

Feb. 22, 1949.

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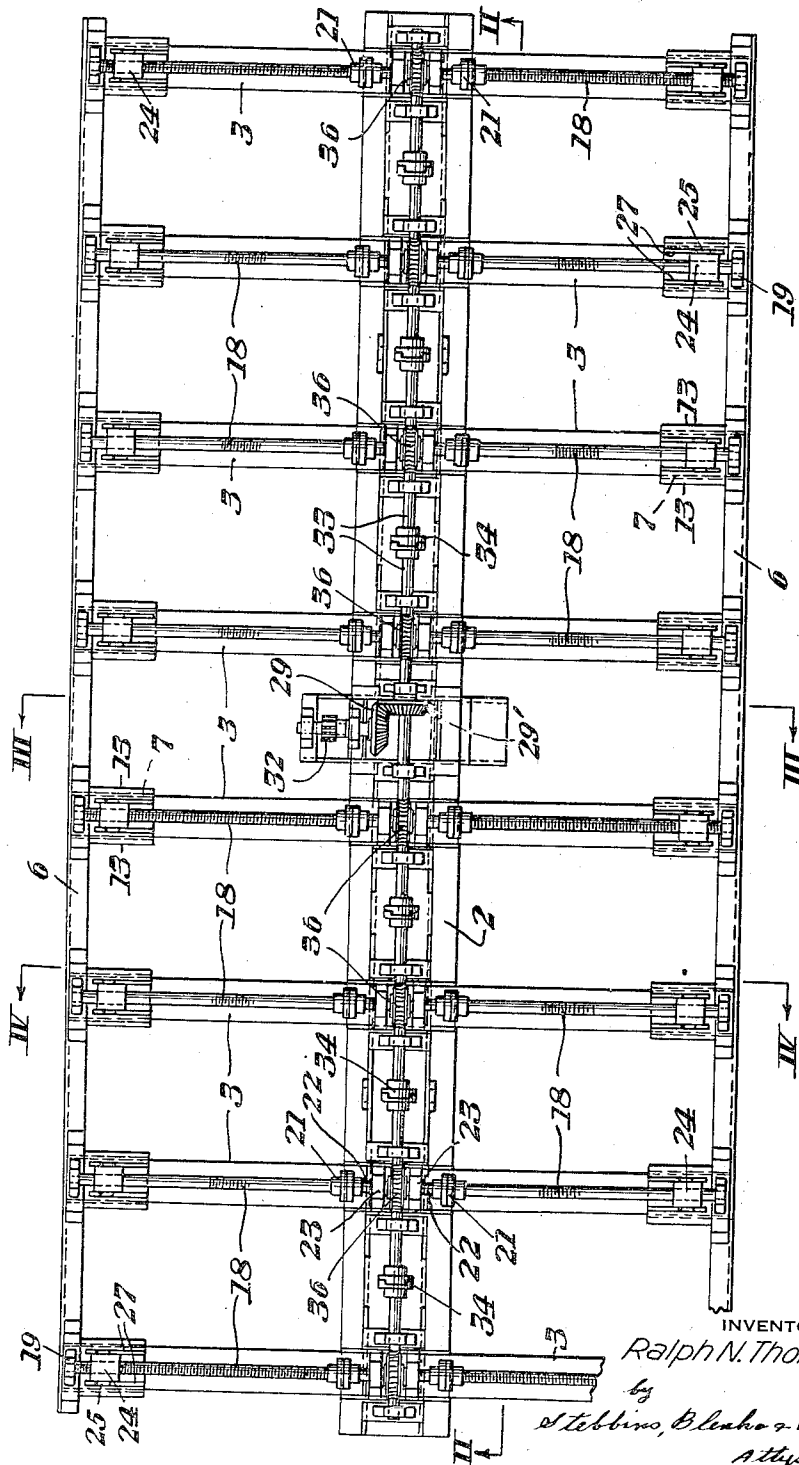
2,462,691

APPARATUS FOR TRANSFERRING MATERIAL

Filed Jan. 5, 1945

3 Sheets-Sheet 1

Fig. 1.



