Oct. 19, 1948. A. W. GUNNING 2,451,943

INDUSTRIAL TRUCK

Filed May 20, 1946 2 Sheets-Sheet 1

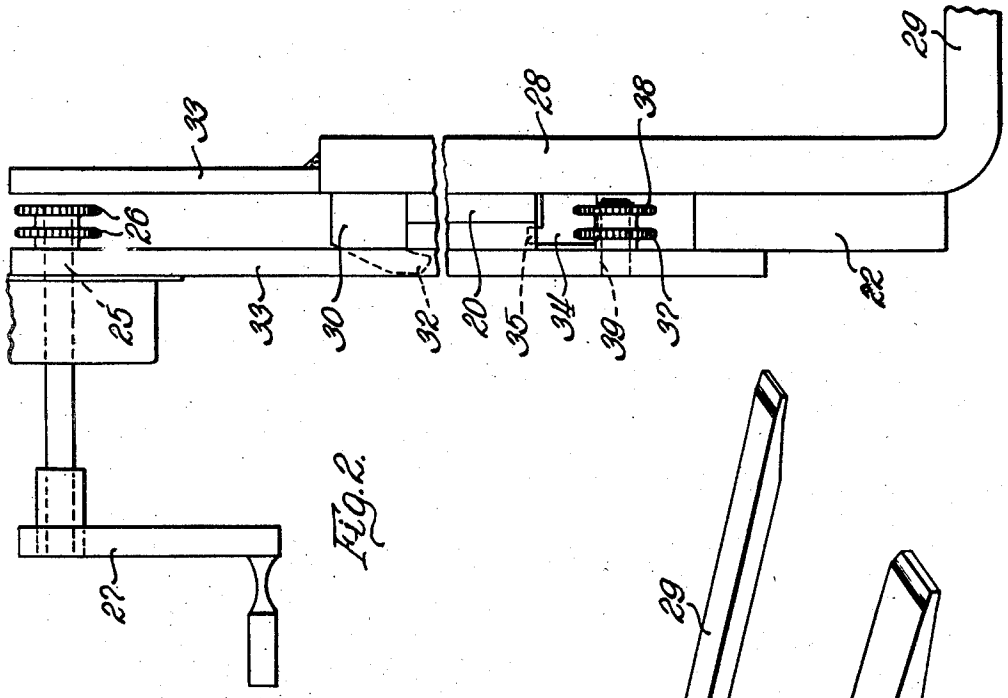


Fig. 2.

