Dec. 8, 1953 G. F. BAUER 2,661,949

SHEET PILER END STOP STRUCTURE

Filed April 15, 1949 2 Sheets-Sheet 1

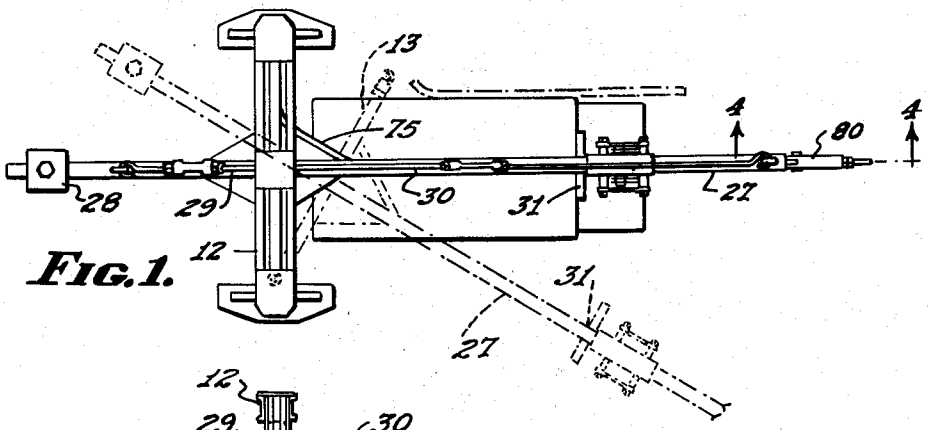


FIG. 1.

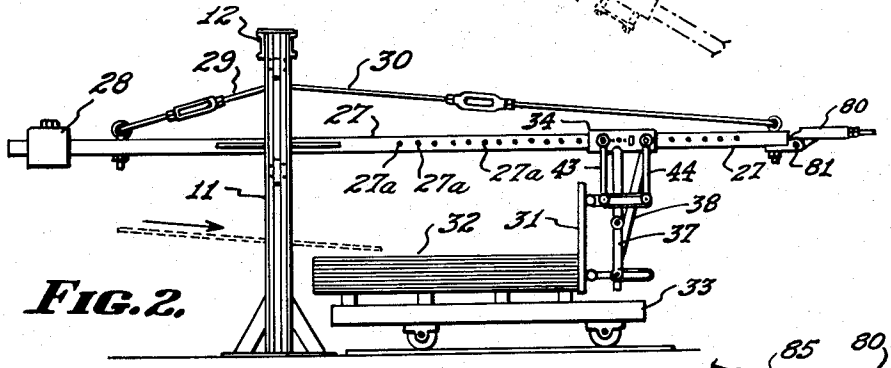


FIG. 2.

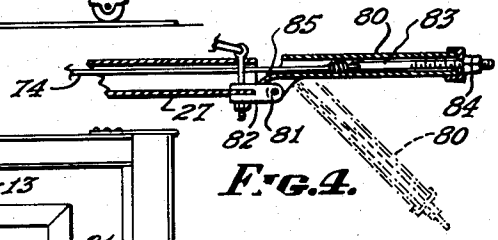


FIG. 4.

