T. O. WERNER.

REVERSING MECHANISM.

APPLICATION FILED DEC. 9, 1915.

1,175,101.

Patented Mar. 14, 1916.

2 SHEETS—SHEET 1.

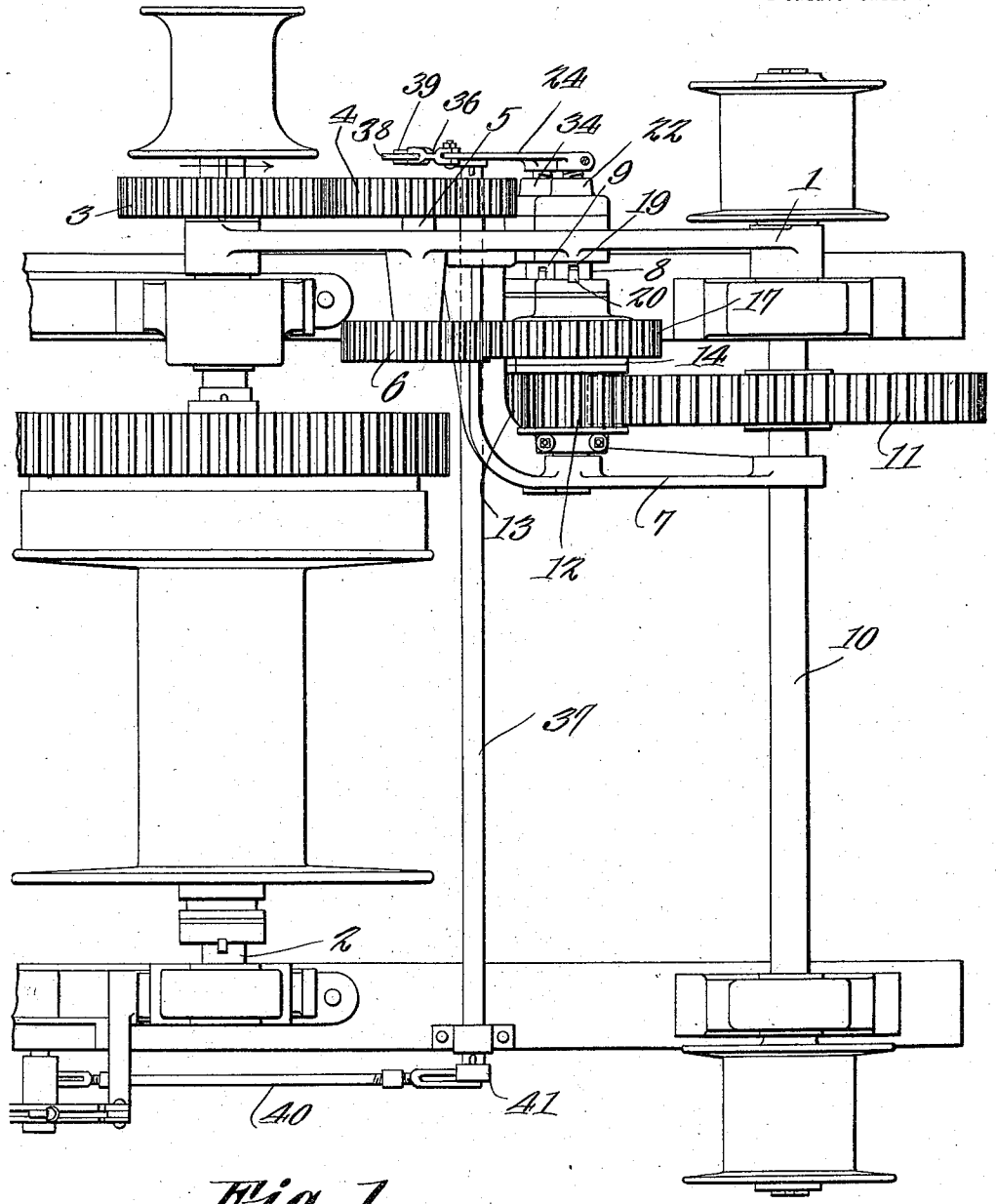

Fig. 1.

