

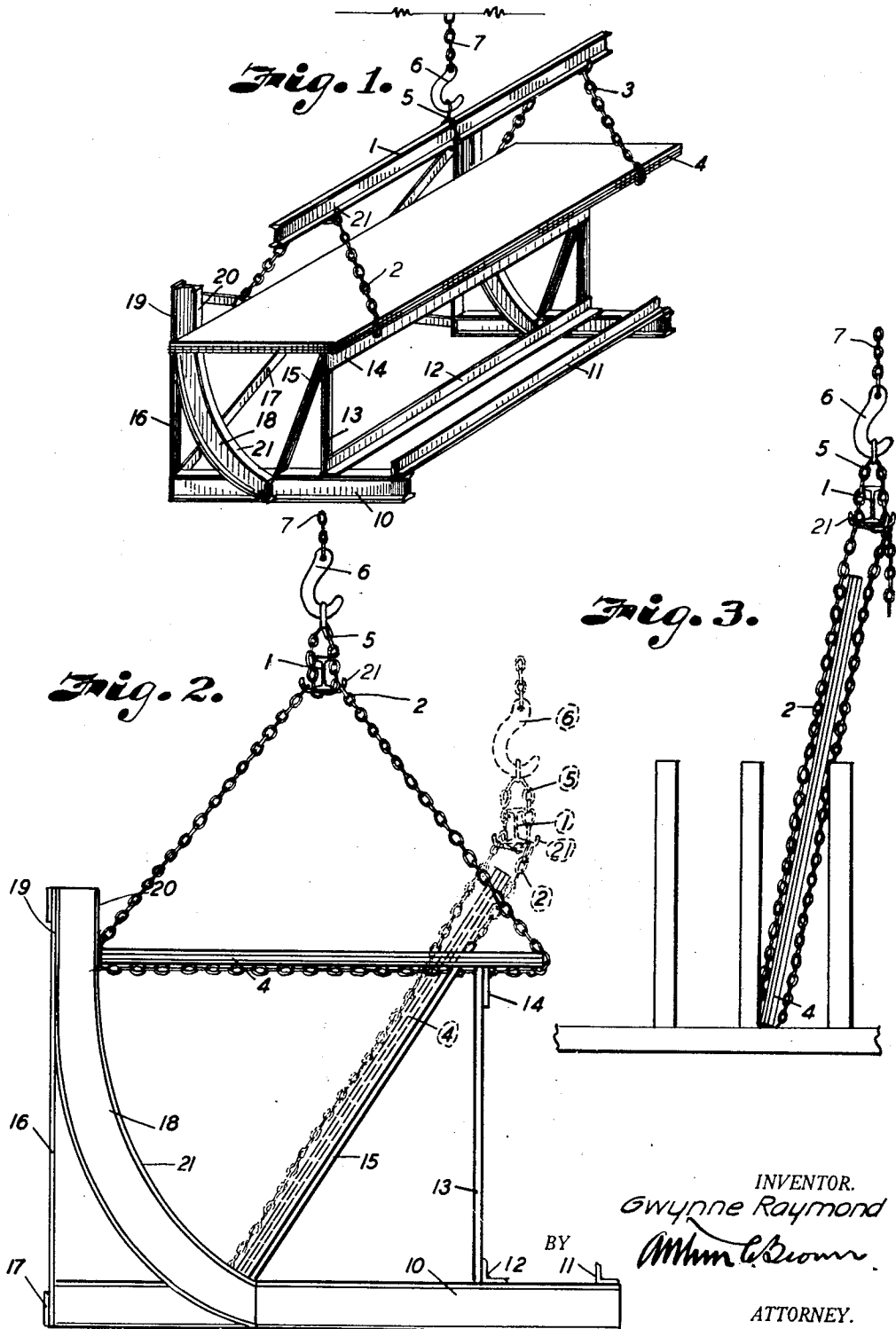
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APPARATUS FOR STACKING HEAVY SHEETS

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APPARATUS FOR STACKING HEAVY SHEETS

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My invention relates to material handling apparatus and more particularly to apparatus for stacking relatively heavy metal sheets.

sheaf of metal plates 4, a chain or loop 5 being mounted at the center of the beam to receive the hook 6 of a supporting chain 7 adapted to be moved vertically and horizontally by a traveling crane or the like, not shown.