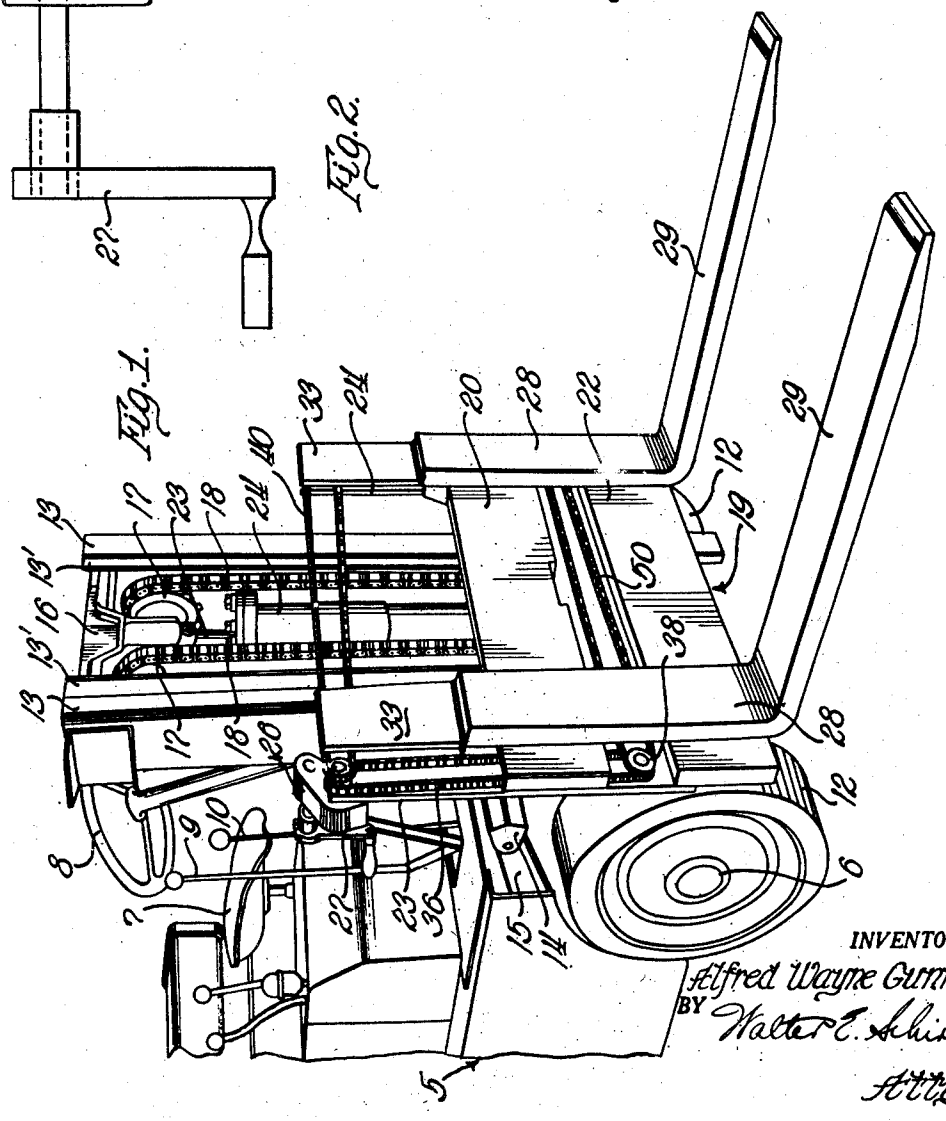


Fig. 1.

