D. WILLIAMSON.

POWER TRANSMITTER.

APPLICATION FILED MAY 10, 1906.

912,345. Patented Feb. 16, 1909.

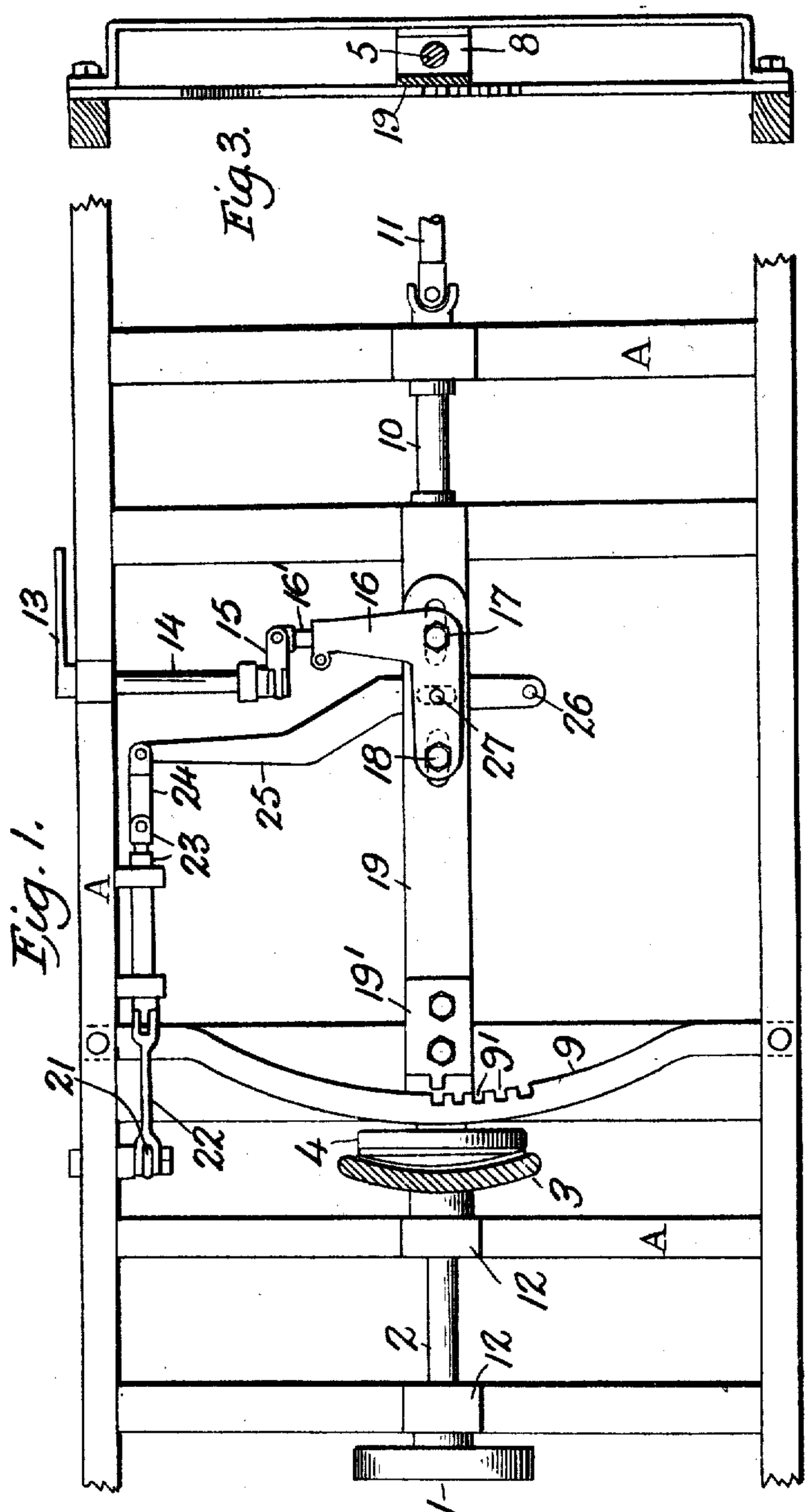


Fig. 1.

