May 26, 1931. F. H. MEYER 1,807,124

LIFTING GRAPPLE

Filed July 10, 1929 3 Sheets-Sheet 1

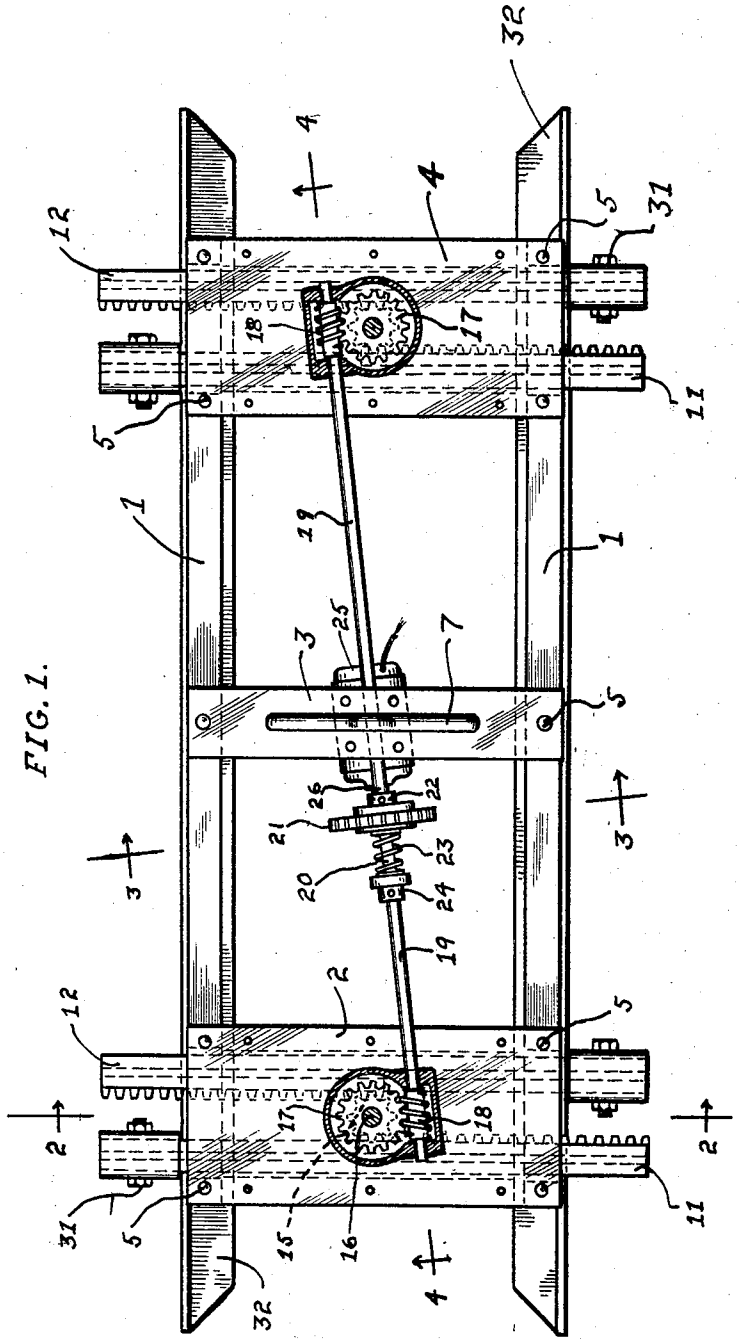

FIG. 1.

Witness:
A. Redding

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FIG. 2.