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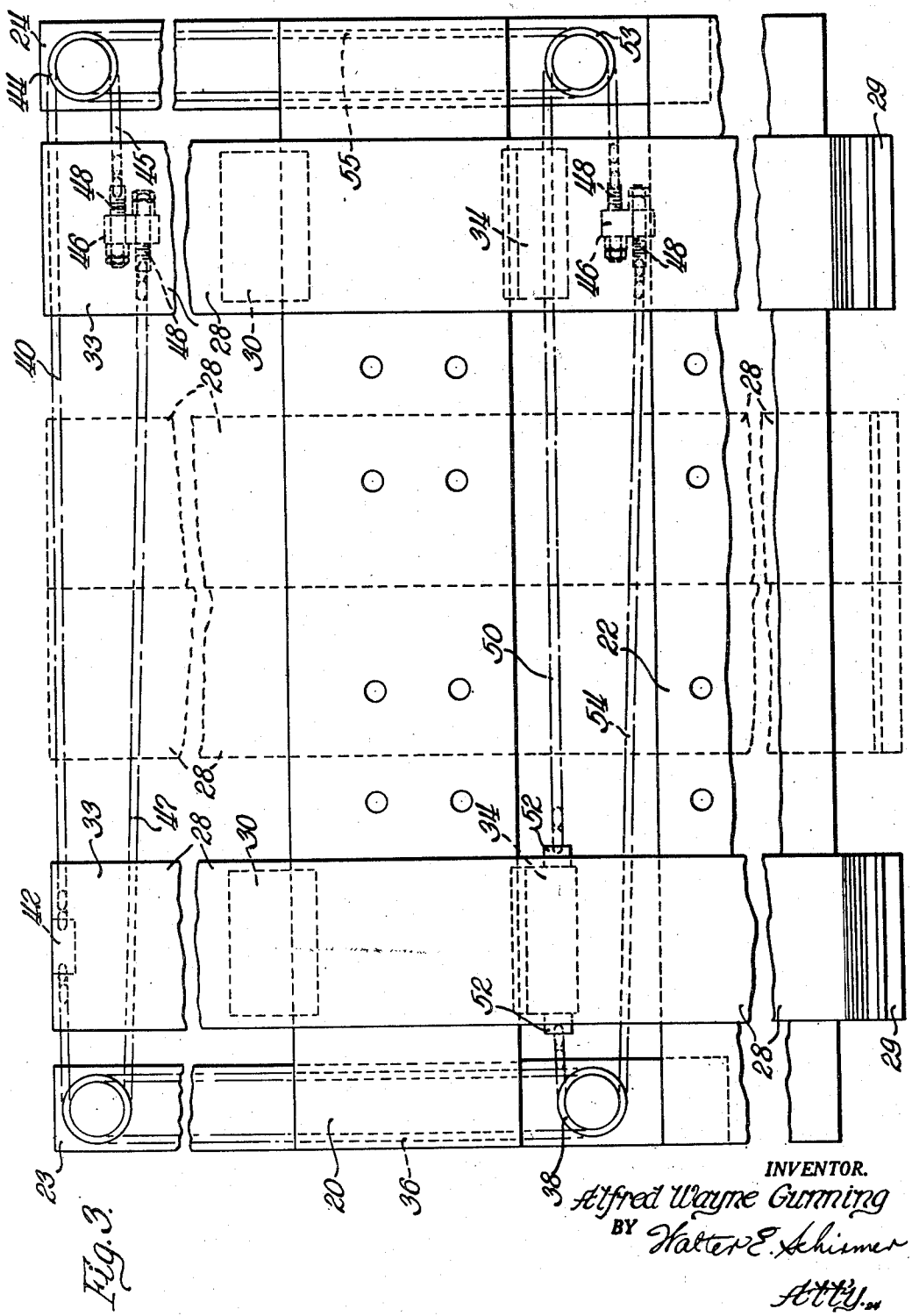


Fig. 3.

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INDUSTRIAL TRUCK

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6 Claims. (Cl. 214—113)

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This invention relates to industrial trucks, and more particularly is concerned with the provision of an industrial truck of the fork type in which provision is made for adjustably spacing the forks on the load supporting carriage to provide different lateral spacings therebetween, whereby the forks are adapted to be located in different positions for picking up various types of pallets or other load supporting mechanisms.

One of the primary objects of the present invention is to provide a simplified mechanism which can be readily adapted to industrial trucks now in use to provide for a wide variance of the spacing of the forks or fingers carried on the vertical uprights at one end of the truck to accommodate them to the various types of loads which are to be lifted and transported by the truck.

Another feature of the present invention is to provide a manually operable mechanism which can be operated by the driver without leaving the truck, whereby he can change the position of the forks as he approaches the load to insure proper spacing thereof.

Another feature of the present invention is to provide a simplified mechanical mechanism consisting of chains operated through a crank and secured in the desired manner to the forks for moving the forks laterally toward or away from each other.

Other objects and advantages of the present invention will appear more fully from the following detailed description which, taken in conjunction with the accompanying drawings, will disclose to those skilled in the art the particular construction and operation of a preferred form of the present invention.

In the drawings:

Figure 1 is a partial perspective view of the truck provided with the present invention;

Figure 2 is a side elevation view of the fork mechanism with the chains removed; and

Figure 3 is a front elevational view of the mechanism showing the chains in operating position.

Referring now in detail to the drawings, a truck of the industrial fork type is indicated generally at 5 having the driving axle 6, the operator seat 7, a steering wheel 8, and the conventional speed and direction control levers 9 and 10.

