June 17, 1958 H. M. BERNARD, JR 2,839,295

STOP FOR DOUBLE-DRAFT PILING OF SHEETS

Filed Sept. 29, 1955 2 Sheets-Sheet 1

FIG. 2.

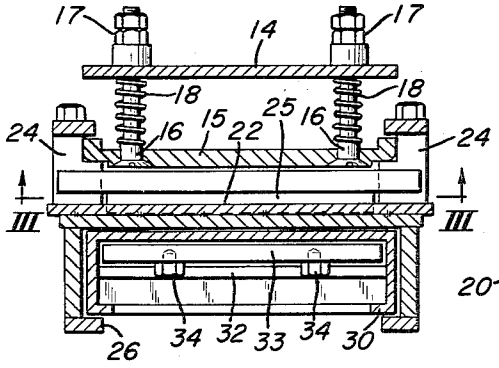


FIG. 3.

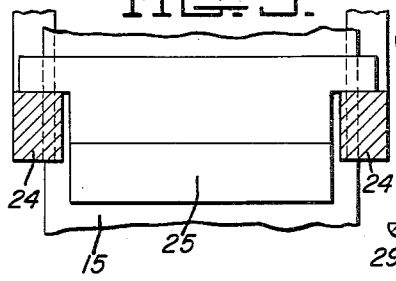
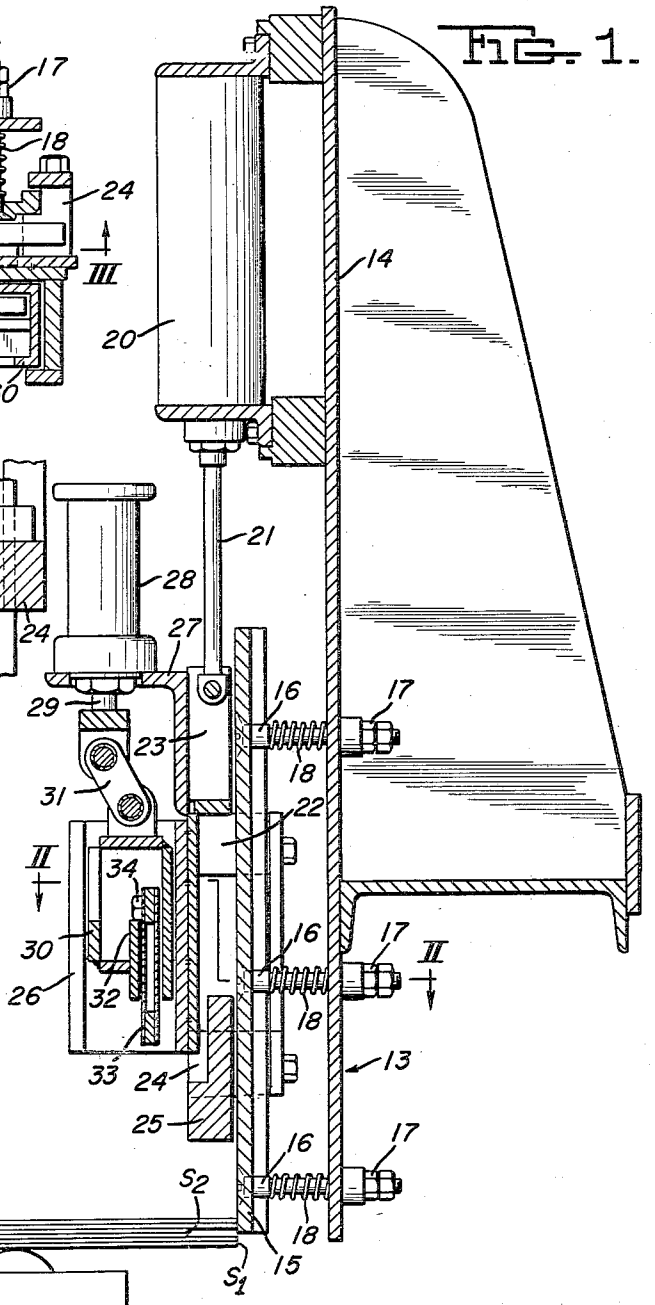


FIG. 1.



INVENTOR:
HARRY M. BERNARD, Jr.,
BY: Donald G. Dalton
his Attorney.