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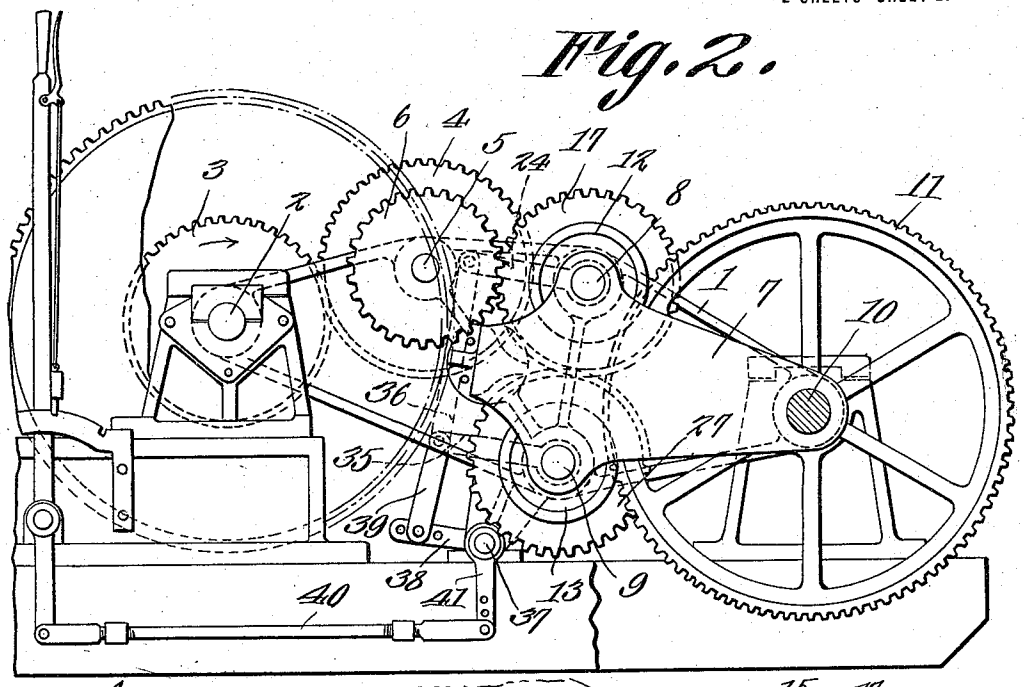
2 SHEETS—SHEET 2.

Fig. 2.



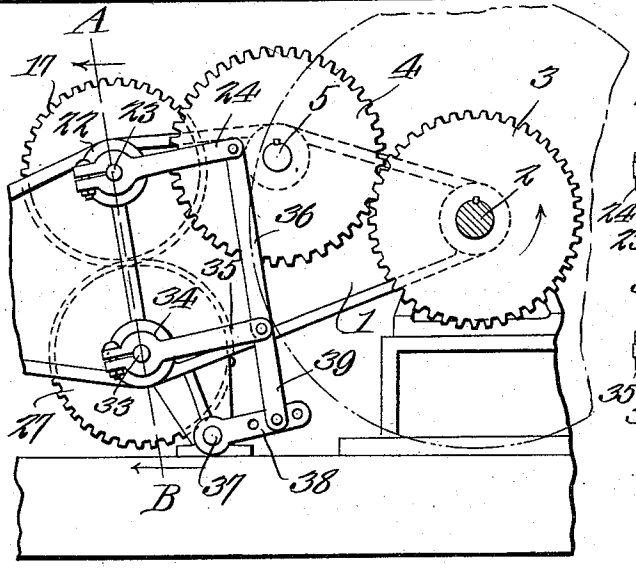


Fig. 3.

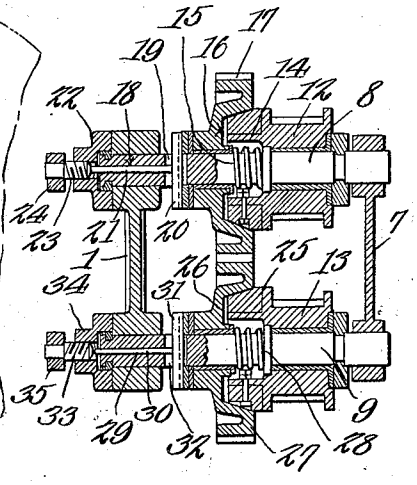


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS ODENWELDER WERNER, OF BANGOR, PENNSYLVANIA.

