June 4, 1957 J. A. FRIEBURGER 2,794,564

HAND TRUCK

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Fig. 2.

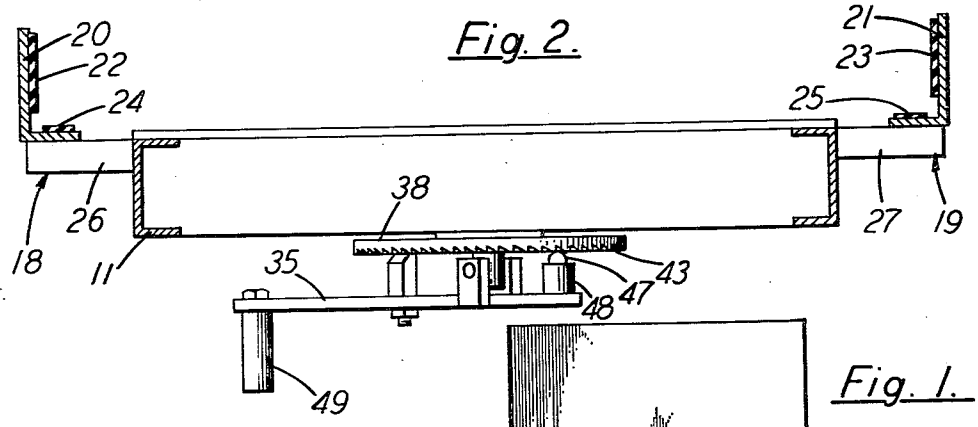


Fig. 1.

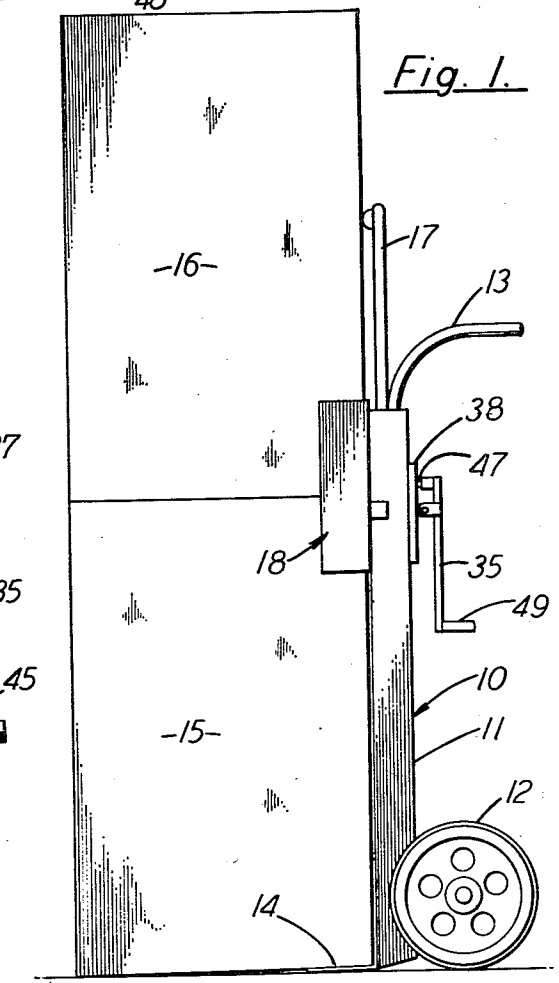
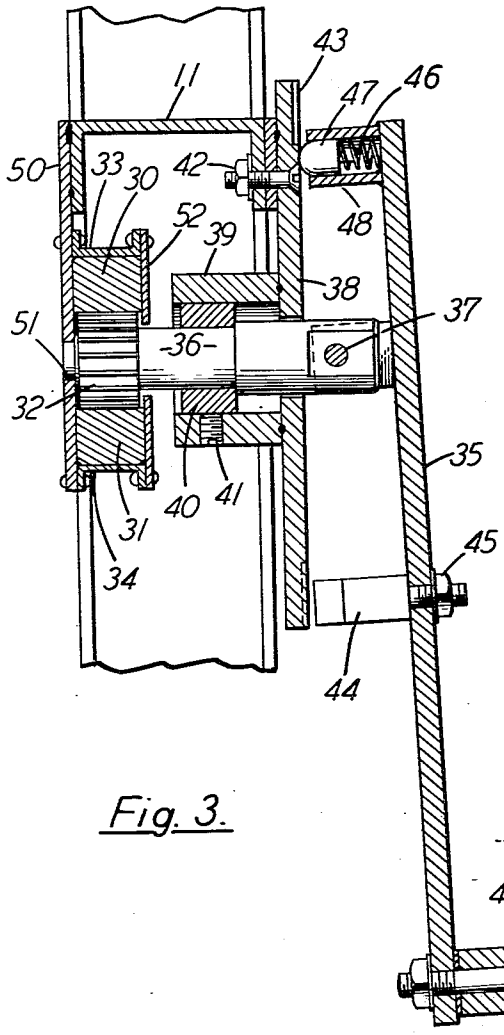