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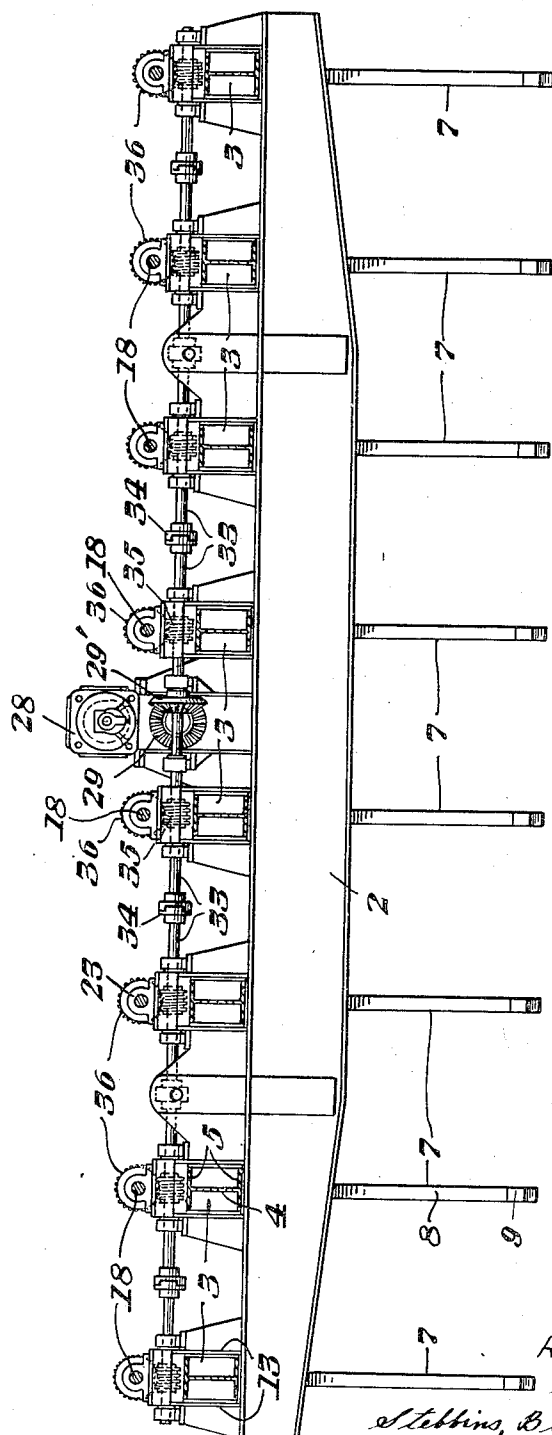
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3 Sheets-Sheet 2

Fig. 2.



