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Herdemann

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[54] **SHOCK-PROOF FORK SUPPORT FOR FORK LIFT TRUCKS**

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[52] **U.S. Cl.** **187/9,** 214/750

[51] **Int. Cl.** **B66b 9/20**

[58] **Field of Search** 214/620, 660, 750, 214/127, 128, 142; 293/85, 86; 187/9

[56] **References Cited**

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[57] **ABSTRACT**

A telescopic mast with stand mast and drive mast for fork lift trucks, which includes a fork support vertically movable in the drive mast and also includes load pick-up and supporting elements connected to said fork support by means of a supporting plate, which latter is in horizontal direction elastically supported by the base frame of the lift carriage.

4 Claims, 3 Drawing Figures

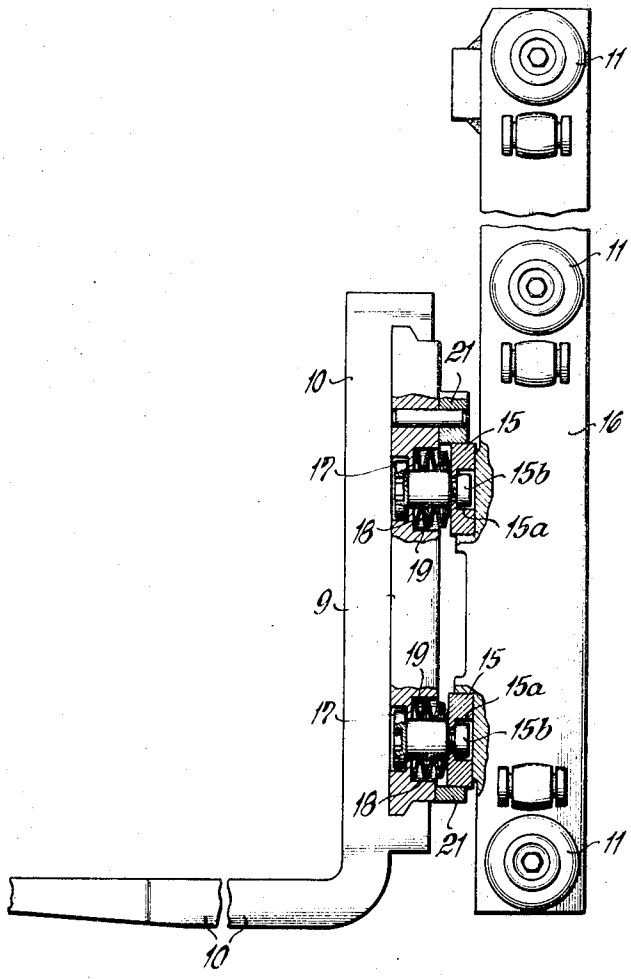

FIG. 1

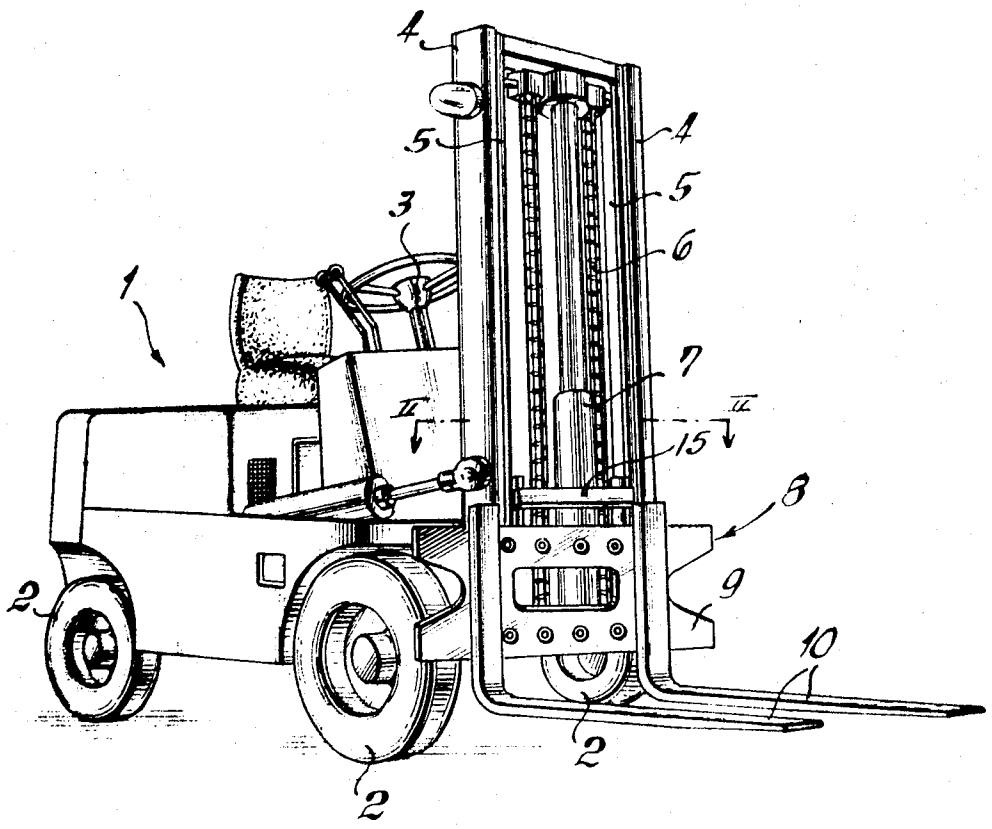

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FIG. 2

