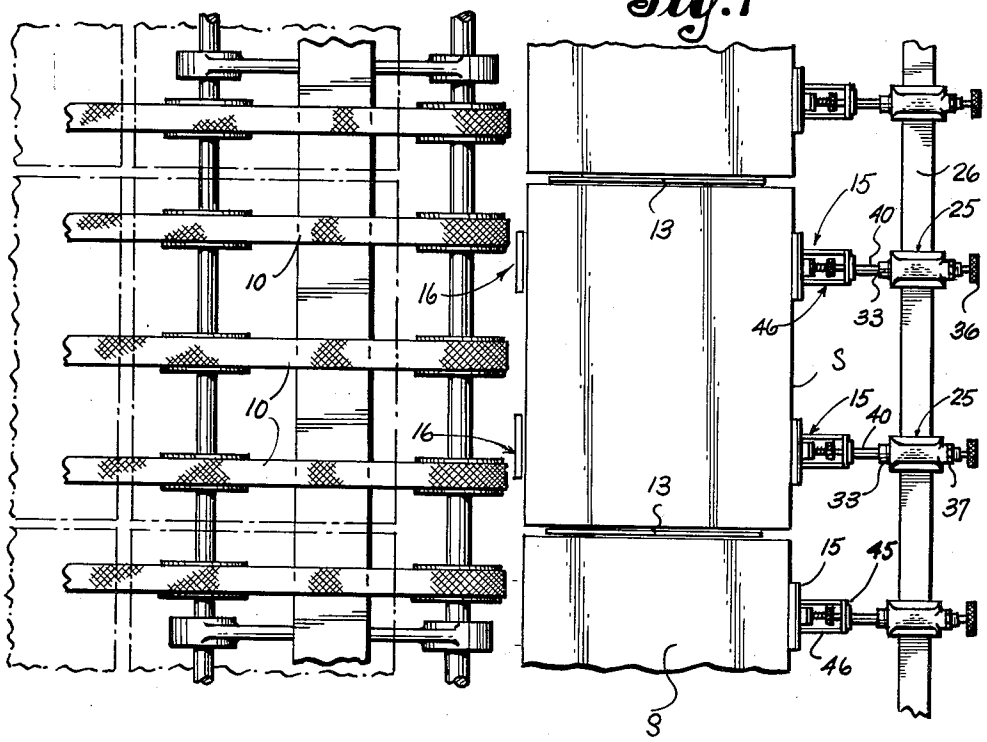
Feb. 27, 1962 G. A. MEAD 3,022,999

SPRING LOADED PIVOTED FORWARD STOP FOR PAPER STACKING MECHANISM

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Fig. 1



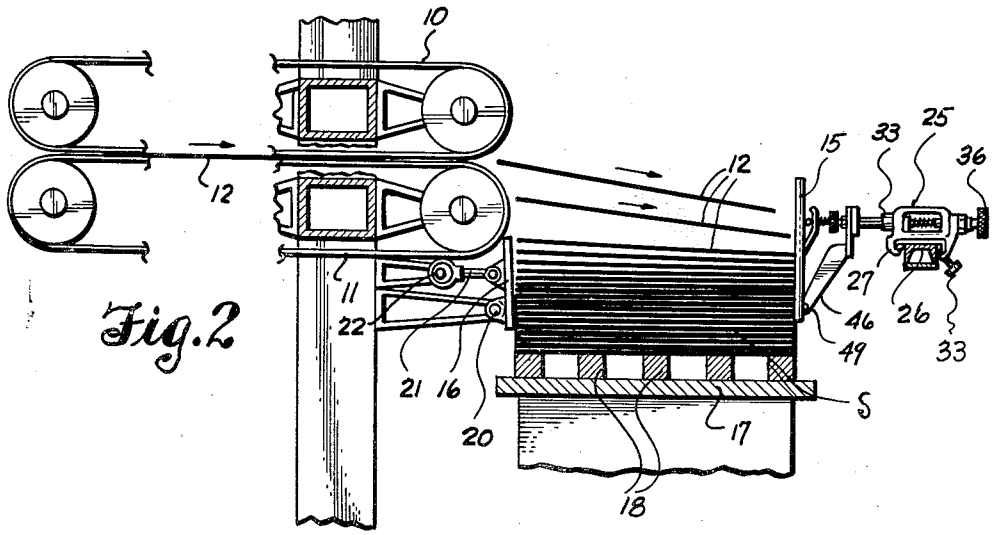


Fig. 2

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Fig. 3

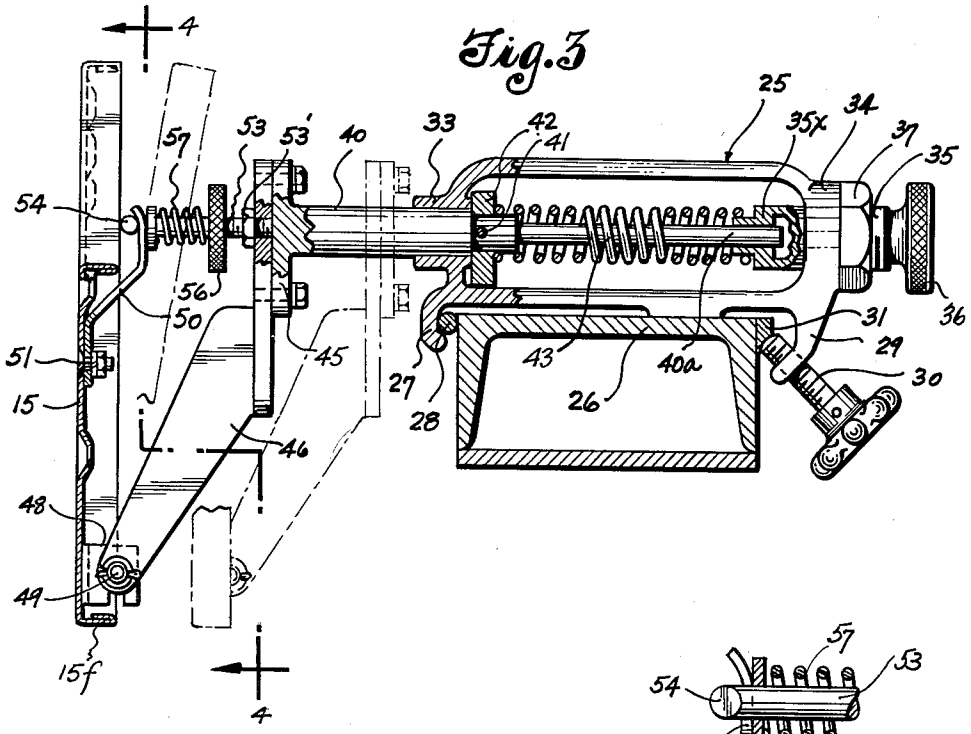
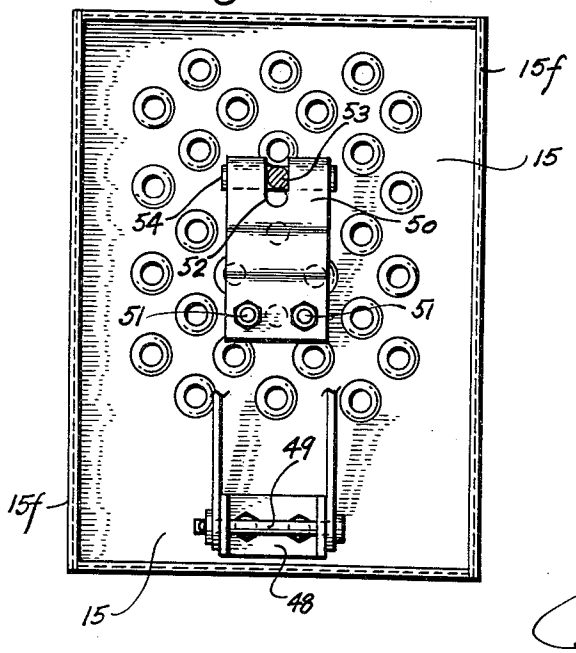


Fig. 4



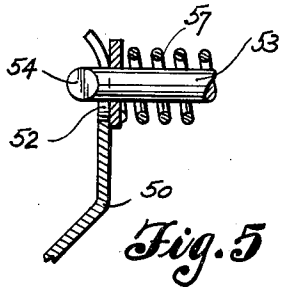


Fig. 5

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3,022,999

SPRING LOADED PIVOTED FORWARD STOP FOR PAPER STACKING MECHANISM

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Filed May 25, 1959, Ser. No. 815,508
5 Claims. (Cl. 271—68)

This invention relates to paper handling machines and has reference more particularly to means whereby sheets of pulp, paper, or other materials having similar stacking characteristics, cut to the same dimensions and discharged from conveying means into receiving pans or compartments may be formed into stacks in which the edges of all sheets in the stack will be flush and even.

