Aug. 3, 1965 J. I. CARLSON, SR., ETAL 3,198,518

SHEET MATERIAL HANDLING APPARATUS

Filed April 5, 1963 2 Sheets-Sheet 1

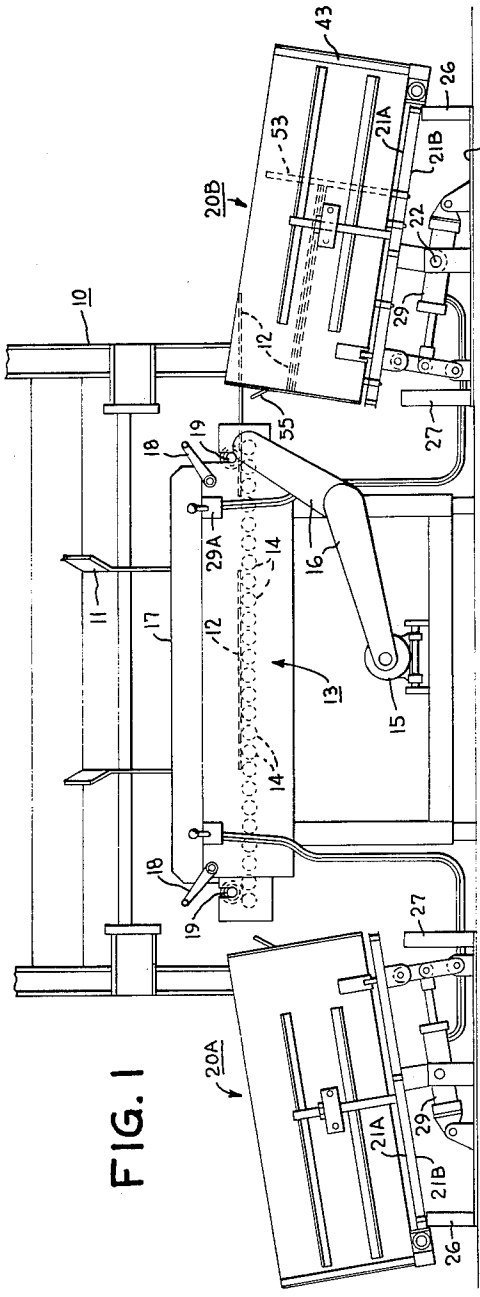


FIG. 1

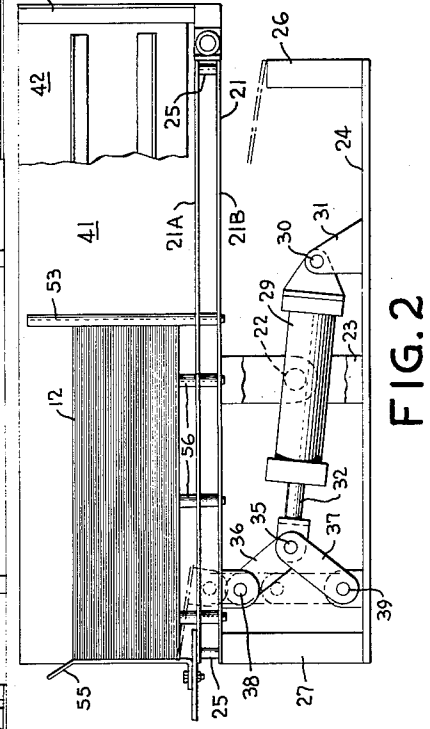


FIG. 2

INVENTORS
JOHN I. CARLSON, SR.,
CHARLES P. PAGE
BY Robert F. Casey
ATTORNEY

Aug. 3, 1965 J. I. CARLSON, SR., ETAL 3,198,518

SHEET MATERIAL HANDLING APPARATUS

Filed April 5, 1963 2 Sheets-Sheet 2

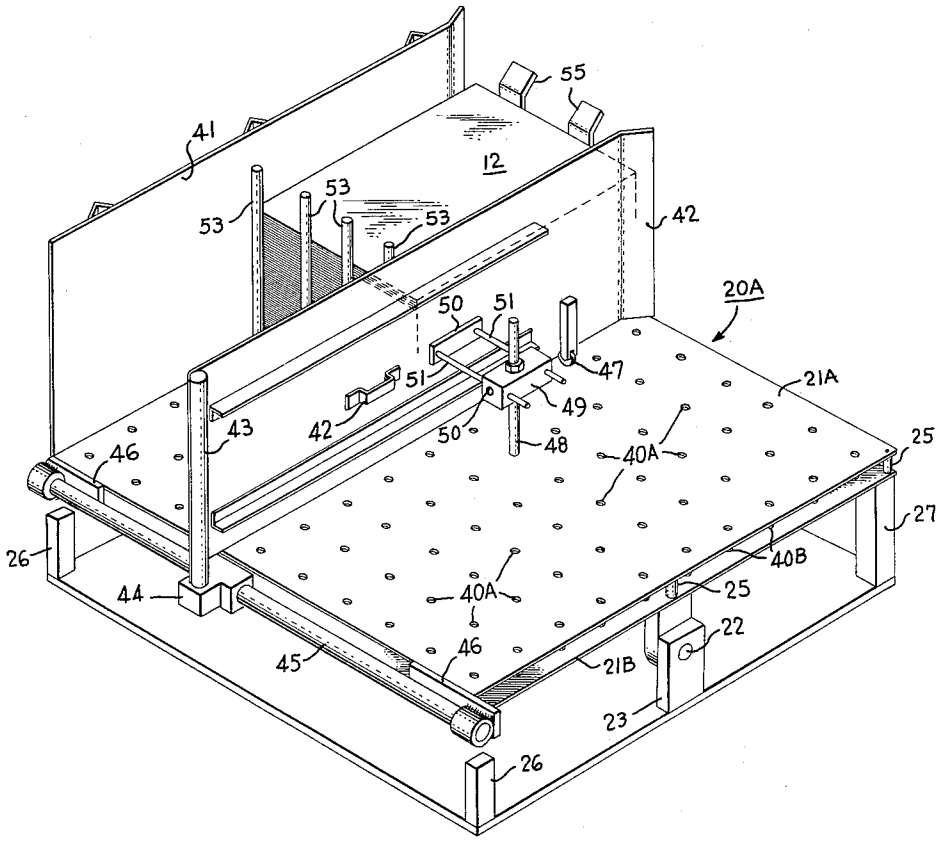


FIG. 3

INVENTORS
JOHN I. CARLSON, SR.,
CHARLES P. PAGE
BY Robert H. Casey
ATTORNEY

United States Patent Office 3,198,518 Patented Aug. 3, 1965

3,198,518

SHEET MATERIAL HANDLING APPARATUS

John I. Carlson, Sr., New Britain, and Charles P. Page, West Hartford, Conn., assignors to General Electric Company, a corporation of New York

Filed Apr. 5, 1963, Ser. No. 270,971
3 Claims. (Cl. 271—86)

Our invention relates to sheet material handling apparatus, and more particularly to apparatus for converting a continuous flow of sheet metal pieces into predetermined size stacks for further handling.

Apparatus for receiving and stacking sheet metal pieces, according to the prior art, has not been readily adjustable to receive pieces of differing sizes. In addition, prior art stacking apparatus has not been capable of receiving and stacking such pieces in evenly arranged stacks in such a manner as to make such stacks readily accessible for transporting such as by means of a "fork lift truck."

It is an object of the present invention to provide a stacking apparatus which can be quickly and easily adjusted to receive evenly stacked metal sheets of differing sizes and shapes.

It is another object of the invention to provide stacking apparatus which is capable of receiving sheet metal pieces and stacking them in an even manner and which makes such stacked pieces readily accessible for removal and transfer to another location, and to do so without requiring interruption of the continuous flow of pieces being stacked.

