

Dec. 18, 1923.

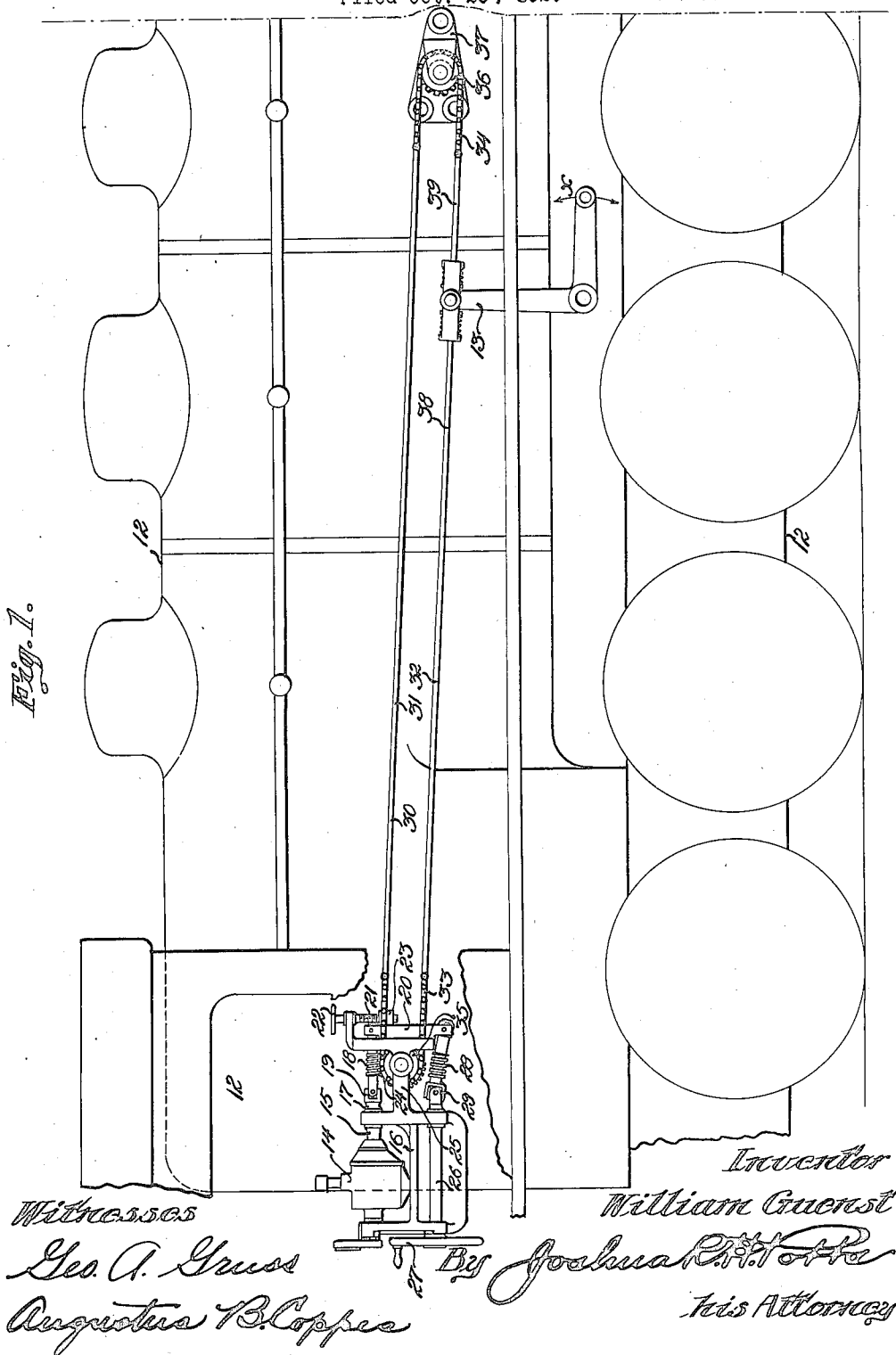
1,477,557

W. GUENST

POWER REVERSE GEAR

Filed Oct. 25, 1920

4 Sheets-Sheet 1



Witnesses

Geo. A. Gross
Augustus B. Cooper

Inventor

William Guerst

By Joshua R. H. Totten
7:00 PM

His Attorney

Dec. 18, 1923.