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FIG. 4.

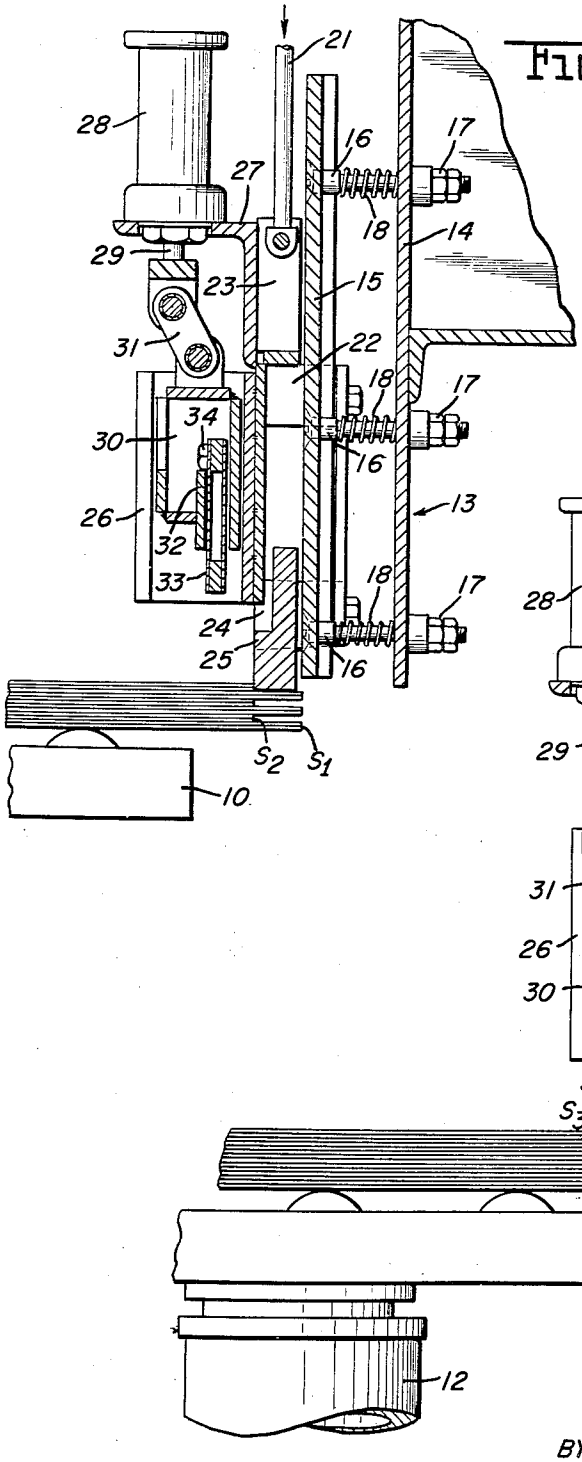
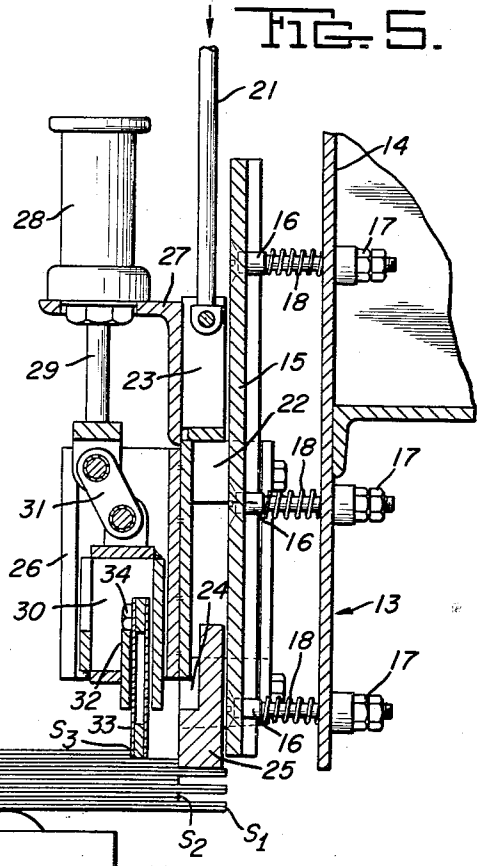


FIG. 5.



