July 13, 1948. J. BRESLAV 2,445,019

GRAPPLE

Filed Oct. 10, 1945

Fig. 1.

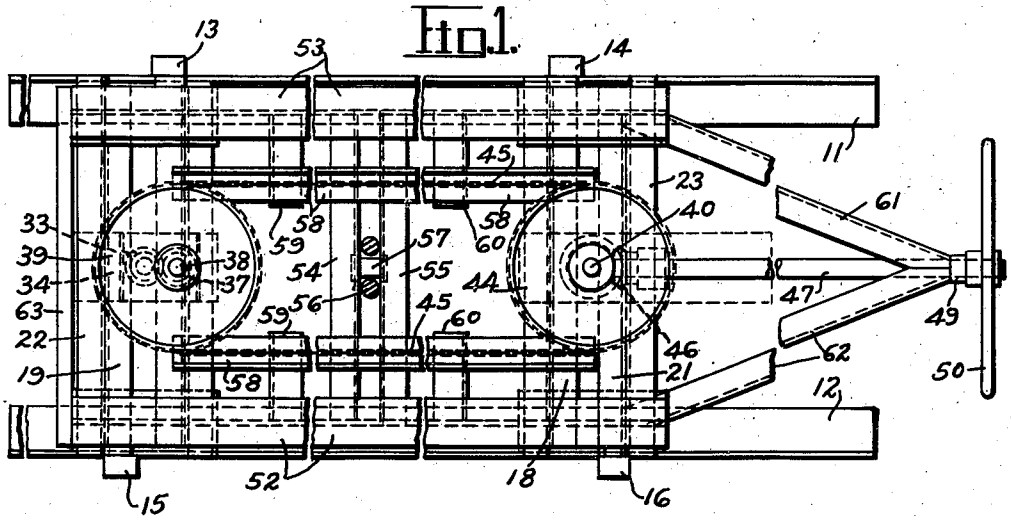


Fig. 2.

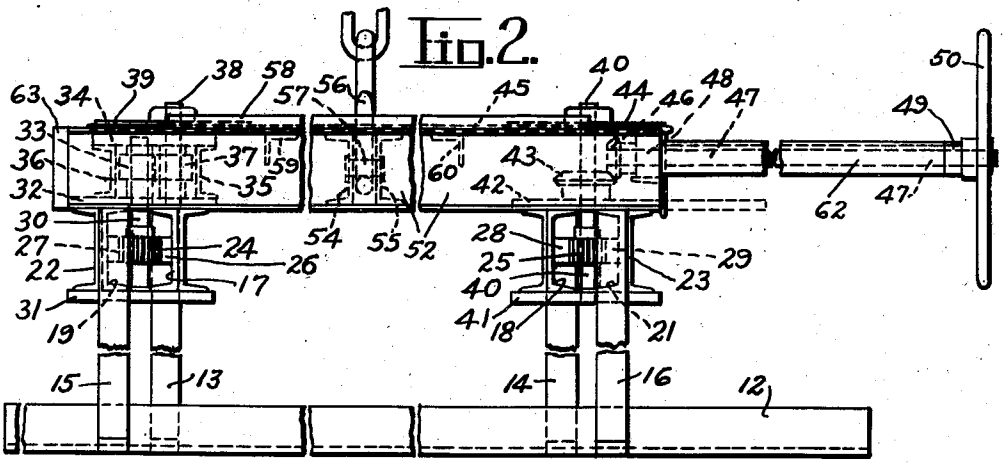


Fig. 3.

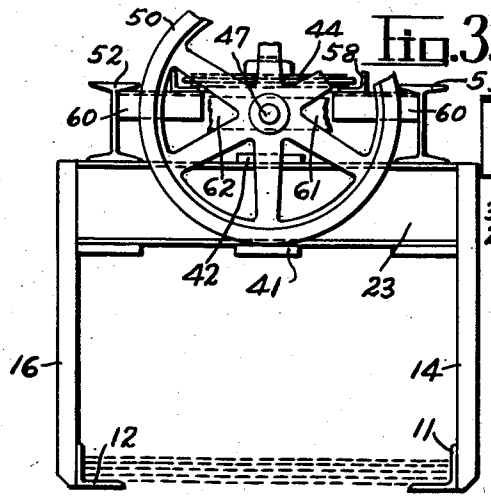
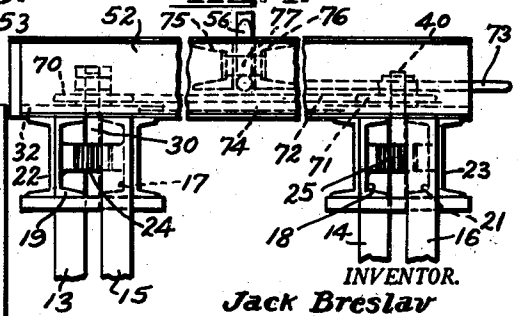


Fig. 4.