Fig. 3.



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Fig. 4.

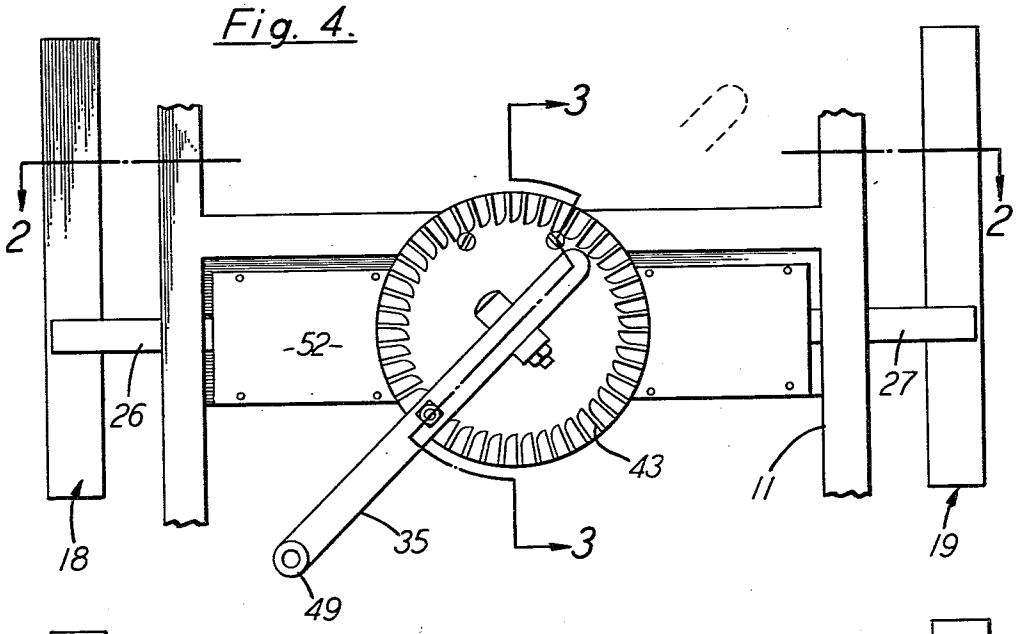
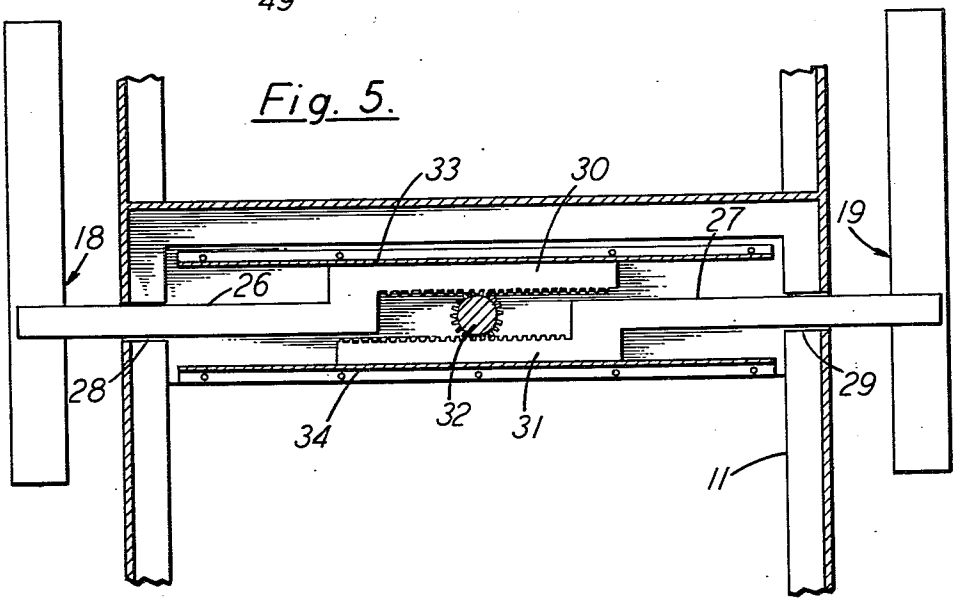