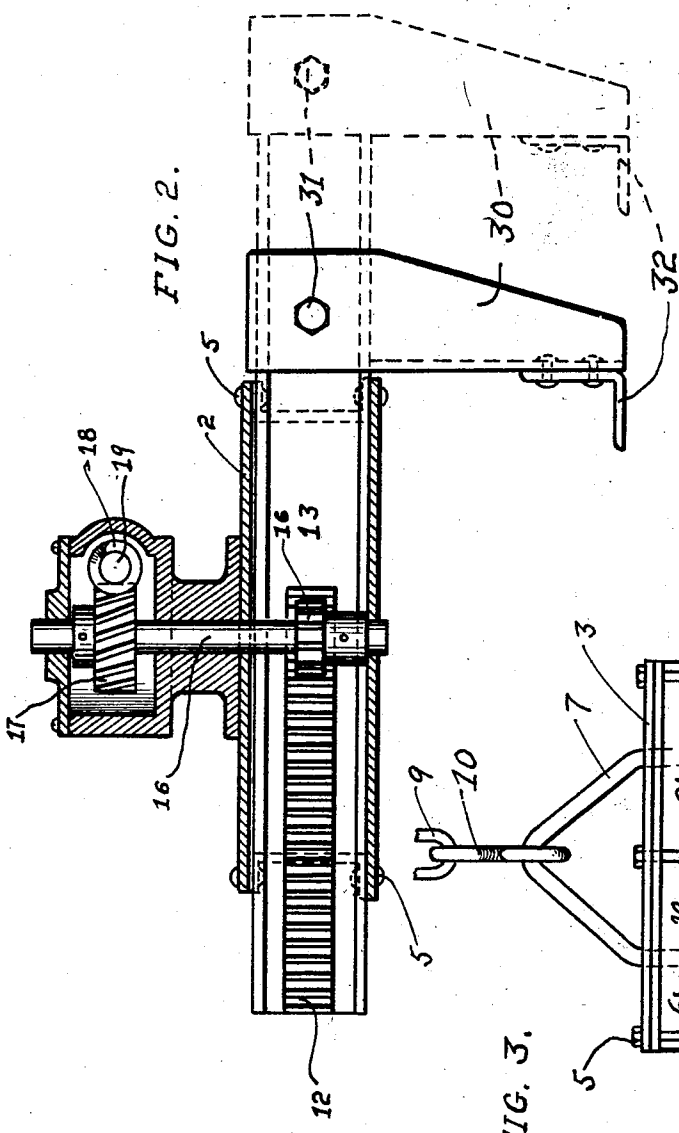
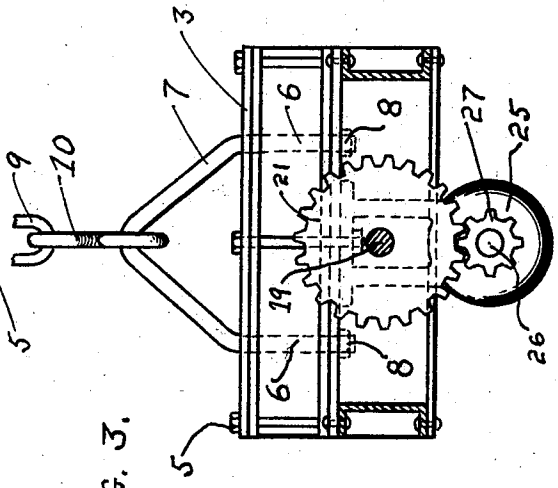


FIG. 3.



Witness:
G. Redding

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May 26, 1931. F. H. MEYER 1,807,124