In accordance with the invention in one form, sheet metal stacking apparatus is provided including a pivotally supported platform having side walls adjustably mounted thereon defining an open-top receptacle, and means for automatically tilting the said platform between a first, tilted, position in which it is adapted to receive and stack metal sheets and a second, horizontal, position in which it is adapted to permit removal of the collected stacks of sheets therefrom.

In accordance with another aspect of the invention, the stacking apparatus includes a generally planar supporting platform having a plurality of regularly spaced holes therein, a stationary planar wall along one side thereof, an adjustable planar wall parallel to and spaced from the stationary wall, and a plurality of supporting rods fixedly received in the holes and arranged to define a third wall between the adjustable and stationary walls. In addition, a plurality of short spacer rods are provided, mounted in the holes of the supporting plate within the area defined by the aforesaid walls for the purpose of spacing the stack of sheets from the supporting base or platform to permit lifting and removal therefrom.

The invention will be more fully understood from the following detailed description, and its scope will be pointed out in the appended claims.

In the drawings,

FIGURE 1 is a side elevation view of an automatic stacking machine including a stacking receptacle in accordance with the invention;

FIGURE 2 is a side elevation view of one of the stacking receptacles of FIGURE 1, shown in condition to permit removal of the stacked material, and

FIGURE 3 is a perspective of one of the stacking receptacles of FIGURE 1.