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4 Sheets-Sheet 2

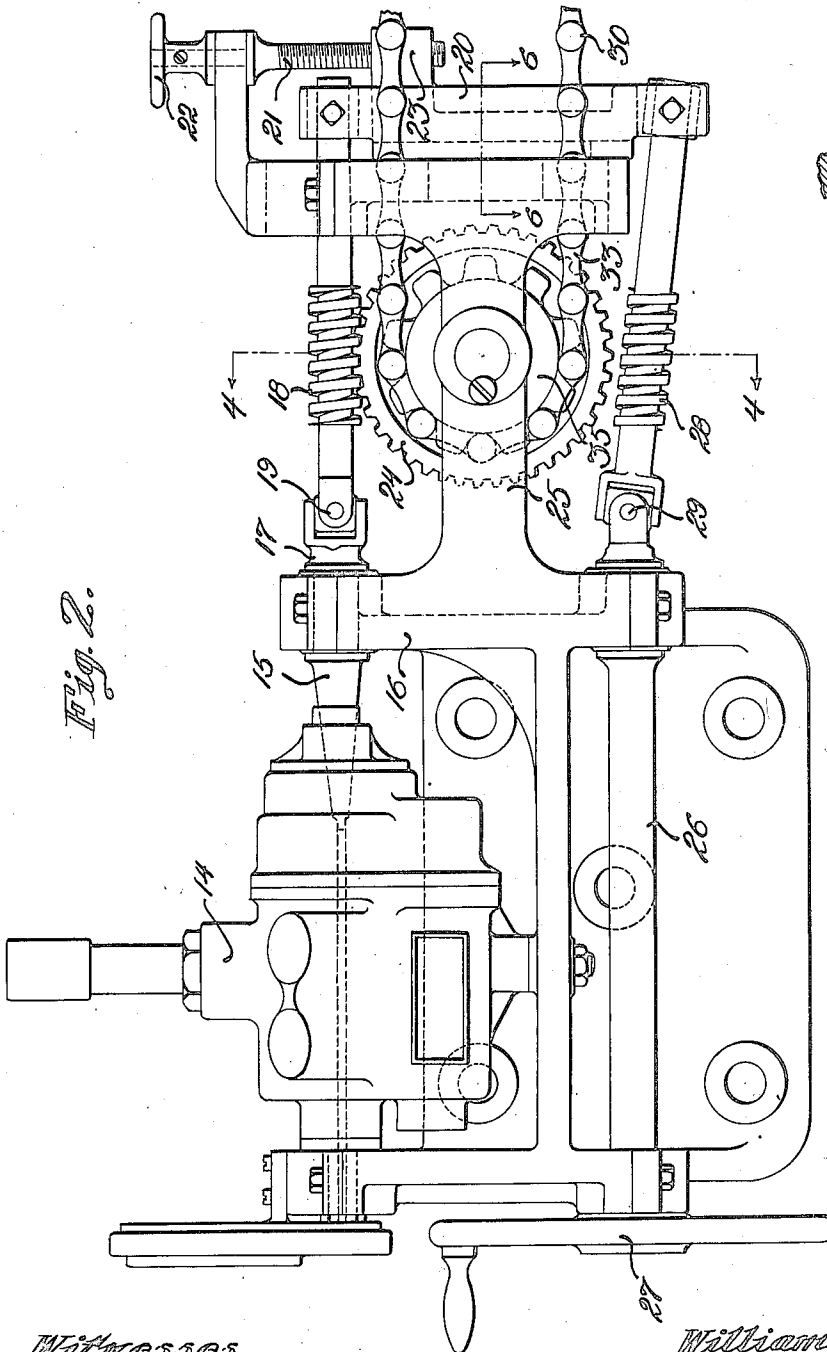


Fig. 2.