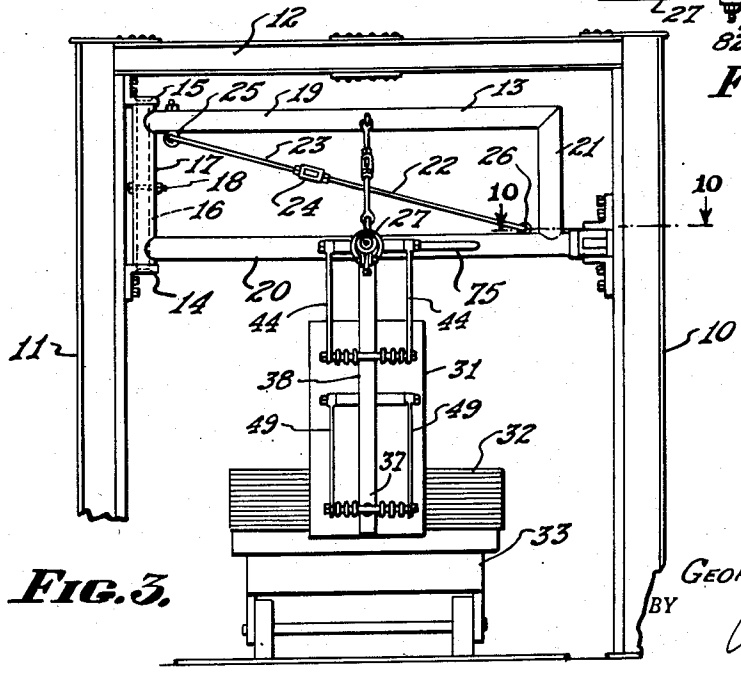


FIG. 3.

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SHEET PILER END STOP STRUCTURE

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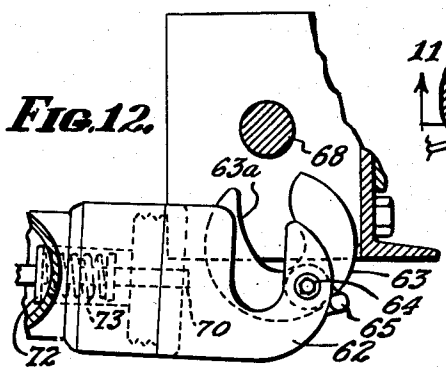


FIG. 12.

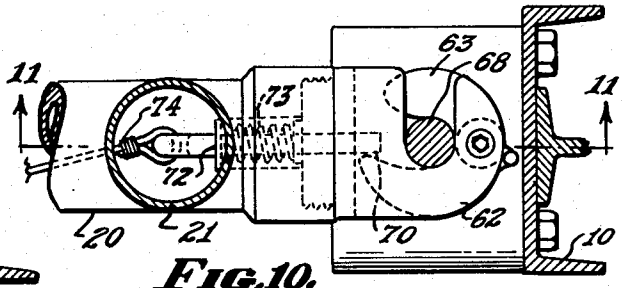


FIG. 10.

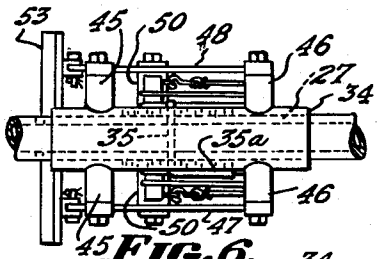


FIG. 6.

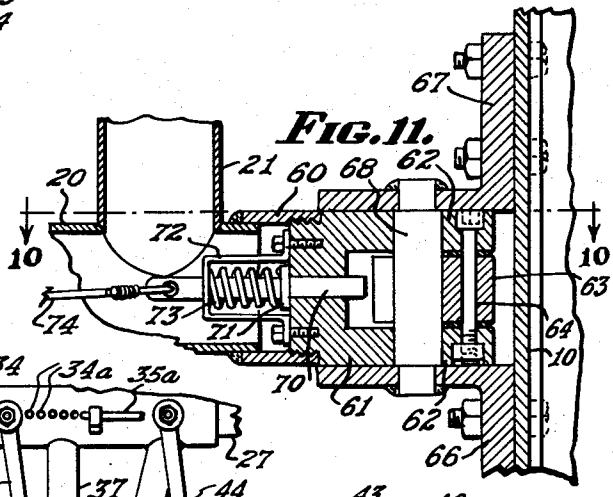


FIG. 11.