Referring first to FIGURE 1, the invention is shown as incorporated in automatic stacking apparatus, illustrated as used in conjunction with an automatic press or other machine 10 having an output chute 11 arranged to discharge a series of rectangular sheet metal plates 12. The plates 12 are adapted to be discharged from the chute 11 and received on an automatic conveyor unit indicated generally by the numeral 13. The conveyor 13,

which is reversible, includes a number of rollers 14 which are adapted to transport the pieces 12 to the right or left as viewed, depending upon the direction of rotation of the rollers 14. The rollers 14 are driven by a driving motor 15 connected thereto by suitable pulley connecting means 16. The conveyor 13 includes an adjustable wall member 17 which can be adjusted toward and away from one edge of the rollers 14 by manual means such as by hand cranks 18. A single upper roller 19 is provided at each end of the conveyor 13 for the purpose of maintaining the pieces 12 in substantially horizontal position as they are being discharged from the conveyor 13, as shown in dotted lines at the right hand portion of FIGURE 1.

In accordance with the invention, a stacking receptacle is provided, two of which are shown in FIGURE 1 at 20A and 20B respectively. Each stacking receptacle 20A, 20B comprises a platform or base having two walls 21A and 21B as shown particularly in FIGURE 2. The platform 21 is adapted to be rocked or pivoted about a pivot pin 22 carried by a supporting post 23 which in turn is supported on a base plate 24. The plates 21A and 21B are supported in spaced relation by suitable spacers 25.

The tilting of the platform 21 is limited in one direction by a pair of short stop posts 26, and in the other direction by a pair of longer stop posts 27. The platform 21 is adapted to be rocked between tilted and horizontal positions automatically by means of an air cylinder 29 pivotally supported by pivot pin 30 on a supporting abutment 31 suitably mounted on the plate 24. The plunger 32 of the air cylinder 29 is connected to pivot pin 35 of a toggle, comprising toggle links 36 and 37. The toggle link 36 is pivotally connected by pin 38 to the lower platform plate 21B, and the toggle link 37 is connected by the pivot pin 39 to the supporting plate 24.

Referring now to FIGURE 3, the upper plate 21A is provided with a series of regularly spaced holes 40A, and the lower plate 21B is provided with a series of smaller diameter holes 40B, corresponding holes in the two plates being in alignment with each other. The sheet metal plates 12 are adapted to be received and stacked in evenly arranged fashion by cooperation of a plurality of side walls including a stationary generally planar side wall 41 which is fixedly mounted to one edge of the plates 21A, 21B by suitable means, such as by welding. A second generally planar wall 42 is mounted in parallel spaced relation to the wall 41, being welded at one end to a supporting post 43 which is supported by a block 44 which in turn is slidably supported on a rod 45 carried by supporting strips 46 welded to the plates 21A, 21B.

The post 43 is pivotally supported in the block 44 so that the wall 42 can be swung like a door, about the post 43 to an open position to facilitate the removal of the stack of pieces 12. To facilitate such opening movement of the side wall 42, a roller 47 is provided, adapted to ride on the plate 21A. The side 42 is held in the closed position as shown in FIGURE 3, by clamping means comprising a post 48 carrying a block 49 which in turn carries a pressure plate 50 slidably supported in the block 49 by rods 51. The rods 51 may be fixed in position in the block 49 by suitable means such as by set screws 50, only one shown. A handle 42A is also provided to facilitate opening movement of the side 42.

For the purpose of providing a third wall for cooperation with the walls 41 and 42, a series of posts 53 are provided which are arranged in a row, the lower end of each post passing through one of the openings 40 in the plate 21A, and each post having a reduced end portion adapted to pass through the smaller openings 40B of the plate 21B, and leaving a shoulder which rests on the upper surface of plate 21B. A pair of guide members 55 are pro-

vided for the purpose of guiding the pieces 12 on the fourth side.

As previously stated, the side wall 42 is adjustable toward and away from the side wall 41, and the posts 53 can be positioned in any row of holes 40A desired. Likewise, the guides 55 are made adjustable a small amount toward and away from the posts 53. The parts may therefore be adjusted to conform closely to the outline of any predetermined sheet 12 as desired, within a given range.

In operation, the machine 10 discharges a series of rectangular plates 12 from the discharge chute 11, onto the conveyor 13. Assuming the conveyor rollers operating with clockwise rotation as viewed, the plates 12 will be carried to the right and discharged into the stacking receptacle 20B. It will be observed that the plate 12 is maintained in a substantially horizontal position until finally released by the roller 19 cooperating with the rollers 14.

During such operation, the stacking receptacle 20B is maintained in a tilted condition as shown in FIGURE 1. This greatly facilitates the even and smooth stacking of the pieces 12 as they are received from the conveyor 13.