In the making of paper or pulp sheets, it is usual that the sheets are cut from a continuous web that may be twelve or more feet wide. As this web is drawn from the drying rolls it is slit longitudinally into strips and these strips are then transversely divided by a continuous cut across the slit web to form pieces of a predetermined length. These pieces, as formed from the individual strips, are then delivered between driven belts or by other suitable means into stacking "pans" or compartments to form stacks. An example of such stacking of pulp sheets has been illustrated and described in U.S. Patent No. 2,745,538, issued to George E. Lamb on March 22, 1956.

The present invention pertains specifically to a novel form of forward stop against which the cut sheets of material, which will hereinafter be referred to as "pulp sheets," are discharged from the conveyor means into the stacking pans or compartments.

One of the problems encountered in stopping the pulp sheets as discharged from a fast moving conveyor is to avoid that damage to their forward edges, referred to as "batter" that results from the sheets striking the devices normally used to stop their forward movement and causing them to drop into the stacking pans.

Another problem, encountered in the stacking operation, is to cause the edges of the successively delivered sheets to exactly coincide as they settle with the pans so that the vertical side surfaces of the stacks will be perfectly smooth, with no sheet projecting beyond any side surface of the stack. Rubber bumpers have been used with moderate success as stops to avoid batter but rubber is compressible and, as a result, the inertia of a fast delivered sheet causes it to be stopped at a position that depends on the extent of compression of the stop. If a sheet of pulp, when delivered to a pan, is laying on top of the sheet that is immediately ahead of it, it may strike the rubber stops while they are still compressed by the forward sheet. If this is the case, it will invariably drop in a position on the stack that varies from the others below it, that is, it will be out of registration with the others in the stack.

Spring loaded horizontally movable stops have been used as substitutes for rubber stops but have been found to have much the same objections and disadvantages in use as rubber stops.

It is to be further explained, in reference to the stacking of the pulp sheets, that for various reasons which need not be explained herein, the even stacking is essential and is demanded by certain users, particularly in the making of chemical cellulose stock.

In view of the foregoing explanatory paragraph, it has been the primary object of the present invention to provide a novel form of forward stop whereby the precisely cut pulp sheets will be caused to drop into the stacking pans to form stacks in which the edges of all sheets are flush and the side surfaces of the stacks true and even.

It is a further object of this invention to provide a stop

that eliminates that damage referred to as "batter" and which also is readily adjustable to suit the particular machine with which it is used, and furthermore, is conveniently adjustable for removal therefrom of sheets that might become jammed or out of position in the pans.

Further objects of the invention reside in the details of construction and combination of parts embodied in the stop and in its mode of use, as will hereinafter be fully described.

In accomplishing the above mentioned and other objects and advantages of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of a part of a paper stacking mechanism employing forward stops in which the improvements of the present invention are embodied.

FIG. 2 is a vertical section taken on line 2—2 in FIG. 1, illustrating one form of conveyor for the delivery of pulp sheets into a stacking pan.

FIG. 3 is an enlarged vertical section of one of the present stops as taken on line 3—3 in FIG. 1.

FIG. 4 is a vertical section taken on lines 4—4 in FIG. 3.

FIG. 5 is a sectional detail of construction showing the connection between stop plate and a supporting stem.

It is further to be understood that the present illustration of the sheet conveyor, stacking pans or compartments and stacking platform is primarily to aid in the explanation of the use of the stop and not an indication that the stops are to be limited in their use with these particular parts.

Referring more in detail to the drawings and first to FIGS. 1 and 2 which show a part of the machine whereby the pulp web is slit to form strips which are then cut to form sheets of exact dimensions which are then discharged into the stacking pans. In these views, 10 and 11 designate horizontally operating conveyor belts between which the precisely cut pulp sheets 12 are delivered in rapid succession into the stacking pans which, in FIG. 1, are shown to be defined between laterally spaced vertical plates 13, the present forward stops 15 and rear stops 16.