Fig. 5.



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HAND TRUCK

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2 Claims. (Cl. 214—378)

This invention relates to the construction of hand trucks used to transport heavy or merely bulky articles over short distances. Essentially, the standard form of these devices includes a frame providing a supporting surface, a set of wheels adjacent to one end of the frame, a lifting plate for insertion under the edges of articles to be carried, and a handle at the opposite end of the frame from the wheels with which the device is manipulated. In operation, the unit is ordinarily brought up to a box or carton, and the lifting plate inserted under the edge of the carton by rocking the carton back to a slight degree. The carton and the truck are then rocked in the opposite direction together, resulting in bringing the center of gravity of the loaded lift truck sufficiently close to directly above the wheels that the load can be controlled conveniently by the handles. In this position, the unit can easily be wheeled from one place to another without excessive effort.

This invention provides an arrangement which permits a stacked group of cartons or packages to be picked up as a unit by the truck through the application of a clamping action applied to the load at the upper part of the frame. It is preferable that the cartons or boxes handled by the vehicle should determine the location of the clamping members such that the actual clamping surface could span the plane separating the stacked articles. If the clamping action is sufficiently strong with respect to the weight of the load, it is even possible to dispense with the conventional lifting plate at the bottom of the hand truck. The invention also provides a manner of controlling and locking the clamping system.

The several features of the invention will be analyzed in detail through an analysis of the particular embodiments illustrated in the accompanying drawings. In the drawings:

Figure 1 presents a side elevation of a hand truck loaded with two superimposed cartons, the lowermost of which is engaged by the lifting plate of the hand truck.

Figure 2 presents a top view in section on the plane of 2—2 of Figure 4.

Figure 3 is a section on an enlarged scale of the plane 3—3 of Figure 4.

Figure 4 is a fragmentary view on an enlarged scale showing the clamping and locking mechanism.

Figure 5 is a plan view similar to that of Figure 4, but with the handle lever and locking mechanism removed to expose the details of the mounting of the clamping members.

Referring to the drawings, a hand truck generally indicated at **10** is formed by a frame **11** provided with wheels **12**, a handle **13**, and a lifting plate **14**. The cartons **15** and **16** are shown in position ready for the loaded unit to be rocked in a clockwise direction as shown in Figure 1 into a position in which the combined center of gravity is sufficiently close to directly above the axis of the wheels **12** that the unit can be controlled conveniently by a man holding the handle **13**. An auxiliary support **17** is provided as an extension of the frame **11** to stabilize the carton **16** against slipping or rotating to the right as shown in Figure 1.

The opposite clamping members generally indicated at **18** and **19** include the plates **20** and **21** covered with padding material as indicated respectively at **22** and **23**. Preferably, the clamping members **18** and **19** are also fitted with pads shown at **24** and **25** for providing additional support to the articles as they are transported.

Referring particularly to Figure 5, the clamping members **18** and **19** are each provided with a beam as shown at **26** and **27** having sliding engagement with openings respectively indicated at **28** and **29** in the frame **11**. The inner extremities of beams **26** and **27** terminate in rack portions **30** and **31**, respectively, which are confined between the gear **32** interposed between them. Rotation of the gear **32** will induce clamping and separating of the plates **20** and **21**, depending upon the direction of rotation.

The control of the clamping mechanism is applied through the use of the handle lever **35**, rotatably mounted on the end of the shaft **36** which supports the gear **32**. Preferably, the gear **32** is machined integrally with the shaft **36**, as in the illustrated form of the invention. The mounting of the handle lever **35** on the pin **37** at the end of the shaft **36** permits rotation of the handle lever on an axis perpendicular to the axis of the shaft **36**, but fixes the handle lever **35** against rotation with respect to shaft on the axis of the shaft **36** itself.