INVENTOR:
HARRY M. BERNARD, Jr.,
BY: Donald G. Dalton
his Attorney.

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2,839,295

STOP FOR DOUBLE-DRAFT PILING OF SHEETS

Harry M. Bernard, Jr., Kennywood, Pa., assignor to United States Steel Corporation, a corporation of New Jersey

Application September 29, 1955, Serial No. 537,522

5 Claims. (Cl. 271—86)

This invention relates to a stop mechanism for double draft stagger-piling of sheets.

In piling sheets of metal or the like, a common practice is to pile a group of a definite number with their edges aligned fore and aft, and then a similar group with their edges also aligned but offset from the first, and to continue in this fashion throughout the pile. This practice, known as "stagger-piling," facilitates subsequent removal of sheets from the pile in groups of a definite number and also eliminates the need for manually counting large numbers of sheets. "Double draft" stagger-piling is an extension of this practice in which the individual sheet groups themselves consist of staggered subgroups. Stop mechanisms are known for automatically stagger-piling sheets in single draft as they emerge from a processing line, but heretofore as far as I am aware piling sheets in double draft has necessitated handling them manually.

An object of the present invention is to provide a stop mechanism for automatically stagger-piling sheets in double draft as they emerge from a processing line.

A further object is to provide a multiple stop mechanism which can align the edges of sheets on three offset vertical planes in predetermined patterns as required for double draft stagger-piling.

A further object is to provide a stop mechanism of the foregoing type in which the individual stops do not bear with appreciable weight on the overhanging portions of the sheets.

In accomplishing these and other objects of the invention, I have provided improved details of structture, a preferred form of which is shown in the accompanying drawings, in which:

Figure 1 is a vertical section of a sheet piler equipped with a stop mechanism constructed in accordance with my invention;

Figure 2 is a horizontal section on line II—II of Figure 1;

Figure 3 is a vertical section on line III—III of Figure 2;

Figure 4 is a vertical section similar to Figure 1, but showing the parts in a different position; and

Figure 5 is another similar view with the parts in still a different position.

Figure 1 shows a portion of a sheet piler which includes a conventional vertically movable roller table **10**, a conventional hydraulic cylinder **12** for raising and lowering said table, and a stop mechanism **13** constructed in accordance with my invention. Sheets S1, S2 and S3 are fed to the piler from any conventional processing equipment and are piled in double draft as shown. In the illustration each subgroup consists of two sheets and each main group of five subgroups, although obviously these numbers can vary as desired. The roller table **10** is of course progressively lowered in the usual fashion as the pile builds up so that incoming sheets always engage the stop mechanism at the proper height.

My stop mechanism comprises a fixed frame **14** which

carries a spring loaded vertical outer stop plate **15**. The mounting shown for this plate includes a series of bolts **16** fixed to the back of the plate and loosely projecting through openings in the frame, nuts **17** carried by said bolts, and springs **18** encircling the bolts and bearing against the back of the plate and the front of the frame. Sheets S1 whose leading edges lie farthest to the right engage this stop plate as they enter the piler and are aligned thereagainst, as shown in Figure 1.

The frame **14** carries a double-acting air cylinder **20** or equivalent reciprocating power means above and overhanging the outer stop plate **15**. This cylinder has a depending piston rod **21**. A frame **22** of U-shape in plan is mounted on the stop plate **15** for vertical sliding movement and is connected through a pivoted filler block **23** with the lower end of this piston rod. The lower portion of the frame **22** includes a pair of horizontal bars **24** located at opposite sides and on which an intermediate stop plate **25** is suspended freely and depends below the bottom edge of said frame, as best shown in Figure 3. When the piston rod **21** is projected from the cylinder **20**, the intermediate stop plate is lowered or extended to its sheet engaging position overlying the outer stop plate, as shown in Figure 4. Sheets S2 whose leading edges lie second from the right engage the intermediate stop plate as they enter the piler and are aligned thereagainst. The pivoted connection of the filler block **23** affords sufficient flexibility to enable the springs **18** to absorb impacts of the sheets. Since the intermediate stop plate **25** is suspended freely and of relatively light weight, it does not bear against the sheets S1 with any appreciable force when lowered, and hence does not damage their overhanging edges. The cylinder **20** is of course operated to retract the stop plate **25** to pile sheets against the outer stop plate **15**.