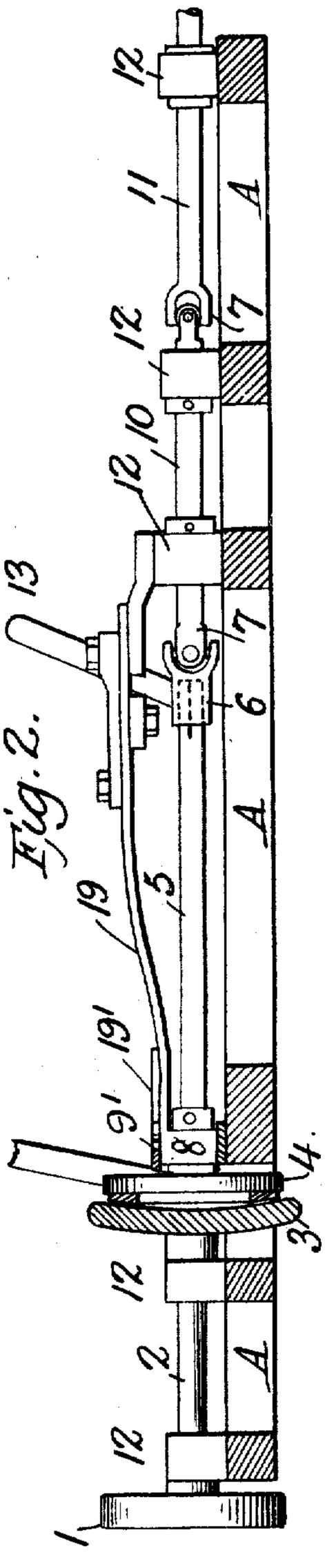


Fig. 2.

WITNESSES

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## POWER-TRANSMITTER.

No. 912,345. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed May 10, 1906. Serial No. 316,219.

*To all whom it may concern:*

Be it known that I, DAVID WILLIAMSON, a citizen of the United States, and resident of the city, county, and State of New York, have invented certain new and useful Improvements in Power-Transmitters, of which the following is a specification.

My present invention pertains to mechanisms for transmitting power, and the objects sought to be accomplished are simplicity of design and operation, the avoidance of the use of toothed gearing, a wide range of variability of speed with relatively close adjustments of the latter, reversibility of movement, perfect control and moderate cost of construction.

While the subject of my invention is well adapted to a wide range of uses, it is believed to embody in its design and operation certain marked advantages which peculiarly adapt it for use on automobiles; as it is noiseless, durable, readily protected from sand or dust, readily lubricated and of but moderate weight.

In the drawing, Figure 1 is a side elevation of the particular form of my invention which is described in this specification; parts of the sustaining framework being removed; Fig. 2 is a top plan view thereof, and Fig. 3 is an end elevation of a part of the mechanism and frame.

Reference characters are relatively alike throughout the drawing.

On a frame A are fixed a number of journal-boxes 12 in which are journaled a drive-shaft 2, a driven-shaft 5, an intermediate shaft 10 and a connecting shaft 11. On the drive-shaft 2 is shown a pulley 1, which, by means of a belt (not shown) may be made to drive the mechanism of my invention. It will be readily understood, however, that any suitable source of power may be used for the purpose mentioned. Upon an end of the shaft 2 is fixed one and upon the adjacent end of the shaft 5 is fixed the other of a pair of rotatable bodies, respectively referred to herein as "3" and "4", which are so mounted on a common plane that a side of one body may contact and engage, preferably frictionally, a side of the other body.

It should be noted that the terms "drive" and "driven", as used herein, refer to the specific form of my invention that is shown herein. Either one of the bodies 3 or 4 may be the driver, the other one being, as a matter of course, the driven.

Means are provided for causing the bodies 3 and 4 to contact and engage each other as before related, and such contact and engagement may be made with said bodies either concentric with or eccentric to one another. Furthermore, such contact and engagement may be made with said bodies either in axial alinement with or angularly adjusted to one another. As an illustration of a form of mechanism that may be used for the purposes mentioned, I have shown in the drawing universal joints 7, 7, one of which couples the shafts 5 and 10 and the other one as coupling shafts 10 and 11. The shaft 5 may be oscillated upon a pivot which is preferably in transverse alinement with the center of the universal joint 7 which couples the shaft 5 to the shaft 10; thus providing for the oscillation of the body 4 transversely of its axis. A hand-lever 13 is shown as pivotally mounted upon the frame A by means of a rock-shaft 14 which carries a toe 14′ which is connected by a link 15 to an angle-lever 16, which is provided with means for adjusting the proportional movement thereof, said means comprising a screw-threaded stud which is tapped into the angle-lever 16; the latter being split and provided with a binding screw for the purpose of taking up any wear that may take place in the joint formed by the screw-stud and the angle-lever. All of the adjusting parts thus described are referred to in the drawings, collectively, as 16′. The angle-lever 16 is pivoted at 17, and preferably in alinement with the pivot upon which the shaft 5 is oscillatable. Slidable and oscillatable upon the pivot 17 is a bar 19, which, because of the fact that in the form of my invention shown in the drawing, it is functionally-operative to communicate to the body 4 all of the movements which are necessary for the operation of the mechanism, save and except the rotary motion of the body 4, I have designated "the operating-bar." In this bar there is fixed a pivot 18 which is shown as engaged in a slot which is formed in an arm of the angle-lever 16. The operating-