Pivotally mounted at the forward end of the truck intermediate the wheels 12 are telescopically arranged uprights 13 which are provided with suitable brackets 14 to which piston rods 15 are connected for controlling the forward and rearward tilting of the uprights from a vertical position. The inner uprights 13' are provided adjacent their upper ends with a cross member 16 which carries laterally spaced sprockets 17 over which chains 18 are trained, the chains 18 being anchored at one end to the base of the uprights and at the opposite end being secured to a load supporting carriage indicated generally at 19, and consisting of vertically spaced face plates 20 and 22 having rearwardly projecting bracket portions, including rollers mounted within the channels of the uprights for guiding movement during the vertical raising and lowering of the uprights.

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This vertical movement of the load supporting carriage is provided by means of a piston member 23 carried in a cylinder 24 to which fluid under pressure is admitted for raising the sprockets 17, and consequently tensioning the chains to draw the load supporting carriage 19 upwardly.

Mounted in vertical position on opposite ends of the members 20 and 22 are vertically extending plates 23 and 24, respectively, which project upwardly beyond the upper end of the plate member 20 an appreciable distance. The member 23 is provided at its upper end with a shaft 25 provided with a double set of sprockets 26, the shaft 25 going through a suitable gear reduction member 26' and being controlled by means of a crank 27 which is located adjacent the operator's seat 7 and is rotated in one or the other direction to provide for moving the forks toward or away from each other. Each of the forks 28 comprises an L-shaped member, the forwardly projecting portions 29 thereof having chisel-shaped ends and being adapted to be moved under the load to be lifted or transported by the truck. Adjacent the upper ends of the forks 28, they are provided with bracket members 30 having rearwardly spaced down-turned flange ends 32 engaging over the upper rear edge of the upper face place 20, thereby holding the forks in position. The forks are also provided with vertical extensions 33 which may be welded or otherwise secured to the upper ends of the forks 28, which projections project upwardly approximately the same height as the extensions 23 and 24 of the load supporting carriage 19.

The forks are provided intermediate the vertically extending portions thereof with a second pair of brackets 34 welded or otherwise secured to the rear faces thereof having a rearwardly spaced upwardly projecting lip 35 engaging back of the lower rear edge of the upper face

plate 20, whereby the forks are locked against disengagement from the load-supporting carriage 19.

Over the rearward sprocket 26 there is trained a chain 36, which chain extends downwardly about the rear sprocket 37 of a pair of sprockets 37 and 38 mounted on the stub shaft 39 carried by the extension plate 33. Thus, the forward sprocket of each of the sets of sprockets is driven by rotation of the crank 27, it being apparent that the two sprockets are joined together as a unitary structure so that they rotate conjointly.

Over the forward sprocket of the upper set of sprockets 26 there is trained a chain 40, which chain, as will be more apparent in Figure 3, is clamped as indicated at 42 to the upper extension 33 of the left hand fork, as viewed in Figure 3, and then extends over a cooperating sprocket 44 mounted on the upper end of the extension plate 24 of the load supporting carriage. The lower run of the chain, indicated at 45, is adjustably clamped to a bracket 46 carried by the opposite fork extension 43 and the opposite end of the chain indicated at 47 is also adjustably secured in the clamp 46 as by means of a threaded clevis 48 whereby the tension in the chain 40—45—47 can be adjusted. It will be apparent that upon rotation of the chain 42 in a clockwise direction, as viewed in Figure 3, the two fork extensions will tend to be drawn together to the dotted line positions indicated in the center of this drawing, and, upon opposite rotation of the chain 40, the two forks will tend to be separated due to the tension exerted on the bracket 46 and on the clamp 42.

There is provided a second fork engaging chain 50, indicated in Figure 3, which is trained over the forward sprocket 38 of the set of sprockets 37—38, and which is anchored to suitable brackets 52 carried on opposite edges of the left hand fork 28 on opposite sides of the bracket 34 thereof. The chain 50 then extends laterally across the space between the face plates 20 and 22, and is trained over a sprocket 53 disposed on the vertical member 24 at the right hand side of the load supporting carriage in line with the sprocket 44. From the sprocket 53, the chain engages a clamp 46 corresponding to the upper clamp 46, and suitable adjusting clevises 48 are provided for imparting the proper tension to this chain in the lower run of the chain indicated at 54, then returns free of the forks to the sprocket 38.