REVERSING MECHANISM.

1,175,101. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed December 9, 1915. Serial No. 65,960.

To all whom it may concern:

Be it known that I, THOMAS O. WERNER, a citizen of the United States, residing at Bangor, in the county of Northampton and State of Pennsylvania, have invented a new and useful Reversing Mechanism, of which the following is a specification.

This invention relates to reversing mechanisms particularly designed for use in connection with hoisting engines and the like, whereby the motion of the drum can be readily reversed.

The invention is more especially designed as an improvement upon the structure covered by Patent No. 778,615, issued jointly to J. H. Werner and S. Flory, on December 27, 1904.

Mechanisms of this character as heretofore constructed have been objectionable for the reason that it has been impossible to use one standard mechanism in connection with machines of different makes and types. On the contrary reversing mechanisms have necessarily been altered more or less extensively in order to render them capable of use in connection with different machines. This has obviously added materially to the cost of making a reversing mechanism and applying it to the machine.

One of the objects of the present invention is to provide reversing mechanism the gears of which are so located relative to each other that, merely by the removal of two gears and the substitution of two other gears of different diameters, the speed of the driven parts can be varied. Consequently, the mechanism can be adapted to machines of different types without necessitating alterations either in the machine constituting the present invention or to the apparatus to which it is applied.

It might be stated further that in mechanisms of this type as heretofore constructed it has been practically impossible to change the speed of the driven parts because the power transmitting gears have been arranged in a train with a number of the gears in the same plane and, consequently, the gears could not be rearranged in order to get the desired changes in speed. By means of the mechanism constituting the present invention certain of the gears can be interchanged or other gears substituted, thus to effect a change of speed readily and without changing the structure of the mechanism.

A further object of the invention is to provide a novel arrangement of gears together with clutch mechanisms of novel form whereby a positive operation of the mechanism in the desired direction is secured.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings, the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a plan view of the mechanism constituting the present invention. Fig. 2 is an elevation of one side of the apparatus, parts being broken away. Fig. 3 is an elevation of the opposite side of the reversing mechanism. Fig. 4 is a section on line A—B Fig. 3.

Referring to the figures by characters of reference 1 designates a portion of the frame of the machine, the same having a drive shaft 2 which may be actuated in any manner desired, this drive shaft having a gear 3 secured to it and constantly meshing with a gear 4 which is detachably secured to a shaft 5 journaled within the frame 1. To this shaft 5 is secured a gear 6. It is to be understood that the gear 3 as well as gear 4 can be detached and other gears of different sizes substituted therefor so that the speed ratio of the two shafts 2 and 5 can be varied. Obviously this change in gears can be effected without disturbing any of the other parts of the mechanism. Secured to the frame 1 is a supplemental frame 7 and secured in this frame as well as the frame 1, are superposed shafts 8 and 9 each of which is held against rotation in any manner desired. A driven shaft 10 is journaled in the frames 1 and 7 and has a large gear 11 keyed or otherwise secured thereto and constantly meshing with two similar gears 12 and 13 mounted for rotation on the shafts 8 and 9 respectively. Gear 12 is provided

at one end with a conical clutch member 14 surrounding a coiled spring 15 mounted on the shaft 8, this spring 15 bearing against the inner wall of a recess 16 formed in one side of a gear 17 which is loosely mounted on the shaft 8. The wall of recess 16 is adapted to be frictionally engaged by the clutch member 14 and, when the parts are thus held in contact, the two gears 12 and 17 will rotate as one body upon the shaft 8. When, however, the clutch members are thus in frictional engagement, the spring 15 is under compression. Shaft 8 is provided, in its outer end, with a longitudinal bore 18 opening, at its inner end, in a diametrical slot 19 formed in the shaft 8. Extending through this slot is a cross arm 20 from the center of which projects a pin 21 slidably mounted in the bore 18. A cap 22 houses the outer end of shaft 8 and is engaged by an adjusting screw 23 having a quick thread, this screw constantly bearing against the end of the pin 21. An arm 24 is extended radially from the screw and is preferably clamped thereon, as shown in Fig. 3, so that movement of the arm in one direction will cause the screw to move inwardly and thrust against the pin 21 while movement of the arm in the other direction will result in the partial unscrewing of the part 23 and the consequent movement of the gear 17 and cross arm 20 under the action of spring 15.