bar 19 is rigidly connected with a journal-box 8 which journals the shaft 5 and is slidable in curved ways 9, both longitudinally and transversely of the latter. The journal box 8 is fixed axially of the shaft 5, between a hub of the body 4 and a collar 20 which is rigidly mounted upon the shaft 5. On the bar 19 is shown, fixed thereto, a locking-plate 19′, which has a projecting detent which is engageable in any one of a plurality of notches 9′ which are formed in an edge of one of the plates which compose the curved ways 9. The depth of the recesses 9′ and the length of the detent on the locking-plate 19′ should be equally sufficient to permit the bar 19 to move the body 4 a sufficient distance to contact and engage the body 3, as hereinafter related.

A power-engaging lever, so-called, referred to herein as 21, is pivotally mounted upon the frame A and connected by a link 22 to a pressure-adjusting means 23 which, as shown, comprises a turnbuckle which is slidably mounted upon the frame A, and is connected by a link 24 to a lever 25 which is pivoted at 26 by a fulcrum-pivot, and is pivotally connected with the operating-bar 19 by a pivot 27 which engages in a slot which is formed in the lever 25.

The body 3, as shown herein, is concave on the side adjacent to the body 4, and the latter is shown herein as convex on the side adjacent to the body 3. These specific forms are shown and described only as illustrating certain operative designs which have been found effective in securing desired results, and in no wise limit my invention. Moreover, it may be found desirable to form the convex surface of one body upon a greater or a less radius than the concave surface of the other body; but I do not limit my invention to either of said forms, should a convex and a concave surface be used.

The operation of the mechanisms herein shown and described would be as follows: The several parts being in the positions shown in the drawing and it being desired to obtain power from the shaft 2, and at the maximum speed communicable thereby, the power-engaging lever 21 should be urged in a direction from right to left, as the mechanism is shown; thus urging the free end of the lever 25 in the same direction and, by means of the pivot 27, operating-bar 19, and the journal-box 8, forcing the body 4 against the body 3; both of said bodies being, as shown, in axial alinement or concentric one with the other; said bodies 3 and 4 being locked in their respective positions, the former by its fixed journal boxes and the latter by the engagement of the detent on the locking-plate 19′ in a notch or recess 9′. As the engagement of the bodies 3 and 4 is shown herein as frictional, all of the power obtainable by means of the mechanism as shown may be had by exerting an adequate pressure upon the lever 21; but, if it be necessary to do so, the contacting surfaces of the bodies 3 and 4 may be permitted to slip, one upon the other, by reducing the pressure applied by means of the lever 21 and connecting mechanism. A slip-joint may be provided to permit the shaft 5 and body 4 to be moved as hereinbefore related. Such a one is shown in the drawings and is referred to as "6." It comprises a squared end of the shaft 5, engaged in a complemental socket formed in a member which is, practically, a continuation of the shaft 5. It is obvious that a return of the lever 21 to its prime position will cause all other parts previously operated thereby to assume the same, relatively, and the mechanism will become non-operative. If now it be desired to obtain power from the shaft 2, but at a speed which will be less than that of said shaft, the speed-regulating and reversing lever 13 should be urged in a direction from right to left, as the mechanism is shown, as far as may be necessary to direct the body 4 to a point of contact with the body 3 where such contact will be made by the radially outward parts of the engaging surface of the body 4 and radially inward parts of the engaging surface of the body 3; when, suitable engagement of the contacting parts being effected by an operation of the lever 21, as hereinbefore related, power will be communicated or transmitted by the body 3 to the body 4 at a speed directly in proportion to the radii of the rotating and contacting surfaces.

The direction of rotation of the driven body relatively of that of the driving body may be changed at the will of the operator of the mechanism. If the contact and engagement of the driving and driven bodies be made and effected at one and the same side of the axis of each, said bodies will both rotate in one and the same direction; but if said contact and engagement be made and effected at opposite sides of the axes of said bodies, said bodies will rotate in reversed or opposite directions. Therefore, if the speed-regulating and reversing lever be moved in one direction, it will, by means of the connecting mechanism, cause the driven body, herein shown as the body 4, to contact and engage the driving body, herein shown as the body 3, either in axial alinement or at the side of its axis which is nearer the top of the drawing as the mechanism is shown, the direction of the rotation of the body 4 will be the same as that of the body 3; while, if the body 4 contact and engage the body 3 at the opposite sides of their respective axes, the direction of rotation of the body 4 will be the reverse of that of the body 3. A return of the levers 13 and 21 to their respec-

tive prime positions will cause a relatively similar movement of all of the mechanisms which are operated by said levers.

