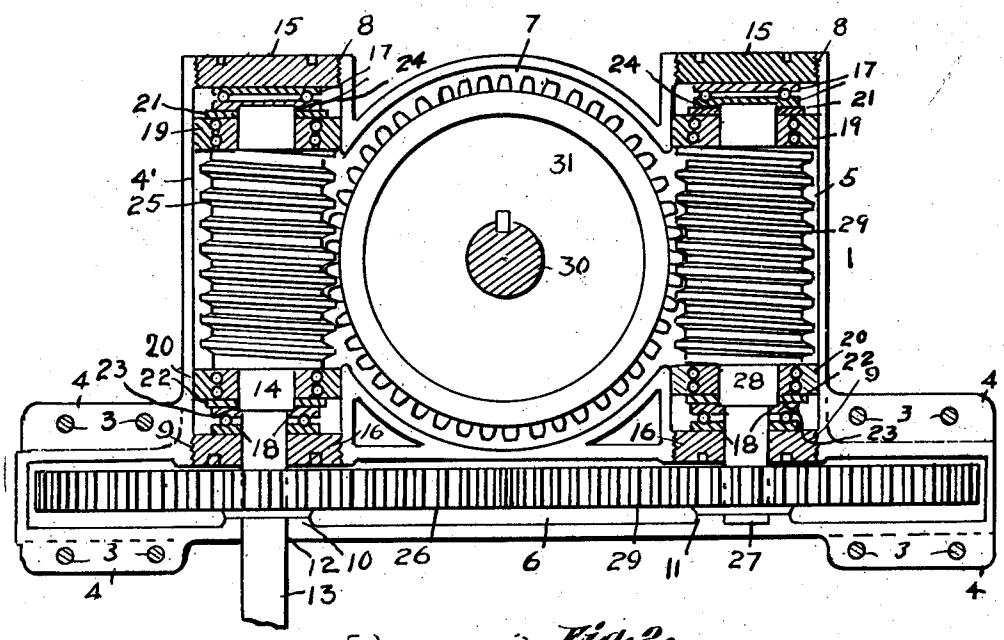
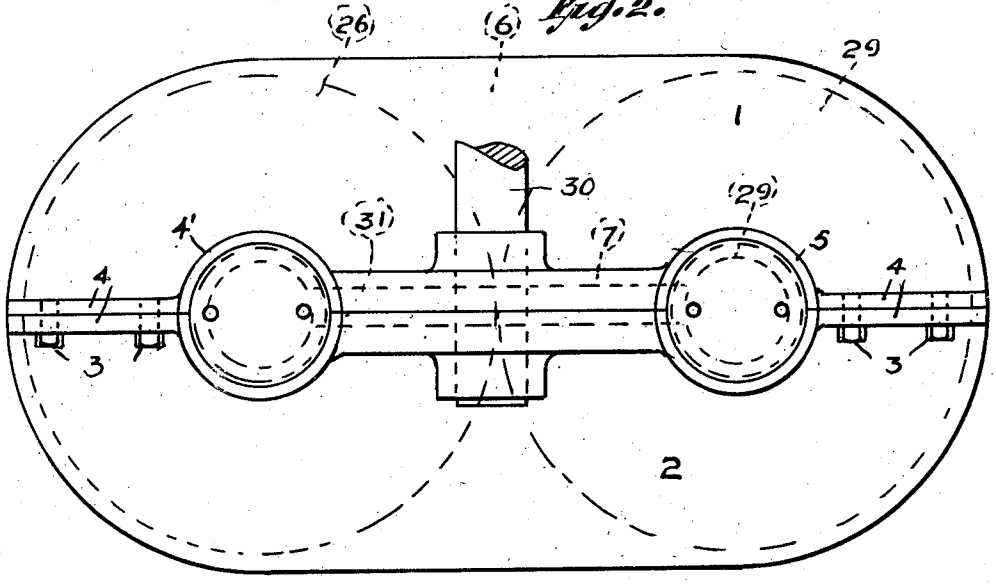


Fig. 2.



WITNESSES

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GEAR TRANSMISSION.

1,369,442. Specification of Letters Patent. Patented Feb. 22, 1921.

Application filed July 16, 1919. Serial No. 311,224.

To all whom it may concern:

Be it known that I, JOHN H. KAUFFMAN, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gear Transmissions, of which the following is a specification.

This invention relates to worm-gear driving mechanism, and has for its object to provide a mechanism of such class with means, in a manner as hereinafter set forth, whereby a pair of oppositely operating and synchronously actuated worms driven from a common source are employed for driving a worm-gear whereby the operation of the latter is facilitated and uniform.

Further objects of this invention are to provide a mechanism of such class, in a manner as hereinafter set forth, which is simple in its construction and arrangement, strong, durable and efficient in its use, readily set up and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more fully set forth and illustrated in the accompanying drawing wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claim hereunto appended.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views:

Figure 1 is a vertical elevation of a worm gear driving mechanism, with a section of the housing removed, and in accordance with this invention.