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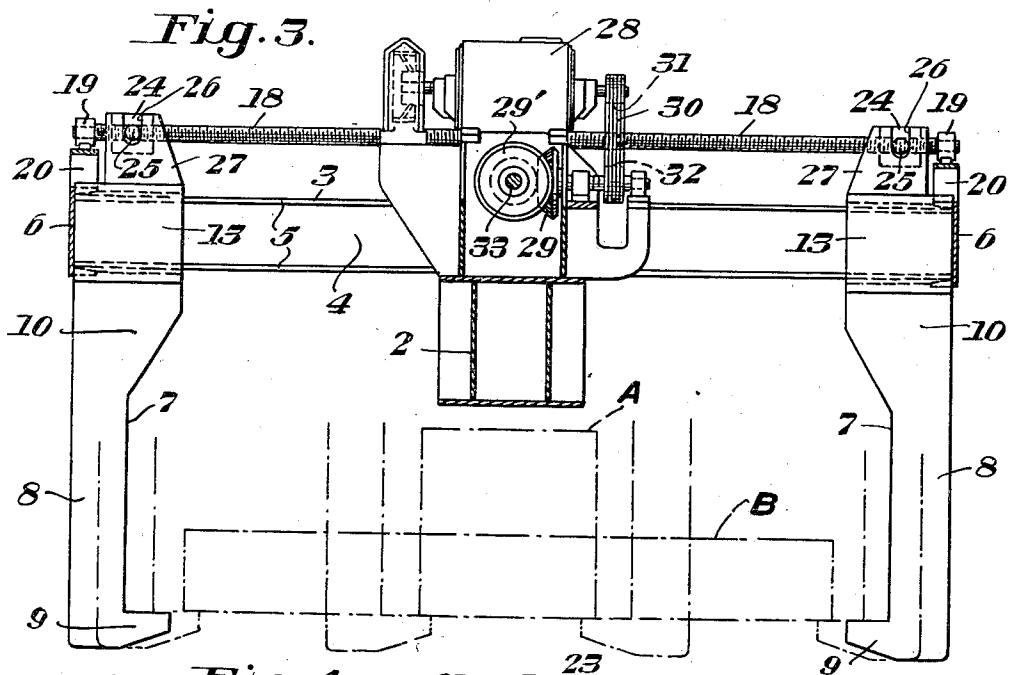
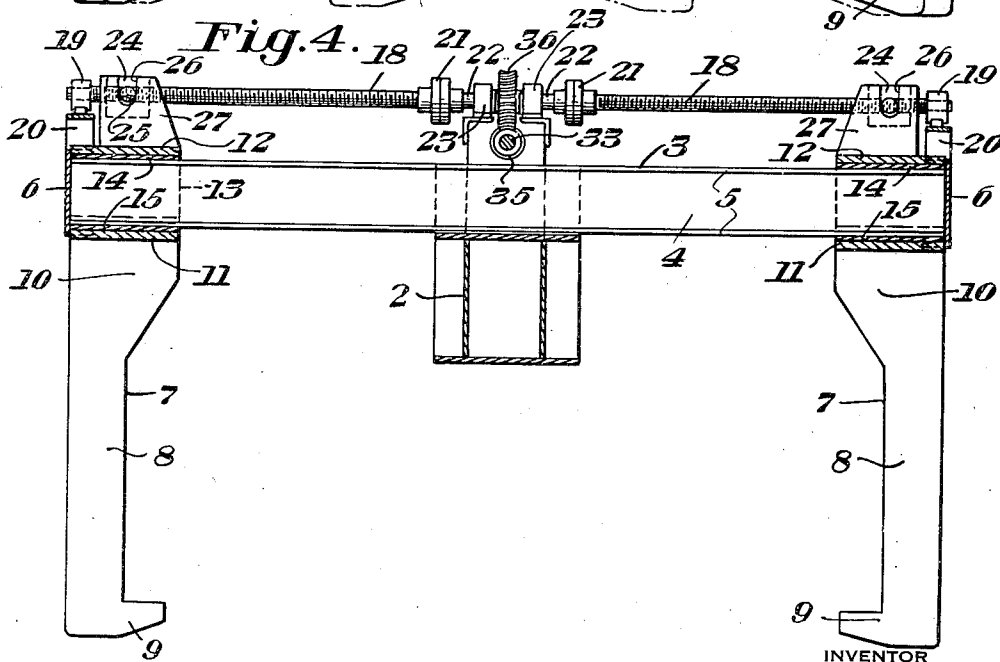
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APPARATUS FOR TRANSFERRING MATERIAL

Filed Jan. 5, 1945

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,462,691

APPARATUS FOR TRANSFERRING
MATERIAL

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Application January 5, 1945, Serial No. 571,510

3 Claims. (Cl. 294—67)

1
This invention relates to apparatus for transferring material and more particularly to a rig or grapple for engaging and lifting a pile of sheet stock or other material for transfer to another location. The apparatus makes possible the handling of stacks of sheets in confined areas and is particularly useful for handling armor plate where the size of the annealing pit to which the armor plate is to be transferred is such that the usual sheet stack lifter cannot be used because of the dimensions of the pit or furnace.

In the accompanying drawings which illustrate a preferred embodiment of the invention

Figure 1 is a plan view;

Figure 2 is a vertical longitudinal section on the line II—II of Figure 1;

Figure 3 is a vertical transverse section on the line III—III of Figure 1; and

Figure 4 is a vertical transverse section on the line IV—IV of Figure 1.

Referring more particularly to the accompanying drawings, the apparatus comprises a central longitudinal extending frame member **2** which extends the length of the apparatus. A plurality of cross members **3** are secured at intervals to the longitudinal frame member **2**. In the form shown, these cross members are I-beams having a web **4** and flanges **5**. The ends of the cross members **3** are supported in side frames **6** which in the form shown are channels. These side frames **6** likewise extend the full length of the apparatus.

The material to be lifted, such as a stack of sheets or armor plate is indicated in chain lines in Figure 3. The reference letter A designates a stack of sheets and the reference letter B a pile of armor plate. Of course, in the operation of the apparatus only the stack of sheets or pile of armor plate and not both will be conveyed at any one time, but the figure shows the wide range of widths of material to be transferred which can be handled by the apparatus. Figure 3 also shows in chain lines the different positions of the jaws which engage the material to be moved.