INVENTOR.
Jack Breslav

BY
Walter J. Edwards
ATTORNEY

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GRAPPLE

Jack Breslav, New Haven, Conn.

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1 Claim. (Cl. 294—67)

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This invention relates to grapples and more particularly to improvements in grapples especially adapted to engage and lift a pile of sheet, or plate, stock for transfer to another location.

One form of grapple adapted for the above-mentioned use is provided with a pair of opposed stock carrying bars, or angles, between which the stock in sheet or plate form, extends, either singly or in piles, with the side edges thereof resting upon said bars. These bars, or angles, are arranged to be positively moved toward and away from each other by each being secured to the lower ends of one or more drop legs, or carrying arms, each of the latter depending from the outer end of a horizontally disposed and slidably mounted beam, the beams being supported to be oppositely moved in an enclosing structure by means of a hand wheel, or an electric motor, acting through suitable gears and shafts. Such a form of grapple is shown and described in Patent No. 2,337,176, issued to Jack Breslav, December 21, 1945.

The principal object of this invention is to improve the structure of a grapple of the above nature whereby the operating mechanism and the supporting frame therefor will be of minimum height, to save overhead operating space and thus facilitate the use of such a grapple in a stock storage location having a relatively low ceiling.

Another object is to provide in a grapple of the above nature mechanism operating means of an improved structure whereby the same may be disposed within a minimum amount of space and protected against interference by associated mechanism.

A further object of this invention is to provide an improved form of grapple which will be relatively simple in construction, inexpensive to manufacture, readily manipulated, especially compact, and very efficient and durable in use.

With these and other objects in view, which will appear as the description proceeds, there have been illustrated in the accompanying drawings forms in which the features and principles of this invention may be conveniently embodied in practice, it being understood that various changes may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:

Figure 1 is a top plan view of a grapple embodying the features and principles of this invention;

Figure 2 is a side view of the same;

Figure 3 is an end view of the same; and

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Figure 4 is a broken-away side view of a somewhat modified form of grapple embodying the features of this invention.

Referring now to the drawings wherein like reference numerals designate like parts throughout the several views, the reference numerals 11 and 12 denote the stock carrying bars, or angles, which are suitably secured to the lower ends of drop legs 13, 14, and 15, 16 respectively. The legs 13 and 14 are secured to the outer ends of slide beams 17 and 18 respectively, and the legs 15 and 16 are secured to the outer ends of the slide beams 19 and 21 respectively.

The slide beams 17, 19 and 18, 21, are arranged to slide horizontally in opposite directions in housings 22 and 23 respectively, when gear pinions 24 and 25 respectively are rotated. The teeth of gear pinions 24 mesh with the teeth of toothed racks 26 and 27 respectively secured to the beams 17 and 19. The teeth of the gear pinion 25 mesh with the teeth of toothed racks 28 and 29 respectively secured to the beams 18 and 21. The shaft 30, to which the gear pinion 24 is secured, is journaled in a bearing plate 31, extends upwardly through a bearing plate 32, and has a gear 33 secured upon its upper portion, and then passes into an upper bearing plate 34. The plate 32 rests on, and is secured to, the side members of the housing 22, and the bearing plate 34 is supported from the plate 32 on channel beams 35 and 36. The gear 33 is in mesh with a gear 37, the shaft 38 of which is secured thereto and extends between the plates 32 and 34, being journaled therein. The shaft 38 extends upwardly beyond the plate 34 and has a sprocket wheel 39 secured thereto above the plate 34 (see Figures 1 and 2).

The shaft 40 of the gear pinion 25 extends through a bearing plate 41 which rests upon and is secured to the side members of the housing 23. The shaft 40 is secured to the pinion 25 and extends upwardly therefrom through bearing plate 42 and a bevel gear 43 to which it is secured. The shaft 40 extends upwardly beyond the bevel gear 43 and has a sprocket wheel 44 secured upon its upper end. The sprocket wheels 39 and 44 are drivingly connected together by a chain 45 indicated by dotted lines in Figure 1. A bevel gear pinion 46 secured upon a shaft 47 is in mesh with the bevel gear 43, the shaft 47 being journaled in a bearing block 48 and an outboard bearing 49. The shaft 47 has a hand wheel 50 secured to its outer end for actuation thereby.