Fig. 2 is a top plan view thereof.

Referring to the drawing in detail 1 and 2 denote the flanged sections of a housing and which are secured together by the holdfast devices 3 connected to the flanges 4 of the sections 1 and 2. The sections 1 and 2 are complemental with respect to each other and each is formed with a pair of spaced semi-cylindrical portions and a semi-oval portion. The semi-cylindrical portion of each section is hollow and is formed integral with and disposed at right angles with respect to the semi-oval portion. Each of the sections 1 and 2 is further provided with a hollow circular portion which is arranged between and formed integral with a pair of semi-cylindrical portions. The semi-cylindrical portions of one section oppose a like portion of the other section to form a pair of worm chambers 4′ and 5. The semi-oval portion of one section opposes the like portion of the other section to form a gear chamber 6, and the circular portions of the housing sections oppose each other to provide a worm gear chamber 7.

The wall of each of the worm chambers 4′ and 5 is cut away to provide an opening so that the said chambers will communicate with the worm gear chamber 7. The inner face of the wall of each of the chambers 4′ and 5, at the upper portion thereof is threaded as at 8. The bottom of each of the chambers 4′ and 5 open into the gear chamber 6, and the wall of each of the worm chambers is interiorily threaded, at its lower end as at 9. The bottom of the gear chamber 6 has its upper face formed with annular bosses 10 and 11, and is also formed with an opening 12, through which extends a worm shaft 13, the latter having its upper portion of greater diameter than its lower portion, as at 14. The shaft 13 extends through the chamber 6 and up into the chamber 4′ to near the top thereof.

Connected to the threads 8, on the wall of each worm chamber, is an adjusting nut 15, and connected to the threads 9, on the wall of each worm chamber, is an adjusting nut 16. Mounted against the nut 15 is a thrust bearing 17 and mounted on the nut 16 is a thrust bearing 18. Positioned in each worm chamber is a pair of bearing elements 19 and 20.

The bearing element 19 is arranged below the thrust bearing 17 and the bearing element 20 is positioned above the thrust bearing 18. Interposed between the element 19 and the thrust bearing 17 is a washer 21, and interposed between the element 20 and the thrust bearing 18 is a washer 22.

The reduced or lower portion of the shaft 13 extends through the nut 16 and terminates in the thrust bearing 18, the latter is formed in its upper face with a depression 23 which constitutes a seat for the lower end of the enlarged portion of the shaft 13. The enlarged portion 14, of the shaft 13, extends up through the washer 22, bearing element 20, bearing element 19, washer 21 and into a depression 24 formed in the lower face of the thrust bearing 17. The enlarged

portion of the shaft 13, has secured or formed integral therewith a worm 25, the latter is positioned between the bearing elements 19 and 20, within the worm chamber 4'.

Secured to the shaft 13, within the gear chamber 6, is a gear wheel 26, the hub of which is seated on the boss 10.

The reference character 27, denotes a shaft, having its upper portion enlarged as at 28, the lower end of the shaft 27 is seated against the bottom of the gear chamber 6 within the boss 11. The shaft 27 has secured thereto, within the chamber 6, a gear wheel 29 which meshes with and is of the same diameter as the gear wheel 26 and is driven by the latter whereby the shaft 27 will operate at the same rate of speed as the shaft 13. The shaft 27 extends up through the nut 16 and terminates in the thrust bearing 17. The lower end of the enlarged portion 28, of the shaft 27, is seated in the depression 23, and the said enlarged portion 28 extends up through the washer 22, bearing element 20, bearing element 19 and into the depression 24, and the said enlarged portion 28, of the shaft 27, has secured and formed integral therewith a worm 29, which is positioned between the bearing elements 19, 20, within the chamber 5.

Supported by the circular portions of the housing sections is a driven shaft 30, the latter extending through the chamber 7, and from one of the circular portions and is adapted to be operatively connected with the machine, transmission or other device to be operated from the worm drive mechanism. Secured to the shaft 30, within the chamber 7, is a worm gear 31 which is in mesh with and driven by the worms 25 and 29, the latter traveling in a direction opposite of that of the former, and by setting up the arrangement referred to the gear 31 is driven by a pair of oppositely disposed worms actuated from a common source and which will facilitate the operation of the worm gear 31.

What I claim is:—

A driving mechanism of the class referred to comprising a pair of opposed spaced shafts geared together, a worm on each of said shafts, a worm gear wheel interposed between and meshing with said worms, a shaft having a solid bearing with said gear wheel and driving the latter to cause the synchronous driving of said shafts and operating the worms in opposite directions, upper and lower thrust bearings for each of said shafts, upper and lower bearing elements for each of said shafts, and upper and lower adjusting nuts for each of said thrust bearings and bearing elements, said thrust bearings interposed between the nuts and the bearing elements.

In testimony whereof I affix my signature.

JOHN H. KAUFFMAN.