LIFTING GRAPPLE

Filed July 10, 1929 3 Sheets-Sheet 3

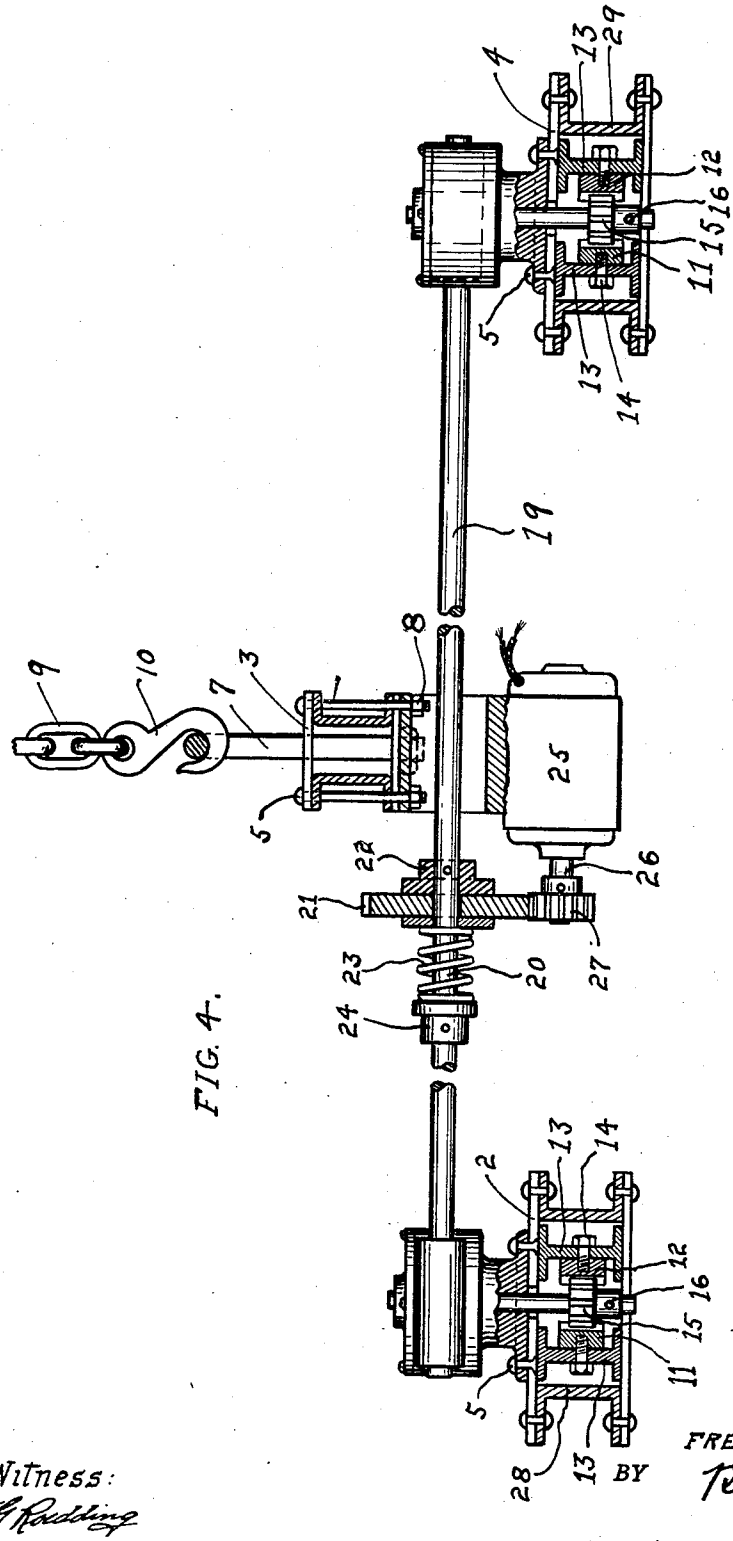

FIG. 4.

Witness:
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Patented May 26, 1931 1,807,124

UNITED STATES PATENT OFFICE

FREDERICK H. MEYER, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO LEITELT IRON WORKS, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF MICHIGAN

LIFTING GRAPPLE

Application filed July 10, 1929. Serial No. 377,134.

The present invention relates to lifting grapples and more particularly to grapples especially adapted for lifting and transferring to a new location, a pile of sheet metal stock.

The main objects of the invention are to provide a novel and effective lifting grapple of the general character above indicated; to provide a device of this character which is adjustably operable to take care of piles of sheet metal stock of varying widths; and, to generally provide a novel and improved mechanism for effecting and carrying out the purposes herein indicated.

An illustrative embodiment of the invention is shown in the accompanying drawings, wherein:

Figure 1 is a top plan view of the structure, partly in section;

Figure 2 is a sectional view thereof taken on line 2—2 of Figure 1, that part of the structure shown in dotted lines indicating the adjustable grappling hooks;

Figure 3 is a sectional view taken on line 3—3 of Figure 1; and

Figure 4 is a sectional view taken on line 4—4 of Figure 1.

The device generally comprises a frame member for supporting a pair of parallelly disposed twin rack gears, each set of said twin rack gears being mounted adjacent opposite sides of said frame member. A pinion gear is interposed between and meshes with each twin set of rack gears and common means comprising a reversible electric motor and a requisite gear train connected with each pinion gear for effecting simultaneous movement of each pinion gear, causes each rack gear to oppositely reciprocally move interrelatively with its twin rack gear. Parallel spaced apart work supporting members forming grappling hooks or work supporting members depend transversely from and are secured to the correspondingly movable rack gears of each set of twin rack gears whereby said work supporting members are interrelatively movable toward and away from each other for supporting varying widths of sheet metal stock. The structure is suspended from a platform mounted on an overhead trackway on which the platform is adapted to move as desired by the operator. The piles of sheet metal stock rest upon suitable supports with their edges overhanging their supports in order that the grapples may hook under the bottom sheet when the pile is to be lifted and moved.