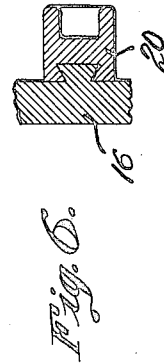


Fig. 6.

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4 Sheets-Sheet 3

Fig. 3.

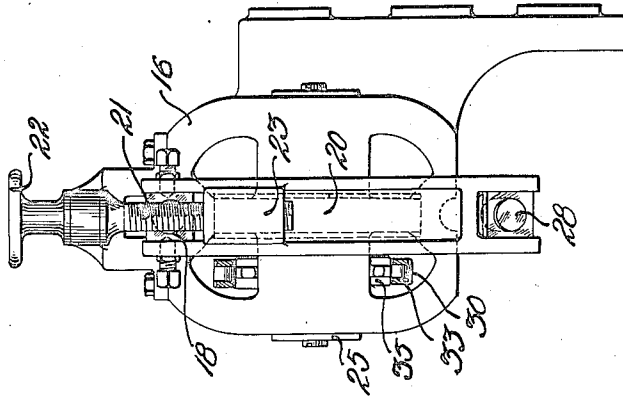


Fig. 4.

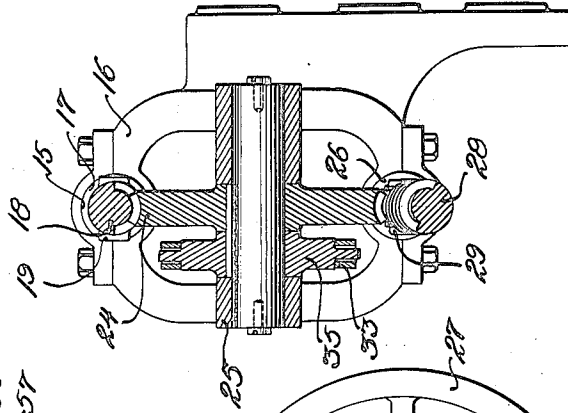
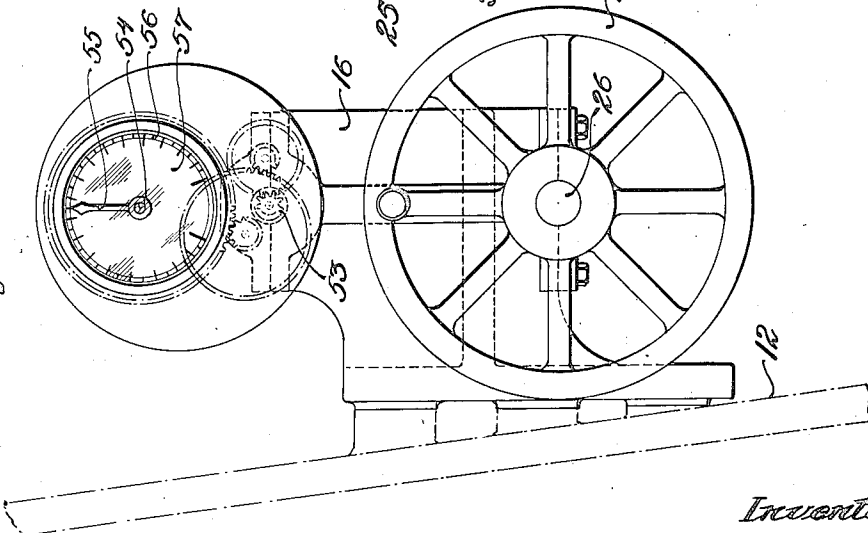


Fig. 5.