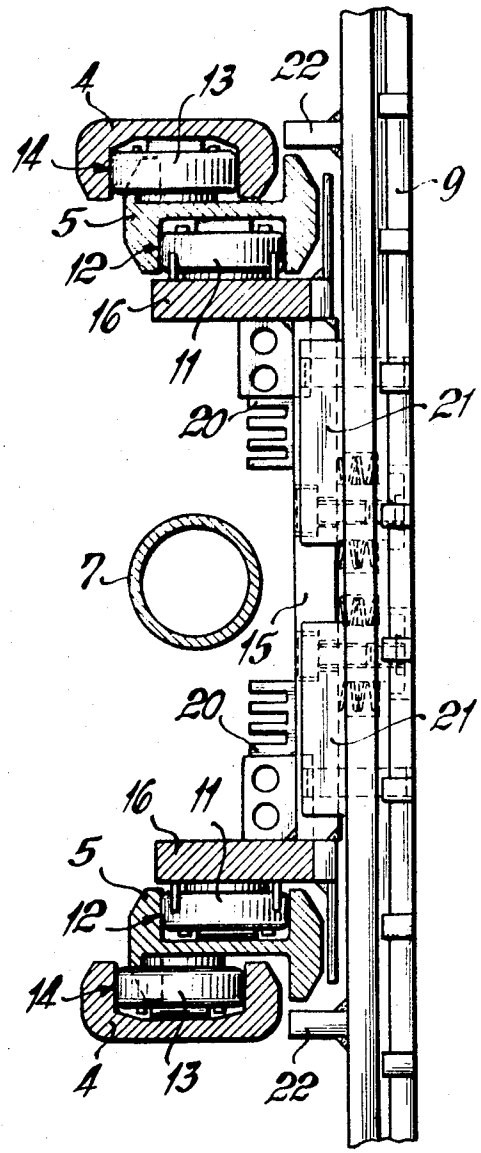

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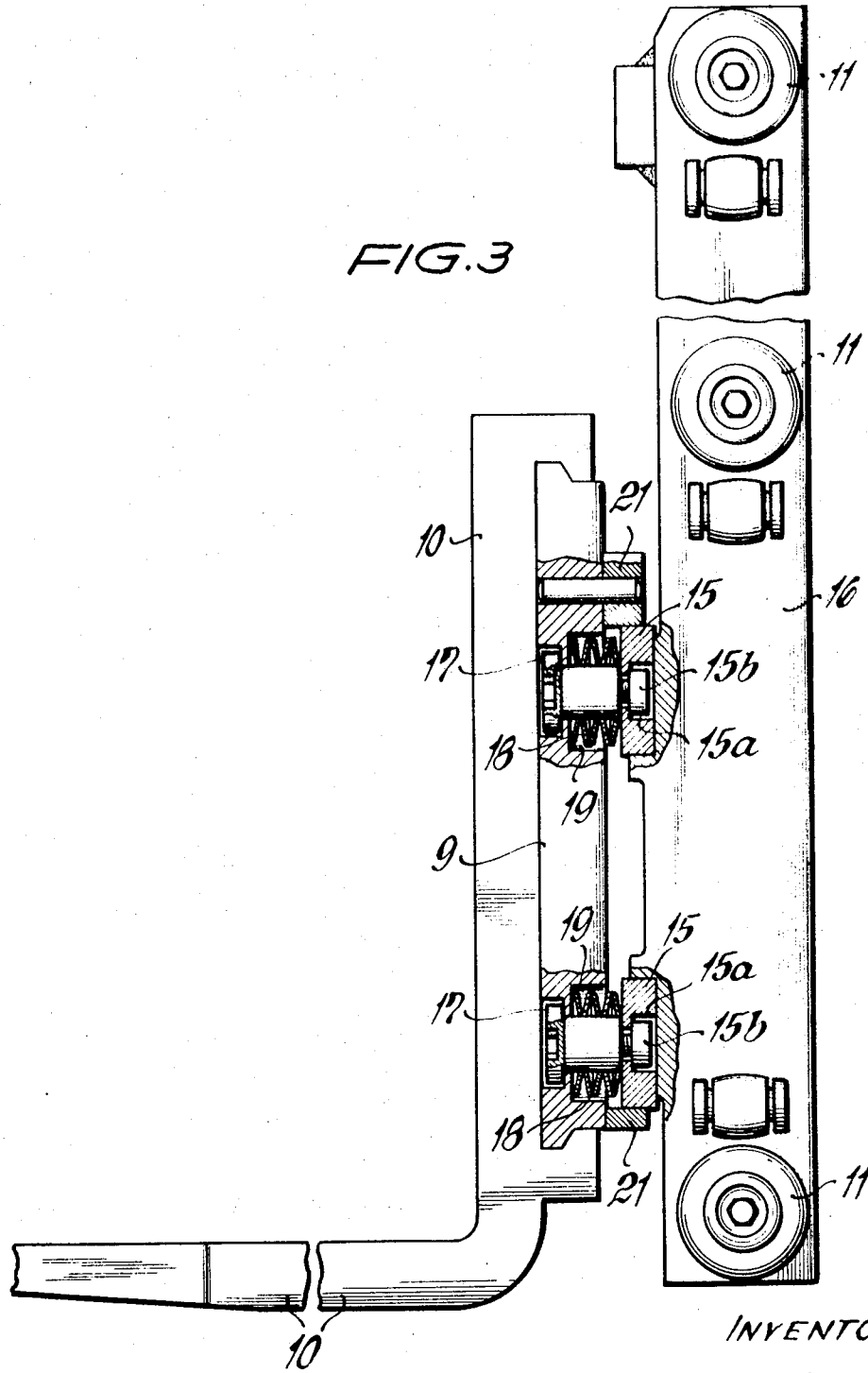
FIG. 3



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SHOCK-PROOF FORK SUPPORT FOR FORK LIFT TRUCKS

The present invention concerns a shock-proof fork support for fork lifts and, more specifically, concerns a telescope mast with stand and driving mast for fork lifts with a fork support vertically movable in the driving mast and with supporting elements connected to said fork support by means of a supporting plate.

With heretofore known arrangements of lifting carriage and fork lifts, the supporting plate is connected to the rollers which directly receive the lateral jaws. Such an arrangement has the drawback that in view of the shock energy occurring during the pickup of the load in view of the dynamic driving load, is directly conveyed to the supporting rollers arranged on the lifting mast and is also conveyed to the running path of the mast so that these parts are frequently damaged or destroyed.

It is, therefore, an object of the present invention to provide an arrangement to equalize the shock stresses, especially the high loads which occur during a fast pickup of load and which bring about a premature wear of the guiding path for the lifting carriage, the rollers, etc.

These objects and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is an isometric view of a fork lifter according to the invention, with shock-proof fork support.

FIG. 2 is a top view of the arrangement of the stand mast, inner mast and base frame, and also the guiding means therefor, said view being taken along the line II — II of FIG. 1.

FIG. 3 shows a side view of the lifting carriage with supporting plate and supporting fork and also shows a partial section through the elastic connection.

The arrangement according to the present invention is characterized primarily in that the supporting plate serving for holding the supporting elements is, in horizontal direction, elastically supported by the base frame.