In ordinary factory practice metal plates or sheets are received from mills stacked in a gondola or a flat car in horizontal position, and are lifted from the car by slings and cranes for transfer to storage.

It is desirable to stack and store the plates edgewise to reduce the space occupied thereby and facilitate subsequent handling. Each plate may weigh as much as a ton and a half, and it is a problem to shift the plates from horizontal to vertical position for storage between the posts of a rack.

The principal objects of my invention therefore are to effect up-ending of plates while the same are being moved from a car to storage, and to provide apparatus whereby plates supported by sling chains or like conveyor may be automatically repositioned in the support and deposited in substantially vertical position without requiring manual manipulation of the plates or removal of the plates from the conveyor.

In accomplishing these and other objects of my invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of apparatus constructed in accordance with my invention illustrating a bundle of plates in horizontal position before operation to tilt the plates into vertical position.

Fig. 2 is an end view illustrating the plates in the position shown in Fig. 1 and in dotted lines indicating the positions of the plates and slings after automatic readjustment into substantially vertical position.

Fig. 3 is an end view of a rack and a bundle of plates delivered to a compartment of the rack by the sling.

Referring in detail to the drawings:

The invention includes a support comprising a rigid rail or spreader I-beam 1, and a plurality of sling chains 2 and 3 mounted in spaced relation on the beam to form loops to receive and support a bundle or

Mounted in a convenient location accessible to the crane, are frames or up-turning horses on which a load of plates may be located for effecting repositioning of the plates each frame including a pair of parallel spaced footing members 10 consisting preferably of I-beams connected by angle irons 11 and 12 fixed to the upper faces of the I-beams respectively at the front ends thereof and in spaced relation with the front and rear ends thereof.

Fixed to the footing beams and to the outer face of the upstanding flange of the second named angle 12 are vertical posts 13 adapted to support a plate and form a pivot for swinging the plate into vertical position as later described. The upper ends of the posts are preferably connected by a horizontal rail 14 to stabilize and reenforce the same and define a front wall of the frame. Extending downwardly rearwardly from the upper ends of said posts are sloping bars 15 having lower ends fixed to the footing beams in substantially spaced relation with the rear ends of said beams.

The rear wall of the frame comprises vertical posts 16 fixed to the rear ends of the footing beams, braces 17 connecting the posts, and guide arms or rails 18 having straight upper end portions provided with vertical rear faces 19 engaging a substantial area of the upper ends of the posts. Vertical front face portions 20 of the guide rails extend above the level of the upper ends of the front posts, and curved lower portions thereof form downwardly forwardly concave surfaces 21 terminating substantially at the juncture of the inclined bars 15 with the footing beams. The rails 18 thus form rear end walls for the frame having curved front edges.

The rails 18 are preferably formed of steel and may be channels bent to desired conformation having relatively hard curved

wearing surfaces, and securely fixed to the footing beams and rear posts, the lower ends of the rails preferably overlying the outer sides of the beams to locate the lower ends of the curved surfaces adjacent the lower ends of the inclined bars without requiring extensive forming of the rails.

The vertical faces 20 of the rails 18 are located at a sufficient distance laterally from the front posts so that when the longitudinal edge of a plate engages said vertical faces the opposite edge of the plate will project substantially forwardly from the front posts, and the upper ends of the posts will form a pivot for the plate.

In practice the horizontal distance between the vertical faces of said guide rails and the upper ends of the front posts will be greater than one-half the width of the widest plates to be handled whereby the longitudinal median line of a plate will always lie between the front and back walls of the frame.