Witnesses

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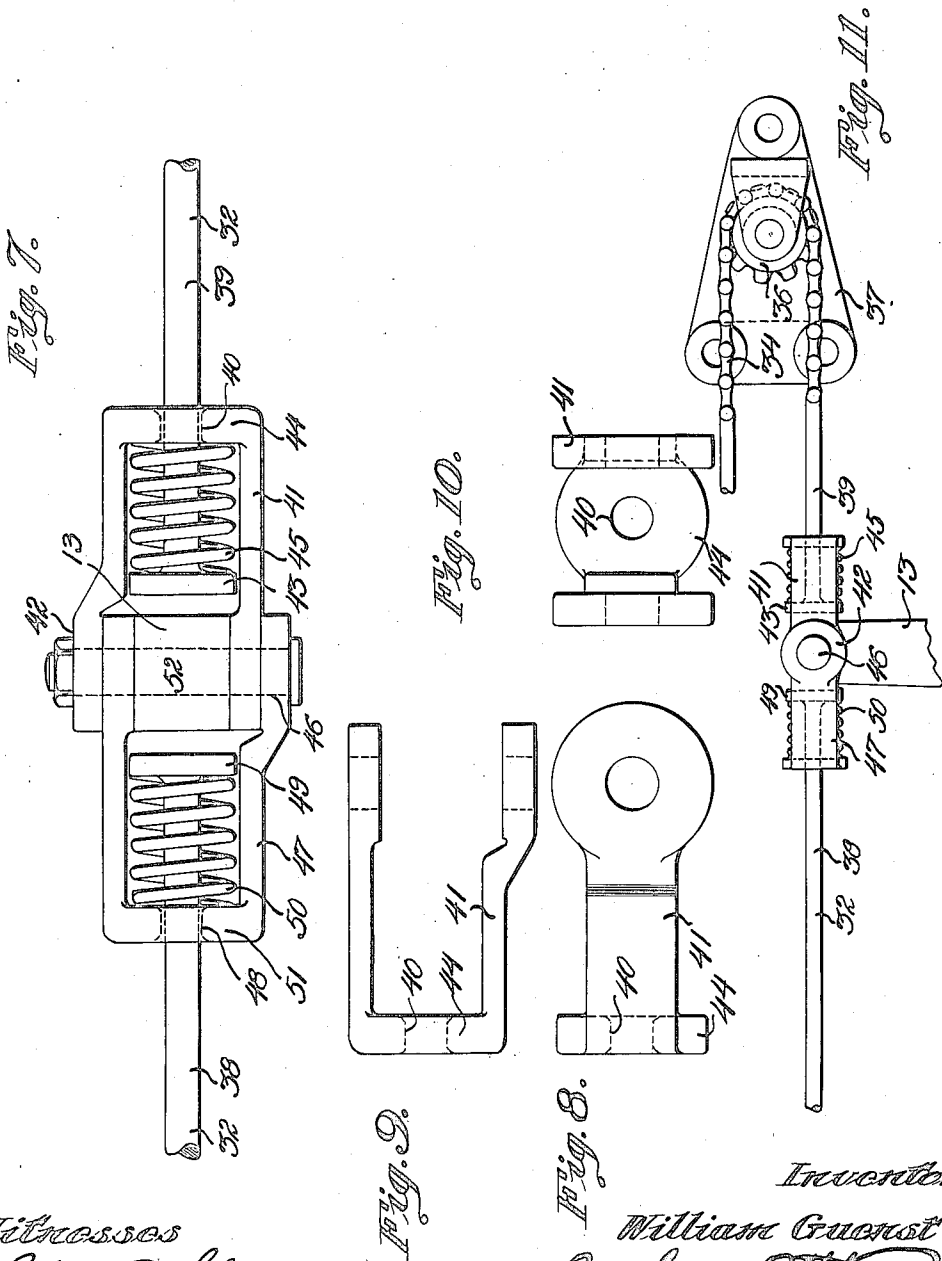
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POWER REVERSE GEAR

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4 Sheets-Sheet 4



Witnesses
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Patented Dec. 18, 1923.

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UNITED STATES PATENT OFFICE.

WILLIAM GUENST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
SAMUEL S. NEWMAN, OF PITTSBURGH, PENNSYLVANIA.

POWER REVERSE GEAR.

Application filed October 25, 1920. Serial No. 419,232.

To all whom it may concern:

Be it known that I, WILLIAM GUENST, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Power Reverse Gears, of which the following is a specification.

One object of my invention is to provide an improved power reverse gear which will be particularly adapted for use on locomotives and which will be so constructed as to effect a quick and certain movement of the reverse mechanism so that the latter will be held in any position into which it has been shifted.