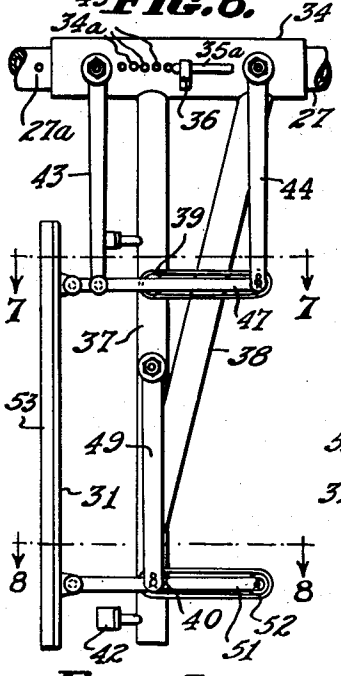


FIG. 5.

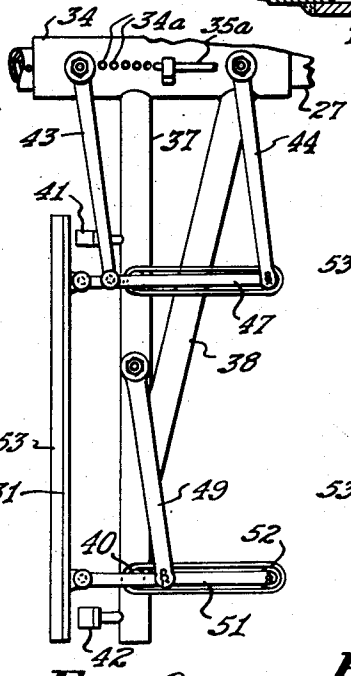


FIG. 9.

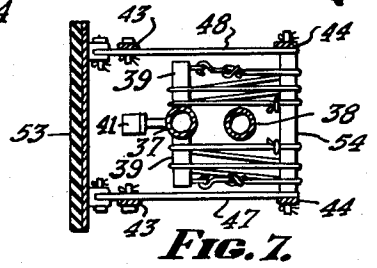


FIG. 7.

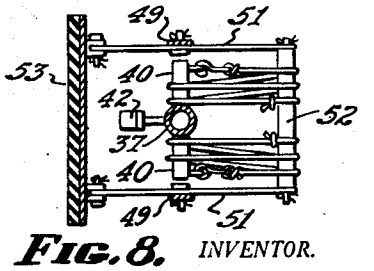


FIG. 8.

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UNITED STATES PATENT OFFICE

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SHEET PILER END STOP STRUCTURE

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Application April 15, 1949, Serial No. 87,739

15 Claims. (Cl. 271—86)

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This invention relates to a sheet piler end stop structure. With modern high speed production methods sheets, plates or similar articles issue from a finishing apparatus or from a production line at very high velocity, and depending upon the weight of the sheets or plates involved, the inertia force in such sheets or plates may be very great. When sheets or plates issue from a production line or a finishing apparatus, they are generally stacked on a dolly or the like, so that they may be conveniently transported to another part of the plant. It is very important in the stacking of sheets or plates to produce an even stack, and to accomplish this without damage or injury to the sheets or plates.

With the sheets or plates issuing at very high velocities the problem of providing an end stop which will absorb the high inertia forces involved and which will produce an even stack without damaging the leading ends of the sheets or plates becomes one which is very difficult of solution.

With the foregoing considerations in mind it is an object of my present invention to provide a sheet piler end stop structure which will absorb the inertia forces of the plates or sheets issuing at high velocity without damage to the leading edges of the sheets or plates.

It is another object of my invention to provide a structure as outlined in which the end stop may be positioned in a large number of positions so that it may accommodate stacks of various lengths of sheets or plates.

It is another object of my invention to support the end stop member from an overhead structure so that there is no danger to the operator in moving the end stop structure.

It is a still further object of my invention to support the end stop structure from a boom along which the end stop structure may be adjusted.

Yet another object of my invention involves a novel mounting for the supporting boom in an overhead position whereby the boom may be swung aside so that the end stop may be moved out of the path of travel of the sheets or plates whereby the stack may readily be removed.

Still another object of my invention involves an arrangement for locking the boom in operating position by means of a releasable latch mechanism, and it involves still further the provision of operating means for the latch member associated with the end of the boom where it is within the operator's reach, so that the boom may be conveniently unlatched and swung aside.