The center of curvature of the front faces of the rear rails is slightly below the pivot-forming upper end edges of the front posts, and the curve of the rails increases toward the lower ends thereof.

In using the apparatus, the spreader beam with sling chains mounted thereon may be moved to a flat car and a sheaf or load of plates mounted in the loops of the chains.

A suitable number of frames may be arranged in alignment, and may be spaced if desired, to provide an assembly having sufficient length to receive the load of the plates.

The load may then be suspended by the crane chain above the assembled frames and shifted bodily laterally to engage the rear longitudinal edges of the plates with the vertical upstanding upper end portions of the rails 18. The load may then be lowered to cause the front edge portion thereof to rest on the front posts of the frames. Further lowering of the load, i. e. relaxing of the crane chain, will cause the load to pivot on the upper end edges of the front posts. The inner edge of the load will move downwardly and, being restrained by the curved front faces of the rails, will move forwardly to be stopped by engagement with the sloping bars 15.

It is apparent that the load of plates may pivot freely on the front posts, due to the relaxed condition of the sling chains so that the load will assume substantially vertical position upon lifting movement of the crane chain, and the sling chains may move slidably over the inner edges of the plates to effect suitable readjustment of the engagement of the sling chains with the readjusted load of plates.

Operation of the crane may then be effected to lift the vertically positioned plates and transfer the same to a series of racks, the crane then lowering the load of plates into a

selected relatively shallow rack where the plates will be retained in vertical position.

While any desired degree of slope for the up-ended plates in the frames may be effected, I have particularly provided for a vertical slope of approximately 45 degrees from the perpendicular for the inclined bars 15, since the object is chiefly to release the plates from the sling chains, reposition the plates in substantially vertical position, and re-engage the sling chains with the re-positioned plates. It is apparent that any slope beyond 45 degrees will tend to cause the plates upon re-engagement thereof by the sling chains to move further toward perpendicular position and thus permit the lifting device to lower the plates into relatively narrow racks.

What I claim and desire to secure by Letters Patent is:

1. Apparatus of the character described including a pivot member, a stop member inclined downwardly and rearwardly from the pivot member, and a guide rail curved upwardly from the lower end of the stop member.

2. Apparatus of the character described including a plurality of vertical posts forming a horizontal pivot member, a bar inclined downwardly and rearwardly from the upper ends of said posts, and a guide rail having a vertically extending inner face curved upwardly away from the lower end of said bar.

3. In apparatus of the character described, a frame including a horizontal pivot bearing, a bar inclined downwardly and rearwardly from said bearing, and a guide rail having an upper perpendicular portion spaced laterally from said bearing and a lower portion curved toward said bar.

4. In apparatus of the character described, a frame including a base and a fulcrum member at the front of the base adapted for engagement by one edge of a plate lowered thereonto, a downwardly and forwardly curved guide rail at the rear of the base over which the rear edge of the plate may slide, and a stop member spaced rearwardly from said fulcrum member.

5. In apparatus of the character described, means for supporting a metal plate in horizontal position, a fulcrum member for engagement by the plate, a guide rail having a perpendicular portion against which one edge of the plate may abut, and a forwardly curved portion over which said edge of the plate may slide when the plate is lowered, and a stop member for retaining the plate in substantially vertical position.

6. In apparatus of the character described, a frame including a base, a fulcrum member adjacent the front edge of the base adapted for engagement by one edge of a plate lowered thereonto, a pair of downwardly and rearwardly curved guide rails at the rear edge

of the base over which the rear edge of the plate may slide, and a bar inclined downwardly and rearwardly from said fulcrum member to receive said plate.

5 7. Apparatus of the character described including a fulcrum member, means for lowering a plate flatwise onto the fulcrum member, and a curved guide engageable by an
10 edge of the plate for effecting pivotal movement of said plate into substantially vertical position.

In testimony whereof I affix my signature.
GWYNNE RAYMOND.

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