In order to provide proper coordination of movement of the forks, there is also provided a vertically extending endless chain 55 between the upper and lower sprockets 44, and 53, respectively, of the right hand extension 24 of the load supporting carriage, it being understood that the sprockets 44 and 53 are double sprockets the same as the sprockets 26.

In the operation of this mechanism, it will be apparent that rotation of the crank 27 will cause the chains 40 and 50 to move simultaneously due to the interconnection of these chains through the vertically extending endless chains 36 and 55. As a result, the two chains 40 and 50 move conjointly either in a clockwise or counter-clockwise direction, causing the forks to be conjointly drawn toward each other or pulled away from each other, depending upon the direction of rotation. The brackets 30 and 34 hold the forks against cocking or binding on the face plate 20, and insure that the forks will slide laterally toward and away from each other. If desired to eliminate friction, small rollers or the like may be incorporated in the brackets 30 and 34 to provide for smoother rolling of the forks. However, in most cases the friction is not sufficient to warrant the introduction of such anti-friction rollers, and furthermore, it is desirable that some friction be present to maintain the forks in the desired shifted positions.

I am aware that various changes may be made in the details of the present construction, and I therefore do not intend to be limited except as defined by the scope and spirit of the appended claims.

I claim:

1. In an industrial fork type truck having a pair of vertical uprights at one end thereof, a load supporting carriage mounted for vertical movement in said uprights, a pair of load engaging forks mounted on said carriage for lateral sliding movement, sprocket means on said carriage, chain means carried by said sprocket means and including a pair of parallel transversely extending endless chains having the upper run of each chain secured to one fork and the lower run of each chain secured to the other of said forks, and means for conjointly actuating said chains to move said forks laterally toward or away from each other.

2. In an industrial fork type truck having a pair of vertical uprights at one end thereof, a load supporting carriage mounted for vertical movement in said uprights, a pair of load engaging forks mounted on said carriage for lateral sliding movement, vertically spaced sprocket means on each side of said carriage, upper and lower transversely extending chains carried by said sprocket means and each chain having different portions thereof secured to each of said forks, vertically extending chain means at the side of said carriage interconnecting said sprocket means for conjoint movement, and means for rotating one of said sprocket means to move said forks jointly toward or away from each other.

3. The mechanism of claim 1 including means for adjusting the chain connections to said forks.

4. In an industrial fork type truck having a pair of vertical uprights at one end thereof, a load supporting carriage mounted for vertical movement in said uprights, a pair of load engaging forks mounted on said carriage for lateral sliding movement, double sprockets mounted in vertically spaced relation on each side of said carriage, vertical chains interconnecting said sprockets on each side of said carriage, transverse chains interconnecting said sprockets and extending behind said forks, and means on said transverse chains for securing one of said forks to the upper run thereof and the other of said forks to the lower run thereof.

5. In an industrial fork type truck having a pair of vertical uprights at one end thereof, a load supporting carriage mounted for vertical movement in said uprights, load engaging forks mounted on said carriage for lateral movement, double sprockets mounted in vertically spaced relation on each side of said carriage, a vertical chain interconnecting the sprockets on one side of said carriage, transverse chains interconnecting said sprockets and extending behind said forks, and means on said transverse chains for securing one of said forks to the upper run of said chains and another fork to the lower run of said chains, one of said sprockets having crank means for rotating the same.

6. A load supporting carriage for an industrial truck including a pair of vertically spaced transverse plates, sprockets on the sides of said car-

riage intermediate said plates and above the uppermost plate, endless chain means transversely interconnecting said sprockets, vertical chain means interconnecting the sprockets on one side of said carriage, and a pair of lift forks supported for lateral movement on said plates and so connected to said transverse chain means as to be movable toward or away from each other upon rotation of said sprockets.

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