The gear 13 has a conical clutch member 25 similar to the clutch member 14 and which extends into a recess 26 formed in a gear 27 which is loosely mounted on shaft 9 and constantly meshes with the gear 17. A spring 28 is housed within the clutch member 25 and constantly presses against the central portion of gear 27 so as to hold said gear normally disengaged from the clutch member 25. A longitudinal bore 29 is formed in the outer end portion of shaft 9 and a pin 30 is slidably mounted in this bore and is extended from a cross arm 31 slidably mounted in a slot 32 which is extended through the shaft 9. A screw 33 having a quick thread is mounted within a cap 34 housing the outer end of shaft 9 and secured to this screw is a radial arm 35 similar to the arm 24. The screws 33 and 22 have their threads oppositely pitched, one screw having a right hand thread and the other screw having a left hand thread. The two arms 24 and 35 are connected by a link 36 so that the two arms will move together in the same direction. However this movement of the arms in one direction will result in the outward movement of one of the screws and the inward movement of the other screw. When either of the screws is moved inwardly, it will force the cross arm 20 or 31 against the hub portion of the adjacent gear so as to bind said gear upon the adjacent clutch member and couple the gear to the adjacent gear 12 or 13. Thus it will be seen that movement of the arms 24 and 35 will result in the simultaneous coupling of one gear 17 or 27 and the uncoupling of the other gear.

It is to be understood that the arms 24 and 35 can be actuated in any manner desired. For example, a rock shaft 37 may be extended across the machine, this rock shaft having a crank arm 38 connected by a link 39 to the arm 35. The rock shaft, in turn, can be actuated by a rod 40 connected to a crank arm 41 upon the rock shaft 37, this rod 40 being operated by any desired means.

It will be apparent that when the shaft 2 is rotating, for example, in the direction indicated by the arrow in Figs. 1, 2 and 3, motion will be transmitted therefrom through gears 3 and 4 to shaft 5 and from gear 6 on said shaft to gear 17. As gear 17 is constantly in mesh with gear 27, the two gears will be rotated simultaneously in opposite directions respectively. By utilizing a construction such as illustrated, it will be seen that when the arms 35 and 24 are drawn downwardly, the screw 23 will feed inwardly against the pin 21 and thrust the cross arm 20 against the middle portion of gear 17, thus binding said gear upon the clutch member 14 and causing gear 12 to rotate with gear 17. At the same time, screw 23 will be fed outwardly so that spring 28, which is under compression, will press gear 27 away from clutch member 25, thereby uncoupling gear 17 from said gear 27. As both gears 12 and 13 are in mesh with the gear 11, it will be apparent that said gear 11 will receive motion solely from gear 12 and will be rotated in one direction, gear 13 rotating freely on its shaft 9. By moving the arms 35 and 24 upwardly, the foregoing operation will be reversed, gear 12 being uncoupled from its gear 17, while gear 13 becomes coupled to gear 27 and thus operates as the means for rotating the gear 11. Consequently the rotation of gear 11 and shaft 10 will be reversed. As only a minute movement of each gear 17 and 27 is necessary in order to shift it into and out of engagement with its clutch member, it will be apparent that there is no danger of these gears moving out of mesh with each other. By using clutch shifting mechanism such as described, a very quick application of the clutch or release of the clutch is effected and the mechanism is at all times under the positive control of the operator.

What is claimed is:—

The combination with stationary shafts, a driven gear, a pair of gears mounted for rotation on said shafts and constantly meshing with the driven gear, and a clutch member integral with both gears of said pair, of a second pair of gears mounted for rotation on the shafts and having clutch faces for

engagement by said clutch members, yieldable means upon the shafts for holding the gears of the two pairs normally uncoupled from each other, means slidably carried by each of said shafts for shifting one gear on each shaft to couple it to the other gear thereon, a threaded element carried by each shaft for actuating said sliding shifting means, and means for simultaneously actuating said threaded elements, the threads on the elements being oppositely pitched.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS ODENWELDER WERNER.

Witnesses:

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MARVEL E. TRACAY.