The connecting shaft 11 may or may not be a part of the mechanism preferably used. The so-called intermediate shaft 10 may, if preferred, be connected directly with the mechanism which is to be driven by the invention.

I claim as new and as my invention,

1. In a device of the character described, a drive shaft, a driven shaft, the latter being oscillatable, a driving member on the drive shaft, a driven member on the free end of the driven shaft, said members being adapted for engagement with each other to effect a connection between said shafts, a guide-way including a fixed rack, and means co-operating with the rack to lock said members together.

2. In a device of the character described, a drive shaft, a driven shaft, the latter being oscillatable, a driving member on the drive shaft, a driven member on the free end of the driven shaft, said members being adapted for engagement with each other to effect a connection between said shafts, means for oscillating said oscillatable shaft to vary the speed of rotation of the driven shaft, a guide-way including a rack, and a locking plate having a detent to engage the teeth of the rack to lock said members together.

3. In a device of the character described, a drive shaft, a driven shaft, the latter being oscillatable, a driving member on the drive shaft provided with a concave face, a driven member on the free end of the driven shaft provided with a convex face for engagement with the concave face of the driving member to effect rotation of the driven shaft, a fixed rack, and a locking device movable with the driven shaft to engage said rack and lock said members together.

4. In a device of the character described, a drive shaft, a driven shaft, the latter being oscillatable, a driving member on the drive shaft provided with a concave face, a driven member on the free end of the driven shaft provided with a convex face for engagement with the concave face of the driving member to effect a connection between said shafts, means for oscillating said oscillatable shaft to vary the speed of rotation of the driven shaft, a rack, and a locking plate having a detent for engagement with the rack to lock said members together, said lock plate being movable with the driven shaft.

5. In a device of the character described, a frame, a drive shaft, a driven shaft, the latter being oscillatable, a driving member on the free end of the drive shaft, a driven member on one end of the driven shaft to be engaged by the driving member, a curved guide-way in the frame, one element of said guide-way having teeth, a bearing block in which the free end of the driven shaft is mounted, said block being slidable in said guide-way, a slidable and an oscillatable bar having connection with said bearing block and provided at one end with a detent, an angle lever mounted on said bar, means having connection with said angle lever to shift said block in said guide-way and thereby oscillate said driven shaft to change the plane of the driven member with relation to the driving member to vary the speed of rotation of the driven shaft when said members are forced together, another lever pivoted at one end in the frame and also having pivotal engagement with said bar, means whereby said last mentioned lever may be operated to shift said bar to present its detent between the corresponding teeth of said guide-way to lock the aforesaid members in operative relation to effect rotation of said driven shaft.

6. In a device of the character described, a frame, a drive shaft, a driven shaft, the latter being oscillatable, a driven member carried by the driven shaft, a driving member carried by the drive shaft, a guide-way provided with teeth, a bearing block in which the free end of the driven shaft is mounted, said block being slidable in said guide-way, a slidable and an oscillatable bar having connection with said bearing block and provided at one end with a detent, an angle lever adjustably mounted on said bar, means having connection with said angle lever to shift said block in said guide-way and thereby oscillate said driven shaft to change the plane of the driven member with relation to the driving member to vary the speed of rotation of the driven shaft when said members are forced together, another lever having pivotal engagement with said bar, and means whereby said last mentioned lever may be operated to shift said bar to present its detent between corresponding teeth of said guide-way to lock the aforesaid members in operative position to control the speed of rotation of said driven shaft.

7. In a device of the character described, a frame, a drive shaft, a driven shaft, the latter being oscillatable out of alignement with the drive shaft, a driving member mounted upon said drive shaft, a driven member mounted upon the driven shaft, one of said members having a concaved face and the other member having a convex face, a guide-way in which one end of the driven shaft is shifted, means whereby said members may be thrown into operative relation, and means movable longitudinally of the shafts into engagement with said guide-way to lock said members together.

8. In a device of the character described, a frame, a drive shaft, a driven shaft, the

latter being oscillatable, a driven member on the free end of the driven shaft, a driving member on the drive shaft to be engaged by the driven member, a slidable and an oscillatable bar, an angle lever mounted on said bar, means having connection with said angle lever to oscillate the driven shaft to move said bar and change the plane of the driven member with relation to the driving member to vary the speed of rotation of the drive shaft when said members are forced together, means for forcing said members together, and means for locking said members in their coupled relation.

In witness whereof I have signed this in the presence of two subscribing witnesses.

DAVID WILLIAMSON.

Witnesses:

MOSES ROSENFIELD,

CHAS. H. DAVIDS.