These and other objects of my invention which I shall point out in more detail hereinafter, or

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which will become apparent to one skilled in the art upon reading the specifications I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference is made to the drawings forming a part hereof and in which:

Figure 1 is a plan view of a sheet piler end stop structure;

Figure 2 is an elevational view of the same;

Figure 3 is an end elevational view of the same on a slightly enlarged scale;

Figure 4 is a fragmentary cross-sectional view taken on the line 4—4 of Figure 1;

Figure 5 is an elevational view of the end stop structure in normal position;

Figure 6 is a plan view of the same;

Figure 7 is a cross-sectional view taken on the line 7—7 of Figure 5;

Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 5;

Figure 9 is a view similar to Figure 5 showing the end stop member in retracted position;

Figure 10 is an enlarged cross-sectional view of the catch mechanism taken on the line 10—10 of Figure 3;

Figure 11 is a cross-sectional view of the same taken on the line 11—11 of Figure 10; and

Figure 12 is a view similar to Figure 10 showing the catch in released condition.

Briefly, in the practice of my invention I provide an A frame having the upright members 10 and 11 and connected across the top by a cross member 12. This frame member is disposed transversely of the path of movement of the sheets or plates from the production line and straddles this path of movement.

A gate structure indicated generally at 13 is hingedly mounted in the A frame as will now be described. Secured to the member 11 are the brackets 14 and 15 which carry a pintle member 16. A tubular member 17 which forms a part of the gate structure has pivotal movement on the pintle 16 and is held in position there by means of the bolt 18.

The member 17 forms one end of the gate structure which has been indicated generally at and which comprises the transverse elements 19 and 20 and a vertical member 21 at the end opposite the member 17. There is thus provided a rectangular framework of tubular pieces. Since this frame work will have to carry considerable weight, it is preferable to provide for a brace member which may comprise tension rods 22 and 23 connected together by a turnbuckle 24, and secured at their respective ends to the eye-bolts 25 and

26. A latch member is provided at the right hand end of the member 20, which will be described hereinafter.

Secured to the member 20, substantially at right angles thereto, is the boom member indicated generally at 27. As seen in Figures 1 and 2 the right hand end of the boom carries the end stop member proper and in order to produce a balanced structure the left hand end of the boom is provided with a counter-weight 28, brace members 29 and 30 are provided as best seen in Figure 2 to carry the load of the end stop member and the counter-weight respectively.

From the foregoing it will be clear that when the latch member is released the gate member 13 may be swung out to the position shown in broken lines in Figure 1, which will bring the boom to the position shown also in broken lines whereby the end stop member, which is indicated generally at 31, is moved aside out of the way of the stack so that the stack may be conveniently transported away.

As seen in Figure 2, the stack which is indicated generally at 32 is formed upon a dolly or the like 33, and when a stack of the desired size has been accomplished the boom is swung aside and the dolly moved out of the way.

The end stop member itself will be described in connection with Figures 5 to 9 inclusive where its features are shown in detail. A tubular member 34 having an internal diameter of sufficient size that the member 34 may slide freely along the boom 27 is mounted for sliding movement on said boom. The boom 27 is provided with a series of evenly spaced holes 27*a* and the member 34 is provided with an evenly but more closely spaced series of holes 34*a*. The member 34 is fixed in relation to the boom 27 by means of a locking pin 35 which is passed through a pair of the holes 34*a* and a pair of the holes 27*a*. The latch member 35 has a right angle bent end portion 35*a* which may be engaged with a latch member 36 to hold it in position. When it is desired to set up the member 34 in any particular relation to the boom 27 the locking pin 35 is removed and the member 34 is slid along the boom 27 to the desired position. The pin 35 is then reinserted through a registering pair of holes 34*a* and 27*a*, and the portion 35*a* of the locking pin is rotated toward the right and engaged behind the latch member 36. It will be observed that the series of holes 27*a* provide for coarse adjustment, while the relatively closely spaced holes 34*a* provide for a fine adjustment of the position of the member 34 in relation to the boom 27.