Another object is to provide means which will enable the engineer to accurately determine the point of "cut-off" of the valves so that the most economical results in the operation of the locomotive can be obtained.

Another object is to make the device of my invention of a durable and comparatively simple construction and which can be operated at a low cost.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is an elevation, partly diagrammatic, showing my invention applied to a locomotive and illustrating how the same can be attached to the arm which connects with the reverse link thereof; said reverse link not being illustrated,

Figure 2 is an enlarged longitudinal elevation showing certain of the features of my invention,

Figure 3 is an end elevation looking in the direction of the left hand end of Figure 2,

Figure 4 is a section taken on the line 4—4 of Figure 2,

Figure 5 is an elevation of the right hand end of Figure 2,

Figure 6 is a fragmentary section taken on the line 6—6 of Figure 2,

Figure 7 is a top plan view showing a resilient housing connection which I preferably employ,

Figures 8, 9 and 10 are respectively a side view, top plan and end view of one of the yoked connecting members as shown in Figure 7, and

Figure 11 is a fragmentary elevation

showing certain of the parts of my invention and illustrated on a larger scale than that illustrated in Figure 1.

Referring to the drawings, 12 represents a locomotive which may be of any type employing an arm 13 for attachment to the reverse link which effects the reverse movement of the locomotive.

My invention consists in providing a pneumatic motor 14 which has a shaft 15 capable of being rotated in either direction when pressure fluid such as compressed air is supplied to the motor and it is hereby made of record that the motor 14 may be of any well known type capable of reversing a shaft such as the shaft 15. The shaft 15 is rotatably mounted in a frame or supporting structure 16 and has an extension 17 to which is connected a worm 18 through the medium of a universal joint 19. The opposite end of the worm 18 is movably connected to a slide 20 capable of being moved upwardly or downwardly through the medium of a screw 21 operated by a hand wheel 22. The slide 20 has a screw threaded projection or nut 23 in which the screw 21 engages and by rotating the screw 21, the worm 18 can be moved into or out of engagement with a worm wheel 24 which is rotatably mounted in an extension 25 of the supporting structure 16. The supporting structure 16 below the motor 14 forms a bearing for an auxiliary shaft 26 which may be rotated by a hand wheel 27. The shaft 26 is connected to a worm 28 through the medium of a universal joint 29 and the opposite end of the worm 28 is movably connected to the slide 20. The arrangement is such that when the slide is moved downwardly to move the worm 18 into mesh with the worm wheel 24, the worm 28 will be moved out of mesh with the worm wheel 24 so that upon a rotation of the shaft 15 by the motor 14, the worm wheel 24 will be automatically rotated. However, the upward movement of the slide 20 will move the worm 28 into mesh with the worm wheel 24 and simultaneously move the worm 18 out of mesh with the worm wheel 24. When the worm 28 is in engagement with the worm wheel 24, the latter may be rotated by hand power upon the turning of the hand wheel 27.

A flexible device 30, which as illustrated includes two substantially parallel bars 31 and 32 which are connected at their ends

by two chains 33 and 34, has the chain 33 passing over a sprocket wheel 35; said sprocket wheel being rotatably connected to the worm wheel 24. The flexible device 30 leads forwardly from the sprocket 35 and the chain 34 passes over an idler sprocket wheel 36 which is rotatively mounted in a bracket 37 which can be secured in any suitable manner to the forward portion of the locomotive in a manner shown in Figure 1. The bar 32 is made in two sections 38 and 39; the section 39 having one end connected to the chain 34 and its other end extending through a hole 40 in a yoked member 41 which forms a part of a housing 42. The extreme end of the section 39 of the bar 32 within the yoked member 41 is provided with a head 43 and between this head and the end 44 of the yoked member is interposed a coil spring 45 as clearly shown in Figure 7. The yoked member 41 is pivotally connected by a bolt 46 to a similarly constructed yoked member 47 which is provided with a hole 48 through which passes the end portion of the section 38 of the bar 32. The section 38 of the bar 32 is also provided with a head 49 within the yoked member 47 and a spring 50 is interposed between the head 49 and the outer end of the yoked member 47.