It is shown in FIG. 2 that the stack S as formed in the sheet receiving pan is supported on a platform 17. It is a general practise, at the start of the stack forming operation, to support this platform close to the lower ends of the stops and to cause it to be gradually lowered as the stack builds up so that the normal top level of the stack is maintained approximately three inches above the lower ends of the hinged stops 15. The platform is here shown to be equipped on its top side with parallel rails 18 to adapt it for a fork lift operation in removing the completed stacks from it.

Further, in reference to the showing in FIGS. 1 and 2, it is observed that two laterally spaced forward stops 15 are associated with each pan, and the rear stops 16 are similarly located. The rear stops are here shown to be vertical plates hinged at their lower ends, as at 20, and each is oscillated by a connecting rod 21 that has an eccentric mounting on a revolubly driven shaft 22; the oscillating movement being very slight.

In a present preferred form of construction, each of the forward stops 15 is as shown in FIG. 3. Each comprises an individual mounting clamp, designated in its entirety by numeral 25. The clamps of the several stops are adjustably fixed to a fixed supporting beam 26 that extends parallel with the pans. Each clamp comprises an open frame extended across the beam 26 that is formed at one end with a hook 27 holdingly engaged with a brad 28 applied to the forward side of the rail, and at its other end has a downwardly directed leg 29 through

which a clamp screw 30 is threaded and which can be manually tightened against a rib 31 applied to the back side of the rail, thus to secure the clamp in any position of adjustment along the rail.

The frame of clamp 25 is shown to be formed at its forward and rearward ends, respectively, with axially aligned bearings 33 and 34. Threaded into the bearing 34 is a hollow screw 35 with a knurled knob 36 at its rear end. A lock nut 37 is threaded on the screw for tightening against the rear end of bearing 34 thus to secure the adjustment of the screw.

Extended horizontally and slidably through the forward bearing 33 is a shaft 40. This is axially aligned with the hollow screw 35 and it has a diametrically reduced end portion 40*a* that is slidably fitted at its end in a bearing 35*x* at the forward end of the screw 35. Fitted about the shaft 40 and fixed thereto by a pin 41 is a block 42 and a coil spring 43 is applied about the reduced portion of the shaft under compression, that bears against the block 42 and the bearing 35*x* of the screw to yieldingly retain the shaft 40 at its extended limit of travel as established by engagement of the block 42 with the bearing 33.

At its forward end, that is, the end nearer the stacking pans, the shaft 40 is formed with a flange 45 and to this a downwardly and forwardly directed bracket 46 is rigidly fixed, and to the lower end of this bracket the stop plate 15 is hinged, as presently more fully explained.

The stop plate 15 is of light weight sheet metal and of rectangular form, approximately thirteen inches high and ten inches wide, and is stiffened by a rearwardly turned peripheral flange 15*f*. The plate also is perforated as shown in FIG. 4. At its lower end, and midway of its opposite side edges, the plate 15 is equipped with a mounting piece 48 that is received between laterally spaced lower end portions of bracket 46 and a pivot pin 49 is applied horizontally through these lower end portions of the bracket and the piece 48 to secure the plate for oscillating action of its upper end toward and from the stacking pans.

Fixed rigidly to the back side of the stop plate 15, approximately at its center is a bracket 50, secured by means of bolts 51 applied through its lower end. The bracket has its upper end portion offset from the plate, as shown. The offset upper end portion of the bracket is formed with a vertical slot 52 through which one end portion of a stem 53 is extended as in FIG. 5; this stem being threaded at its other end into the base of bracket 45 in coaxial alignment with shaft 40 and is secured by a lock nut 53'. The stem has a cross-head at its forward end against which the bracket engages. A knurled nut 56 is threaded on the stem and is adjustable therealong and a coiled spring 57 is retained under compression between this nut and the upper end of bracket 51. The resistance of this spring to the impact of pulp sheets delivered against the plate 15 can be made more or less by adjustment of the nut 56 along the stem; it being explained further that the possible rotation of shaft 40, that would permit plate 15 to move from its upright position, is prevented by the metal block 42 that is pinned to shaft 40 by reason of the fact that the lower horizontal edge of the block is closely adjacent the flat top surface of the base member of the clamp 32.