Depending from the member 34 is a strut 37 having a bracing member 38 joined to it and also depending from the member 34. The strut 37 is provided with transverse members 39 and 40, and with the bumper members 41 and 42. Pivoted to each side of the member 34 are the arms or links 43 and 44. It will be understood that there is a link 43 on each side of the member 34 and a link 44 on each side thereof. The links 43 and 44 are pivoted to lateral bosses 45 and 46 best seen in Figure 6. Thus the pivot points of the links 43 are aligned transversely as are the pivot points of the links 44. All of the links 43 and 44 are of the same length. Pivoted to the lower ends of these pairs of links respectively are the push bars 47 and 48. The distance between the pivot points on the push bars 47 and 48, is the same as the distance between the pivot points on the member 34 for the links 43 and 44. It will be clear from the foregoing that the push bars 47 are capable of movement to the left or right of Figures 5 and 9 while maintaining their horizontal position.

Also pivoted to the strut 37 are the links 49, one on each side of the strut. These links are pivoted to the bosses 50 which are similar to the bosses 45 and 46 described above. The links 49 are of the same length as the links 43 and 44. Pivoted to each of the links 49 is another push bar member 51. The push bars 51 have rearward extensions which are connected together by means of a transverse rod 52.

The end stop plate 53 which may be of any desired construction, is secured to all of the aforesaid push bars as best seen in Figures 5 to 9 inclusive, and it will be clear that if the connection is made in such a way that when all of the links 43, 44 and 49 are in a vertical position, the plate 53 is in a vertical position, then as the linkage mechanism moves toward the right the plate 53 will remain in a vertical plane. The bumper members 41 and 42 limit the movement toward the right of the end stop plate 53.

Resilient means are provided to take up the inertia forces of the sheets or plates striking against the plate 53 at high velocity. These resilient means may be of various types, but I have shown the use of airplane type elastic shock cord to connect the strut member with the movable portions of the mechanism. Referring more particularly to Figures 7 and 8, the push bars 47 and 48 are connected at their free ends by the transverse rod 54, and elastic shock cord or other resilient material is wound around the bar 54 and the bosses, or extensions, 39 on the strut 37 as shown. Similarly, as seen in Figure 8 elastic shock cord material is wound between the bosses or extensions 40 and the transverse rod 52. It will be clear from a consideration of Figures 7 and 8 that when the end stop plate 53 moves toward the right, its movement will be resisted by pull of the elastic shock cord on the extensions 39 and 40 of the strut 37. The structure just described permits of ready adjustment in that any number of turns of shock cord may be wound back and forth between the members 39 and 54 and between the members 40 and 52. The amount of resilience can thus be controlled to suit the mass and velocity of the issuing sheets which will strike the plate 53.

Coming now to a description of the latch mechanism and referring more particularly to Figures 10 to 12 inclusive it will be observed that the member 20 of the gate at its right hand end has welded to it a collar member 60 which is internally threaded, a latch member 61 having an externally threaded portion is screwed into the member 60 as shown. The member 61 as best seen in Figures 10 and 12 is provided with the hook-like elements 62 between which there is pivotally mounted a cam element 63. The member 63 is pivoted between the hook element 62 by means of the pin 64, and it is provided with an abutment member 65 to limit its rotation in a clockwise direction.

Secured to the member 13 are the brackets 66 and 67 between which extends the locking pin 68. The pin 68 may be welded or otherwise suitably secured to the brackets 66 and 67.