The bolt 46 forms a pivotal connection with the housing 42 for the arm 13 which is connected to the reverse link; the upper end 52 of the arm 13 being positioned between the pivoted ends of the yoked members 41 and 47. By constructing each of the yoked members with offset portions as shown in Figures 7 to 10 inclusive, the members may be made identical and so as to keep the sections 38 and 39 of the bar 32 substantially in axial alinement.

The operation of the device thus far specifically described is as follows:—

Considering that the worm 18 is in mesh with the worm wheel 24 and it is desired to operate the reversing arm 13, fluid pressure is supplied to the motor 14 to effect rotation of the shaft 15. This movement will then be transmitted through the worm 18 to the worm wheel 24 and the sprocket 35 will be rotated so as to effect movement of the flexible device longitudinally; the bar 32 effecting the swinging movement of the reverse arm 13 according to the direction in which the shaft 15 is rotated. It will be understood that the springs 45 and 50 are sufficiently strong as to only re-act on a stress well above the motor power necessary to operate the arm 13 and therefore the springs 45 and 50 are included only as a shock absorber interposed between the arm 13 and the flexible device. If it is desired at any time to move the device by hand power, it is merely necessary to turn the hand wheel 22 and thereby effect the move-

ment of the worm 28 into mesh with the worm wheel 24 and the worm wheel 18 out of mesh with the worm wheel 24, after which by rotating the wheel 27, the sprocket 35 will be rotated through the medium of engagement of the worm 26 with the worm wheel 24.

As illustrated in Figure 1, the mechanism directly adjacent the motor is positioned within the cab of the locomotive so as to be in a position near the engineer and in order that the engineer may accurately determine the exact position of the cut-off valve, I provide indicating means which is directly connected with the motor 14.

This indicating means includes a pinion 53 which is rotatable in conjunction with the shaft 15 and operatively connected with a shaft 54 by a train of gears as shown in Figure 3. The shaft 54 has an indicating pointer 55 adapted to traverse the graded markings 56 of an indicating dial 57 located at the end of the supporting structure 16 so as to be clearly seen by the engineer. It will thus be seen that means is provided to enable the engineer to note the point of "cut-off" of valves so that the most economical results in the operation of the locomotive may be obtained. In the preferred embodiment of my invention, air from the air supply line of the locomotive can be employed to drive the pneumatic motor 15 and by virtue of this arrangement such a ratio of gearing is established between the motor and the worm drive that but little air is required to operate the motor and an easy but powerful action of the parts is effected.

It will be noted that the flexible device 30 is in the form of a belt or band, the opposite ends of which pass over the respective sprockets 35 and 36 and that one "run" of the belt is attached to the arm 13 so that when the runs of the belt are shifted, a swinging movement of the arm 13 will be effected and the extent of this swinging movement will determine the amount of movement of the reverse link; the path of movement of the reverse link being indicated by the arrow *x* as shown in Figure 1.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. Reversing mechanism including a reversible motor; a shaft driven thereby; a worm wheel; a sprocket wheel connected with the worm wheel; a second sprocket

wheel; a flexible connection between the sprocket wheels; a reversing link; an operative connection between the flexible connection and the reversing link; a worm having
 5 a jointed connection with the motor shaft; an auxiliary shaft; a worm having a jointed connection with the auxiliary shaft; means for engaging either worm with the worm wheel, and means for actuating the auxiliary
 10 shaft.

2. Reversing mechanism including a reversible motor; a shaft driven thereby; an extension connected with the shaft by a universal joint; a worm carried thereby; an
 15 auxiliary shaft; an extension connected with the auxiliary shaft by a universal joint; means for actuating said shaft; a worm car-

ried thereby; a worm wheel; a sprocket wheel connected to the worm wheel; a movably mounted member connecting the shaft
 20 extensions; means for moving said member to engage either worm with the worm gear; a second sprocket wheel; a flexible connection between the sprocket wheels; a reversing link, and an operative connection be-
 25 tween the flexible connection and the reversing link.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM GUENST.

Witnesses:

ELIZABETH GARBE,
 CHAS. E. POTTS.