Referring to the drawings, the channel bar beams 1 and cross members 2, 3 and 4 which are secured thereto as by rivets 5, form a frame member. The bifurcated ends 6 of the yoke 7 pass through the cross member 3 to which the ends of the yoke are secured as by the nuts 8. A suspended chain 9 from an overhead platform movable on an overhead rail (not shown) is provided with a hook 10 on which the yoke is suspended to provide means for shifting the frame member and its mechanism from place to place as desired.

Twin rack gears 11 and 12 within their respective housings 28 and 29 and having their teeth facing each other, are rigidly secured to I-beams 13 by the set screws 14 and a pinion gear 15 is interposed between and meshes with each set of twin rack gears. These pinion gears are each mounted on a shaft 16 as by set screws and the upper ends of each shaft carry a spur gear 17 which meshes with a worm gear 18 on the common shaft 19.

A spring tensioned clutch member, for the shaft 19, generally designated 20, comprises the gear 21 interposed between the adjustable collar 22 and the coil spring 23 and a second adjustable collar 24 retains this coil spring under continuous tension.

An electric motor 25 of the reversing type is suspended from and secured by suitable means to the cross member 3. The shaft 26 of said motor carries a spur gear 27 which meshes with the gear 21 on the shaft 19.

The outer ends of each of the I-beams 13 carry depending arms 30 to which they are secured by bolts 31 and parallel spaced apart L-shaped channel bar grapples or work supporting members 32, disposed transversely with respect to the rack gears, are rigidly secured to said depending arms for retaining a pile of sheet metal stock between the inwardly turned flanged edges.

In operation, when it is desired to move a

pile of sheet metal stock to a new position, the operator of the device on the platform which is movable on the overhead trackway, supsends the device over said pile of stock and causes the grapples or work supporting members to move toward or away from each other, as determined by the width of the stock to be moved, by the operation of the reversible electric motor, which, when in operation, causes the shaft 19 to rotate. The rotation of this shaft causes each twin rack gear to oppositely reciprocally move interrelatively with respect to its twin gear by means of the gear train 27—21—18—17—15. This opposite reciprocal interrelative movement of each set of twin rack gears causes the grapples or work supporting members to move toward or away from each other as the case may be and as determined by the width of the stock. The clutch member 20 provides slippage and thwarts damage to the gear mechanism in the event that the grapples contact the stock.

It will thus be seen that an effective lifting grapple of the general character above indicated is provided and which is adjustably operable for effecting and carrying out the purposes herein indicated.

While but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a lifting grapple, a frame member, twin parallel bars mounted adjacent one side of said frame member and another set of twin bars mounted adjacent the opposite side of said frame member, said bars being horizontally arranged, means between each set of twin bars for moving the bars of each set in opposite directions, a pair of work supporting members disposed transversely to said pair of twin bars, each work supporting member being secured to and depending from one twin bar of each pair of twin bars, and common means for simultaneously moving the first-mentioned means.

2. In a lifting grapple, a frame member, parallelly disposed twin rack gears mounted adjacent one side of said frame member and another pair of parallelly disposed twin rack gears mounted adjacent the opposite side of said frame member all of said twin rack gears being arranged in the same horizontal plane, a pinion gear interposed between each pair of twin rack gears whereby each rack gear is adapted to oppositely reciprocally move interrelatively with its twin rack gear, all of said pinion gears being arranged in substantially the same horizontal plane with the twin rack gears and common means for simultaneously rotating each pinion gear for the purposes herein specified.

3. In mechanism of the character described: a frame member carrying a motor having a shaft provided with a gear; means for raising and lowering the frame member; a pair of horizontally slidable rack bars mounted adjacent one side of the frame member; another pair of horizontally slidable rack bars mounted adjacent the opposite side of the frame member, the bars of each pair having cooperating work supporting members; gears between and meshing with the bars of the respective pairs for sliding the same relatively to each other and having worm gears on their shafts; connections between the gear of the motor's shaft and the worm gears for rotating the same by the motor, including a horizontal shaft having a gear meshing with the motor shaft's gear and having at its opposite ends worms meshing with the worm gears at the axially-opposite sides thereof respectively.

In testimony whereof I have hereunto set my hand at Grand Rapids, Michigan, this 6th day of July, 1929.

FREDERICK H. MEYER.