A pair of oppositely arranged stock engaging jaws **7** is provided for each cross member **3**. These jaws are supported by and slidable along the cross members **3** transversely of the apparatus into and out of material engaging position. Each of the jaws **7** comprises an arm **8** and a jaw **9**, the jaw fitting under the edge of a pile of sheets to be moved. The upper part **10** of each arm is widened as shown in Figures 3 and 4 in order to strengthen it and is secured as by welding to a plate **11**. The plate **11** forms the lower

2
surface of a housing which fits around and is adapted to slide along the cross member **3**. The upper wall of the housing is constituted by a plate **12** and the sides of the housing are formed by plates **13** (Figure 2). Inside of the housing is an upper liner plate **14** and a lower liner plate **15** which are best shown in Figure 4.

Located above each cross member **3** is a pair of oppositely threaded screws **18**, one screw of each pair being operatively connected to one of each pair of jaws **7** so that upon rotation of the screws **18** the jaws of each pair move in opposite directions, i. e. either toward or away from the stack of sheets. The arrangement of each of the screws **18** and its connection with the jaw **7** is the same except that the two screws of a pair are oppositely threaded. At its outer end the screw **18** is supported in a bearing **19** mounted on a support **20** carried by the side frame **6**. A coupling **21** connects the other end of the screw to a shaft **22** which is mounted in a bearing **23**. A nut **24** is threaded on the screw **18**. This nut is provided with a trunnion **25** at each end, each of the trunnions fitting into a slot **26** formed in a plate **27**, there being one plate **27** on each side of the screw. The plates **27** are welded or otherwise secured to the plate **12** which forms the upper wall of the housing which surrounds the cross member **3**. Rotation of the screws **18** causes the nuts **24** to move inwardly and outwardly thereby sliding the housings along the cross members **3** and moving the jaws toward or away from the pile of sheets. It will be noted that the mounting of the nuts **24** on trunnions **25** and the support of the trunnions in the slots **26** enables the nut to tilt with respect to the plates **27** and the jaws **7**. When a pile of sheets is being lifted, it tends to cause the jaws **7** to move out of a vertical plane and would therefore tend to cause binding between the nut and the screw if the nut were not free to tilt somewhat. The arrangement described overcomes this tendency of the screw and nut to bind or jam.

The arrangement for operating the screws **18** is as follows: A motor **28** (Figures 2 and 3) drives a bevel gear **29** through a sprocket chain **30** and sprockets **31** and **32**. The bevel gear **29** meshes with a bevel gear **29'** mounted on a shaft **33** which extends lengthwise of the apparatus. The shaft **33** is made in sections connected by couplings **34**. At intervals along the length of the shaft **33**, these intervals corresponding to the longitudinal spacing of the shafts **18**, the shaft **33** is provided with worms **35** which mesh with wormwheels **36** mounted on the shaft **22**.

3

When the motor is operated, it rotates bevel gear 29, bevel gear 29', shaft 33, worms 35, wormwheels 36, shafts 22 and screws 18. Since the screws 18 are oppositely threaded, the two jaws 7 of each pair move toward or away from the pile of sheets or other material to be transferred. After the jaws have been moved into engagement with the stack of sheets, the apparatus is raised by any suitable means as, for example, a hoist, and the sheets are transferred to another location. The hoist for lifting the apparatus may be connected to the apparatus by any suitable means (not shown).

The invention is not limited to the preferred embodiment which has been shown merely for purposes of illustration, but may be otherwise embodied or practiced within the scope of the following claims.

I claim:

1. Apparatus for transferring material, comprising a frame including a plurality of cross members, stock engaging jaws supported by and slidable on the cross members, oppositely threaded screws extending crosswise of the apparatus, a nut operatively connected to each jaw and threaded on one of the screws, said nut being mounted for tilting motion relative to the jaw, and means for operating the screws to move the jaws toward and away from the material.

2. Apparatus for transferring material, comprising a frame including a plurality of cross

4

members, stock engaging jaws supported by and slidable on the cross members, oppositely threaded screws extending crosswise of the apparatus, a nut on each screw, trunnions on the nut, the trunnions being received in slots formed in a part which is integral with the jaw, and means for operating the screws to move the jaws toward and away from the material.

3. Apparatus for transferring material, comprising a frame including a cross member, material engaging jaws supported by and movable along the cross member toward and away from each other, oppositely threaded screws extending oppositely along the cross member, and a nut threadedly engaging each screw and operatively connected to each jaw, each of said nuts being tiltable relative to the corresponding jaw.

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