When it is desired to remove a stack of plates 12 from the receptacle 20B, the conveyor 13 is reversed in its direction by suitable means, such as by reversing the direction of rotation of the motor 15, and the pieces are then fed into the stacking receptacle 20A. The receptacle 20B is then moved to a horizontal condition, as shown in FIGURE 2, by activating the air cylinder 29 by suitable means such as by an air switch 29A, see FIGURE 1. This collapses the toggle 36–37 and moves the platform 21A–21B about the pivot 22 into engagement with the stop post 27. The clamping means 48–51 (FIGURE 3) is then released, and the side 42 is swung to open position about the post 43. This permits the removal of the stack of sheet metal pieces 12 by suitable means, such as by means of a forklift truck, the forks of which are inserted under the stack of plates 12 between the supporting posts 56. The posts 56 are mounted similarly to the posts 53, and extend through the openings 40A and include a reduced end portion extending through the openings 40B. If desired, the stack of plates 12 may be removed from the direction of the guide members 53 in a similar manner without the necessity of opening the side wall 42. When the stack of pieces 12 is removed, the wall 42 is returned to its closed position and clamped by means of the clamp 48–51. The platform is then moved to its tilted position again by activating the cylinder 29.

It will be observed that an extremely flexible and convenient sheet material stacking receptacle has been provided. Thus there can be a wide variation in the size of the pieces 12, and it is only necessary to set the side plates 41, 42 farther apart or closer together. Also, for each size piece it is easy to provide the required means for spacing the stack of pieces from the floor of the platform 21A by merely inserting spacer posts 56 in proper positions. Likewise, the wall formed by the row of posts 53 can be varied by adding or subtracting posts.

While the invention has been shown in only one particular embodiment, it will be readily apparent that many modifications thereof may readily be made, and we therefore intend by the appended claims to cover all such modifications as fall within the true spirit and scope of the invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A stacking receptacle for sheet material comprising:
(a) a generally planar platform,
(b) a first generally planar side wall supported on said platform in substantially perpendicular relation thereto,
(c) a second generally planar side wall supported on said platform and extending substantially parallel to said first side wall,

(d) said platform having a large number of regularly and closely spaced holes therein,
(e) a plurality of posts each inserted in said holes in a line to form a bridging wall between said first and second wall, and
(f) a plurality of relatively short spacer posts inserted in said holes within the area defined by said side walls and said bridging wall to maintain said sheet material in spaced relation above said platform.

2. Sheet material stacking apparatus as set forth in claim 1 wherein said platform comprising an upper plate having a first plurality of regularly spaced holes therein and a lower plate spaced from said upper plate and having a second plurality of holes therein aligned with corresponding holes of said first plate, each of said bridging wall posts and each of said spacer posts having a first diameter receivable in said openings of said upper plate and a reduced diameter portion receivable in said openings in said lower plates whereby to rigidly and removably support said posts on said platform.

3. Sheet material stacking apparatus comprising:
(a) a base plate,
(b) a generally planar platform pivotally supported adjacent its mid-point on said base plate,
(c) a pair of relatively short stop posts supported on said base,
(d) a pair of relatively long stop posts supported on said base,
(e) a pair of toggle links interconnecting said platform and said base at a point spaced away from said pivotal support,
(f) means for operating the knee of said toggle to collapse said toggle and to move said platform between a tilted position in which a portion of said platform engages said short stop posts and a horizontal position in which a second portion of said platform engages said long stop posts,
(g) said platform comprising a pair of spaced plates comprising an upper plate and a lower plate said upper plate having a large number of regularly and closely spaced holes and said lower plate having a plurality of regularly spaced holes aligned with corresponding holes of said upper plate,
(h) said upper plate holes being of larger diameter than said lower plate holes,
(i) a generally planar stationary side wall carried by said platform and extending substantially perpendicular thereto,
(j) a generally planar adjustable side wall carried by said platform, said adjustable side wall being pivotally mounted at one end, and also being movable in parallel relation toward and away from said stationary side wall,
(k) clamping means for clamping said adjustable side wall in preselected adjusted positions against movement away from said stationary side wall,
(l) a plurality of relatively long posts disposed in a line extending substantially perpendicular between said stationary wall and said adjustable wall to form a bridging end wall, each of said posts having a portion extending through said holes of said upper plate and a reduced portion extending into said holes of said lower plate,
(m) a plurality of relatively short spacer posts within the area defined by said spaced side walls and said bridging end wall, said relatively short posts also having a first portion extending through said holes in said upper plate and a reduced end portion extending through said holes in said lower plate, and
(n) adjustable guide means positioned opposite said bridging end wall and comprising a fourth wall defining a generally rectangular enclosure.

(References on following page)

5

References Cited by the Examiner

UNITED STATES PATENTS

1,651,189	11/27	Colquhoun	271—89
1,945,905	2/34	Kimball	271—86
2,392,032	1/46	Domville et al.	271—69
2,423,691	7/47	Domville et al.	271—86

6

FOREIGN PATENTS

358,559	10/31	Great Britain.

M. HENSON WOOD, JR., *Primary Examiner.*

RAPHAEL M. LUPO, ROBERT B. REEVES, *Examiners.*