A plate **38** is provided with a cylindrical extension **39** coaxial with respect to the shaft **36**, for the support of the bearing **40** held in position by the set screw **41**. The plate **38** is fixed with respect to the frame **10** by bolt-nut assemblies as indicated at **42** in Figure 3.

In addition to the support of the shaft **36**, the plate **38** provides an annular group of discontinuities indicated at **43**, which are arranged concentrically with respect to the axis of the shaft **36**. A locking member **44** is secured to the handle lever **35** by the nut **45**, and the oscillation of the handle lever **35** about the pin **37** causes the engagement and disengagement of the locking member **44** from the discontinuities **43**. The handle lever is biased in a direction to bring the locking member **44** into engagement with the discontinuties **43** to lock the clamping members into position by the action of the spring **46** which tends to drive the plunger **47** toward the plate **38** on the opposite side of the shaft **36** from the locking member **44**. With this arrangement, the operating handle **49** at the outer end of the handle lever **35** may be used to rotate the shaft **36** to generate the desired degree of clamping or release of the clamping members **18** and **19**, and the operating handle **49** may then be positioned to appropriately engage the locking member **44** with the discontinuities **43**. The action of the spring **46** and the plunger **47** will serve to maintain such engagement until further manipulation of the operating handle **49**.

Preferably, an auxiliary plate **50** is secured to the frame **11** of the hand truck, and is provided with a bearing **51** for receiving the end of the shaft **36**. The rails **33** and **34** are secured directly to the plate **50**, and the cover plate **52** is preferably applied to maintain the position of the rack portion **30** and **31** with respect to the gear **32**.

The particular embodiments of the present invention which have been illustrated and discussed herein are for illustrative purposes only and are not to be considered as a limitation upon the scope of the appended claims. In these claims, it is my intent to claim the entire invention disclosed herein, except as I am limited by the prior art.

I claim:

1. A hand truck, comprising: a frame; clamping members slideably mounted at opposite sides of said frame for relative approaching and separating movement, said clamping members each having respectively overlapping rack portions; a gear interposed between and engaging said rack portions; a shaft supporting said gear and rotatably mounted on said frame; a handle lever mounted on said shaft and rotatable with respect thereto on an axis perpendicular to the axis of said shaft, said handle lever being fixed against rotation with respect to said shaft about the axis of said shaft, a plate fixed with respect to said frame and having an annular group of discontinuities concentric with said shaft; a locking member fixed with respect to said handle lever and engageable and disengageable with said discontinuities on rotation of said handle lever with respect to said shaft; and biasing means including a plunger slideably mounted on said handle lever for movement toward and away from said plate on the opposite side of said shaft from said locking member, and also including a spring urging said plunger against said plate and also urging said handle lever to a position corresponding to engagement of said locking member with said discontinuities to maintain the clamping action of said clamping members.

2. A hand truck, comprising: a frame; clamping members slideably mounted at opposite sides of said frame for relative approaching and separating movement, said

clamping members each having respectively overlapping rack portions; gear means engaging said rack portions; a shaft supporting said gear means and rotatably mounted on said frame; a handle lever mounted on said shaft and rotatable with respect thereto on an axis perpendicular to the axis of said shaft, said handle lever being fixed against rotation with respect to said shaft about the axis of said shaft; means forming an annular group of discontinuities concentric with said shaft and an annular bearing surface transverse to the axis of said shaft; a locking member fixed with respect to said handle lever and engageable and disengageable with said discontinuities on rotation of said handle lever with respect to said shaft; and biasing means including a plunger slideably mounted on said handle lever for movement toward and away from said bearing surface on the opposite side of said shaft from said locking member, and also including a spring urging said plunger against said bearing surface and also urging said handle lever to a position corresponding to engagement of said locking member with said discontinuities to maintain the clamping action of said clamping members.

References Cited in the file of this patent

UNITED STATES PATENTS

1,389,724	Willett	Sept. 6, 1921
1,578,120	Harris	Mar. 23, 1926
2,607,240	Kesling	Aug. 19, 1952