It will be observed that the pivotal member 63 has a curved cam slot 63*a*, as best seen in Figure 12. If now the gate is swung to its closed position, the parts being in the position shown in Figure 12, the pin 68 can enter the slot 63*a* and as the gate swings shut the pin also enters to slot in the members 62, and during this move-

ment the member 63 rotates in a counter-clockwise direction until when the gate member is completely closed the parts are in the position shown in Figure 10. A latch member is provided in order to hold the gate in closed position. This latch member comprises a pin 70 which engages, as best seen in Figure 10, in the slot 63a of the member 63. An opening movement of the gate must be accompanied by a clockwise rotation of the member 63 and it will be clear that the pin 70 prevents such clockwise movement. The pin 70 is provided with a shoulder 71 to limit its movement toward the right and passes through a stirrup member 72 and is urged toward the right by a compression spring 73 bearing against the shoulder 71 on the one side and against the stirrup 72 on the other. The locking mechanism is unlatched by a movement toward the left of the pin 70. This permits the member 63 to rotate in a clockwise direction so that the gate member may be pulled open as seen in Figure 12.

It is desirable that the unlocking of the latching member be accomplished by the operator from his working position which will be adjacent the end of the boom. Therefore the pin 70 has connected to its end as best seen in Figure 11, a flexible member such as a cable or the like 74. This cable member passes through the interior of the gate portion 20. As best seen in Figures 1 and 3 the member 20 is connected to the boom 27 by an angular tubular member 75 which may, if desired, curve at its ends so as to merge with the member 20 and the boom 27. Cable 74 passes through the member 75 into the interior of the boom and runs through the entire length of the boom to the end as seen in Figure 4.

The operating mechanism is best seen in Figure 4 and comprises very simply a piece of tubing 80 having a pivotal connection at 81 with a bracket 82 secured to the end of the boom 27. The cable 74 passes through the tubular member 80 and is secured to a bolt 83 having the lock nuts 84 whereby the tension on the cable 74 may be adjusted. At its innermost end the tubular member 80 has a curved portion 85 to act as a pulley for the cable 74.

From the foregoing description it will be clear that when it is desired to release the pin 70 so that the gate structure may be swung open, the operator simply grasps the portion 80 and moves it downward to the position shown in broken lines in Figure 4, whereby tension is put on the cable 74 causing the pin 70 to be withdrawn from engagement in the slot 63a. Having withdrawn the pin from the slot the operator may simply grasp the boom and push it aside to the position shown in broken lines in Figure 1, whereupon the completed stack may be disposed of as desired.

From the foregoing description it will be observed that the end stop mechanism is yieldable resiliently so that it can absorb the inertia of relatively heavy plates or sheets striking it at high velocity. The degree of resiliency can be adjusted as described above. It will also be noted that the end stop proper is supported from an overhead boom, so that there is no part of the mechanism in the way of the operator at any time. The boom is conveniently placed at a height where the operator can reach it by extending his arm over his head. The swinging of the boom thus will not endanger employees in the immediate vicinity of the piler. The operator can very easily unlatch the gate structure and swing the boom out of the way and when it is desired to replace the boom in its operative position it may be given a push and upon closing of the gate structure the latch functions automatically as set forth above.

It will be understood that numerous modifications may be made as to various details, and I therefore do not intend to limit myself in any way other than as set forth in the claims which follow.

Having now fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame for swinging movement in a horizontal path, a boom carried by said gate structure and extending substantially at right angles to said gate structure, and an end stop member mounted on said boom.

2. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame for swinging movement in a horizontal path, releasable means for locking said gate structure in closed position, a boom carried by said gate structure and extending substantially at right angles to said gate structure, and an end stop member mounted on said boom.

3. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame, releasable means for locking said gate structure in closed position, a boom carried by said gate structure and extending substantially at right angles thereto, an end stop member mounted on said boom, and means disposed at the end of said boom and operatively connected with said releasable means for operating the same to release said gate structure from its closed position.

4. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame, releasable means for locking said gate structure in closed position, a boom carried by said gate structure and extending substantially at right angles thereto, an end stop member mounted on said boom, and means disposed at the end of said boom and operatively connected with said releasable means for operating the same to release said gate structure from its closed position, and means for securing said end stop member to said boom in a plurality of positions longitudinally thereof.

5. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame, releasable means for locking said gate structure in closed position, a boom carried by said gate structure and extending substantially at right angles thereto, a resilient end stop member adjustably mounted on said boom, and means disposed at the end of said boom and operatively connected with said releasable means for operating the same to release said gate structure from its closed position.

6. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame, a boom carried by said gate structure and extending on both sides thereof at substantially right angles thereto, releasable means for locking said gate structure in closed position, a resilient end stop member adjustably mounted on said boom at one side of said gate structure, a counterweight mounted on said boom at the other side of said gate structure, and means disposed at the end of said boom on the side carry-

ing said end stop member and operatively connected with said releasable means for operating the same to release said gate structure from its closed position.

7. A resilient end stop for a sheet piler, comprising a mounting frame, a plurality of links of equal length pivoted to said frame at one end with their other ends extending in the same direction in parallelism, links pivotally connected to the free ends of said first mentioned links, said second mentioned links supporting a stop plate, said stop plate thus being capable of translation in a direction normal to its plane while maintaining its parallelism to said plane, and resilient members connected to said mounting frame and one, at least, of said links to yieldingly resist motion of said stop plate in one direction.

8. A resilient end stop for a sheet piler, comprising a mounting frame, a push bar connected to said mounting frame by a parallel linkage, a second push bar connected to said frame by at least one link of a length equal to that of the links in said parallel linkage, extending in the same direction and parallel thereto, a stop plate secured to said push bars, whereby said stop plate is capable of translation in a direction normal to its plane while maintaining its parallelism to said plane, and means for yieldingly resisting motion of said stop plate in one direction.

9. In combination with an overhead boom, an end stop capable of being secured to said boom in a number of adjusted positions along said boom, said end stop comprising a member mounted for sliding movement along said boom and having a downwardly depending strut, a pair of links pivoted to said member on each side, the distance between said links on one side being equal to the distance between said links on the other side, the links on one side being aligned with and extending in the same direction as those on the other side, and said links being of equal length, a push bar pivotally secured to the pair of links on each side, said push bars being of equal length, a single link secured to said strut on each side, said single links being of a length equal to said other links, extending in the same direction, and parallel thereto, a push bar pivotally secured to each of said single links at their free ends, the ends of said push bars being secured to a stop plate in such manner that when all said links are in a vertical position, said stop plate is in a vertical plane, whereby said stop plate is capable of translation in a direction normal to its plane while maintaining its parallelism to said plane, and means for yieldingly resisting the motion of said stop plate in one direction.

10. The combination of claim 9, in which said pairs of links are transversely connected at their free ends by a cross bar, and in which said second mentioned push bars are extended beyond their pivot points in a direction away from said stop plate and are connected transversely by a cross bar, said cross bars being connected to said strut by resilient means.

11. The structure of claim 9, in which said boom is of tubular construction, and in which said sliding member is also of tubular construction having an internal diameter to slide freely on said boom.

12. The structure of claim 10, in which said boom is provided with an evenly spaced series of transverse holes, and said sliding member is provided with an evenly but more closely spaced series of holes, and in which a locking pin is provided for insertion through aligned holes in said sliding member and boom, the spacing of the holes in said boom providing for coarse adjustment, and the relatively closely spaced holes in said sliding member providing for fine adjustment.

13. A sheet piler end stop structure comprising a frame, a gate structure hingedly mounted in said frame, said gate structure being, at least in part, of tubular material, a boom of tubular material secured to said gate structure and carrying an end stop device, releasable means for locking said gate structure in closed position, means at the end of said boom for operating said releasable means to release said gate structure from its closed position, and a flexible connection between said means at the end of said boom and said releasable means, said flexible connection passing through said tubular boom and a tubular portion at least of said gate structure.

14. A device according to claim 13, in which said releasable means comprises a member spring urged to locking position and secured to one end of said flexible connection, and in which said operating means is movable to exert a pull on said flexible connection.

15. A device according to claim 14 in which said operating means comprises a handle member hinged to the end of said boom and having an end of said flexible connection secured thereto and having a curved extension extending over said hinge to serve as a support for said flexible connection when said handle member is moved about said hinge.

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