The elastic support of the supporting plates with regard to the base frame is mounted by means of dish springs on threaded bushings with the collar of the threaded bushings engaging a recess of the supporting plate while the threaded bushing in its turn is secured against accidentally dropping out by cheese head screws mounted in a recess of the transverse beam of the base frame of the lifting carriage. The lifting stroke of the dish springs is limited by abutment means which are connected to the back side of the supporting plate, said abutment means resting against the stand mast.

Referring now to the drawings in detail, the fork lift 1 is movable on four wheels 2 with rubber tires and is equipped with a drive of its own while being able to be steered by means of the steering wheel 3. At the front end (when looking in driving direction) of the vehicle, the stand mast 4 is pivotally arranged inasmuch as the inner or driving mast 5 is adapted to telescopically slide on guiding means, which will be described further below, as soon as the inner or driving mast 5 is actuated upon by lifting cylinder 7 through the intervention of lifting chains 6. The lifting carriage 8 is displaceably mounted at the lower end of the stand mast 4 and inner mast 5. The said lifting carriage 8 comprises a supporting plate 9 and a supporting fork 10. Said lifting carriage 8 is, by means of supporting rollers 11, displaceable in the guiding means 12 of the inner mast 5. The inner mast 5 in its turn is, by means of rollers 13, arranged in the stand mast 4, vertically displaceable in the guiding means 14 of the stand mast 4.

The supporting plate 9 is, by means of dish springs 18, mounted on threaded bushings 17 in transverse beams 15, elastically mounted in the transverse beams 15 of the base frame 16. These springs 18 on one hand rest against the transverse beam 15 and on the other hand rest in a recess 19 of the supporting plate 9. As a result thereof, the supporting plate 9 does not directly engage the base frame 16 but by means of the dish springs 18 arranged in the turned-out portions 19 of the supporting plate 9 is held in spaced relationship to the base frame 16. For purposes of conveying vertical forces, which, when receiving a load are conveyed by the supporting fork 10 through supporting plate 9 on the base frame 16 by chain-carrying elements 20, the back side of the supporting plate 9 is equipped with holding elements 21 which are slidably engaging the transverse beams 15 so that the supporting plate 9 can carry out movements in horizontal direction. The dimensioning of the dish springs 18 limits the load exerted upon the supporting rollers 11 and 13 during a shock-like pickup of a load on the floor by the oncoming fork lift. When the admissible force allowed for the spring tension of the dish springs is exceeded, the dish springs 18 become effective so that the abutments 22 arranged on the back side of the supporting plate 9 rest against the stand mast 4. In this way, undue high forces which may be generated by shock stresses will be prevented from being conveyed to the supporting rollers 11 and 13 and onto the paths of movement of the inner mast 5 and the stand mast 4.

As will be seen from the above, the advantages obtained by the present invention consist primarily in that in view of the elastic mounting of the supporting elements, the hard shock stresses and thereby the causes for a premature wear of individual vital elements will be avoided.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A fork lift truck, which includes: a stand mast at the front end of said lift truck, a drive mast telescopically movable in said stand mast, a lift carriage vertically displaceable in said drive mast and comprising supporting plate means and supporting fork means for picking up a load and lifting the same, said lift carriage also including base frame means, and elastic means supported by said base frame means and elastically supporting said supporting plate means for damping against damaging shock in substantially horizontal direction by means of a pin received in a hole through said base frame and said supporting plate which allows only substantially horizontal motion of said support plate.

2. A fork lift truck, which includes: a stand mast at the front end of said lift truck, a drive mast telescopically movable in said stand mast, a lift carriage vertically displaceable in said drive mast and comprising supporting plate means and supporting fork means for picking up a load and lifting the same, said lift carriage

also including base frame means, and elastic means supported by said base frame means and elastically supporting said supporting plate means in substantially horizontal direction, said elastic means including dish spring means, and bushing means provided having its ends secured in said supporting plate means and said base frame means while extending through and supporting said dish spring means.

3. A fork lift truck according to claim **2**, which includes abutment means connected to that side of said supporting plate means which faces toward said stand

mast for engaging the latter in response to a compression of said dish spring means beyond a predetermined admissible extent.

4. A fork lift truck according to claim **2**, in which said base frame means includes transverse supporting arm means, and in which said supporting plate means comprises sliding means slidably engaging said arm means for slidably supporting said supporting plate means on said base frame means.

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