A guide box **26** is fixed to the front of the frame **22** to move therewith. A bracket **27** is fixed to the filler block **23** above said box and carries another double-acting air cylinder **28** or equivalent reciprocating power means. This cylinder has a depending piston rod **29**. A frame **30** is mounted within the box **26** for vertical sliding movement and is connected through a link **31** with the lower end of this piston rod. The frame **30** includes a transverse bar **32** on which an inner stop plate **33** is suspended freely again to avoid damaging overhanging portions of sheets. The suspension means illustrated includes a pair of bolts **34** which are engaged with the stop plate and whose heads rest on the bar. When both piston rods **21** and **29** are projected from their respective cylinders **20** and **28**, the inner stop plate is lowered or extended to its sheet engaging position overlying the intermediate stop plate, as shown in Figure 5. Sheets S3 whose leading edges lie farthest to the left engage the inner stop plate as they enter the piler and are aligned thereagainst. The cylinder **28** is of course operated to retract the inner stop plate **33** to pile sheets against either the outer or intermediate stop plate **15** or **25**.

Conventionally stop mechanisms for single draft stagger-piling are controlled automatically by an electronic sheet counter and a suitable circuit which actuates the power means for the stops after a predetermined number of sheets are counted. It is apparent that my stop mechanism is adapted for control in this manner, although I have not illustrated the circuits involved since they follow well known principles. Alternatively as long as the speeds are not too great, the power means can be controlled manually.

From the foregoing description it is seen that my invention affords a simple stop mechanism for automatically stagger-piling sheets in double draft. Since all stops which rest on the sheet edges are suspended freely,

any tendency to damage the sheets is avoided. As a further advantage, the mechanism is readily installed on existing equipment.

While I have shown and described only a single embodiment of my invention, it is apparent that modifications may arise. Therefore, I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. A stop mechanism for double draft piling of sheets comprising a first frame, a spring loaded vertical outer stop plate mounted on said first frame, a second frame movably mounted on said outer stop plate, an intermediate stop plate carried by said second frame, said second frame having an extended position in which said intermediate stop plate overlies said outer stop plate and another position in which said intermediate stop plate is retracted, a third frame movably mounted on said second frame, an inner stop plate carried by said third frame, said third frame having an extended position in which said inner stop plate overlies said intermediate stop plate and another position in which said inner stop plate is retracted, and respective power means connected to said second and third frames for moving them between said positions.

2. A stop mechanism as defined in claim 1 in which said intermediate and inner stop plates are suspended freely from said second and third frames respectively to bear against sheets previously piled with only their own weight.

3. A stop mechanism for double draft piling of sheets comprising a first frame, a spring loaded vertical outer stop plate mounted on said first frame, a second frame mounted for vertical movement on said outer stop plate, an intermediate stop plate carried by said second frame, said second frame having an extended position in which said intermediate stop plate overlies said outer stop plate and another position in which said intermediate stop plate is retracted, reciprocating power means carried by said first frame and connected to said second frame for moving the latter frame between said positions, a third frame mounted for vertical movement on said second frame, an inner stop plate carried by said third frame, said third frame having an extended position in which said inner stop plate overlies said intermediate stop plate and another position in which said inner stop plate is retracted, and reciprocating power means carried by said second frame and connected to said third frame for moving the latter frame between said positions.

4. A stop mechanism as defined in claim 3 in which said intermediate and inner stop plates are suspended freely from said second and third frames respectively to bear against sheets previously piled with only their own weight.

5. A stop mechanism for double draft piling of sheets of similar length comprising a frame, a spring loaded vertical outer stop plate mounted on said frame, an intermediate stop plate mounted on said frame for vertical sliding movement with respect to said outer stop plate and having extended and retracted positions overlying said outer stop plate, an inner stop plate mounted for movement with said intermediate stop plate and also for vertical sliding movement with respect thereto, said inner stop plate having extended and retracted positions overlying said intermediate stop plate, and respective power means connected to said intermediate and inner stop plates for moving them between their extended and retracted positions, the spring loading of said outer stop plate serving to cushion impacts against any of the three stop plates.

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