The housings 22 and 23 are suspended from spaced apart grapple frame side beams 52 and 53, the housings 22 and 23 being spaced apart

along the beams 52 and 53 and secured one at each end of the beams. Channel beams 54 and 55 are secured to and extend between the frame beams 52 and 53 intermediate their ends. The beams 54 and 55 are spaced apart sufficiently to allow the hoist, or crane, (not shown), to pass therebetween and hook onto a pin 57 secured to and extending between the beams 54 and 55, whereby the grapple and its load may be raised and transported by the hoist, or crane, to which the hook 56 is attached.

A chain guard and support is provided for each run of the chain 45 between the sprockets 39 and 44. Each chain guard and support comprises an angle bar 58 extending from one sprocket to the other with one leg of the angle lying in under the chain and the other lying alongside the outside edge of the chain and extending upwardly beyond the chain and sprockets to form a guard to prevent interference of the hoist frame, or other overhead structure, with the chains or sprockets. The guard and support bars 58 are secured to and supported on bars 59 and 60 which extend inwardly from the frame beams 52 and 53. The outboard bearing 49, in which the shaft 46 is journaled, is supported by angle bars 61 and 62 which are secured to corresponding ends of frame beams 52 and 53 and converge into contact with each other at the outboard bearing 49, whereat the bars 61 and 62 are secured to each other and to the bearing 49. An outboard bearing counterbalancing bar 63 is provided and is secured to the ends of the frame beams 52 and 53 opposite the ends to which the outboard bearing 49 is secured.

In the modified form shown in Figure 4, the legs 13 and 15 are connected to the outer ends of beams 19 and 17 respectively instead of as in the form shown in Figures 1, 2, and 3 to the beams 17 and 19 respectively. Due to this difference in connection, the gears 33 and 37 may be omitted and a sprocket 70 is secured to the upper end of the shaft 30 above the bearing plate 32. As in the form shown in Figures 1, 2, and 3, the sprocket 70 is drivingly connected to a sprocket 71 by a chain 72. The sprocket 71 is secured on the shaft 40. A handwheel 73 is secured to the shaft 40 above the sprocket 71.

Plates 74, extending one along each of the beams 52 and 53, below the opposite runs of the chain 45, form guards for the chain 45. In this form of structure crossbeams 75 and 76, somewhat narrower than the beams 54 and 55, extend between the frame beams 52 and 53 and are connected to said frame beams adjacent their upper surface so as to lie above the runs of the chain 45. The cross beams 75 and 76 are spaced apart and have a pin 77 extending therebetween intermediate their ends to which the hook 56 of the hoist can be connected.

In both forms, the actuating mechanism for moving the stock carrying bars 11 and 12 is disposed substantially in line with, or below the upper surface of the frame side beams 52 and 53 whereby the overhead operating space required by the mechanism of this invention is of minimum dimension. The frame side beams 52 and 53 form a housing in which the operating mechanism is disposed and also a support for the housings 22 and 23 which are secured to and depend therefrom. By disposing the grapple supporting pin 57, or 77, intermediate the frame beams 52 and 53 and between the chain runs, and by locating the axes of the shafts 30 and 40 and the sprockets 39 and 44 intermediate the frame beams 52 and 53, the grapple is balanced laterally, whereby the load engaging bars 11 and 12 will be maintained substantially in the same plane at all times.

It will be understood that the novel features and principles of this invention may be embodied in other specific forms without departing from the spirit and essential attributes thereof, and it is therefore desired that the present embodiments be considered as illustrative and not restrictive, reference being had to the claim rather than to the foregoing description to indicate the scope of the invention.

Having thus fully disclosed the invention, what is claimed as new and for which it is desired to secure Letters Patent, is:

In a grapple, laterally spaced apart frame side beams, lengthwise spaced apart housings extending between and secured to said side beams, a pair of oppositely movable bars in each housing, a gear rack on each bar, a stock engaging member on the outer end of each bar, a first gear pinion in one housing in mesh with the gear racks on the bars in said housing, a second gear pinion in mesh with the first gear pinion, a shaft for the second gear pinion and extending upwardly therefrom, a sprocket on said pinion shaft, a third gear pinion in the other housing in mesh with the gear racks on the bars in said housing, a shaft for, and extending upwardly from, the third gear pinion, a sprocket on said last mentioned shaft, a chain running about and between said sprockets to drivingly connect them, spaced apart angle bars, each having one of its arms in under the chain between the sprockets and its other arm extending upwardly along side of and above said chain to prevent interference of overhead structure with the chain, and means to rotate one of said sprockets.

JACK BRESLAV.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

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