With stops 15 so formed, and assuming that they are applied to the machine, for example, as shown in FIGS. 1 and 2, their operation is as follows: As each of the cut pulp sheets is discharged against the flat surfaces of the upper end portions of the stop plates 15, the spring 57 yields to absorb the shock and thus that edge damage, referred to as "batter," to the striking edge of the sheet is avoided. The sheet then drops into the pan and gradually settles onto the platform or stack being formed. When each sheet, as discharged from the belts, strikes a plate 15, the plate swings slightly forward on its pivot axis 49 against the light restraining pressure of the coiled spring 57. When the plate rebounds, it is stopped in vertical position by the upper end of the plate bracket 50 coming in contact with the cross-head 54 on the stem 53. In its forwardly leaning position, immediately after being struck by the pulp sheet, the stop plate serves as a sort of funneling element for guiding the sheets onto the stack, and as successively delivered sheets settle into the pan, the air underneath each keeps it "live" for a limited distance below the top of the stack; that is, to a depth approximately even with the level of the hinge axes of the stops. Therefore, by the time any sheet has completely settled, the jogging action causes its edges to be brought flush with the edges of the next lower sheet, and as the lowering stack gradually forms, all of its vertical faces will be true and even.

The evening of the sheet edges in the stacks, as accomplished by that slight oscillating movement and jogging action of the stop plates 15 that is caused by the sheets being delivered successively against them, is augmented further when oscillating stops 16 are employed.

While the present drawing illustrates two stops being employed for each pan, it is to be understood that one or more may be employed; this being governed primarily by the size or the width of the sheets being stacked.

The perforating of the plates, as has been shown in FIG. 4, has two objects in mind. First, it lightens the stop and second, it permits air to be more easily expelled from beneath and between the sheets where unperforated flat stop plates of this size might retard it.

In the event that, for any reason a sheet might fall out of place in a pan and cause a jam, the stop may be easily pulled forward, as for example to its dotted line showing in FIG. 3 so that the sheet can be removed or pushed back to a proper position. It is to be remembered in this connection that the springs 43 are placed under such compression that they will in all normal conditions, hold the stops in place, as in FIG. 2. The holding pressure of springs 57 is comparatively light.

The adjustable mounting of stops on the supporting beam 26 provides for placing them in the most advantageous positions and in suitable numbers.

What I claim as new is:

1. In combination, a conveyor for the delivery of sheet material to a stacking station, a stacking station including a vertically movable platform upon which sheets from the conveyor are individually deposited in rapid succession, a stop device mounted adjacent said platform on the side thereof opposite said conveyor, said stop device comprising a vertically disposed sheet engaging member against which the sheet material is aligned in the formation of a stack, the upper edge of said sheet engaging member being substantially of the same level as said conveyor, means pivotally supporting said sheet engaging member only at the lower end thereof, and means yieldingly engaging the upper portion of said sheet engaging member whereby the upper end of the sheet engaging member is permitted to swing in a limited arc about its pivotal mounting incident to engagement by the sheets delivered from said conveyor.

2. A front stop for use in the stacking of pulp sheets, or the like, as discharged horizontally from a fast moving conveyor for their reception and settlement within a stationary stacking bin; said front stop comprising a flat, vertically disposed sheet engaging member against which the sheet material is aligned in the formation of a stack, the upper edge of said sheet engaging member being substantially at the same level as said conveyor, a support for said sheet engaging member comprising a clamp member equipped for fixation to a stationary support, a rod extending from said clamp member, said rod being mounted for endwise adjustment in said clamp member to provide for the temporary retraction of the sheet engaging member from its sheet stopping relationship to the bin, a stop member secured to said rod to limit its forward movement, a spring on said rod and

acting against said clamp member and stop member to yieldingly retain the rod at its forward limit of travel, a bracket fixed to the extended end of said rod and pivotally supporting said sheet engaging member at its lower end for slight yielding and jogging movement under impact of sheets as successively discharged thereagainst and resilient means in engagement with the upper end of said sheet engaging member for yieldingly resisting said movement and for restoring the sheet engaging member to normal position after each impact.

3. A combination as in claim 1 including means interconnected with said sheet engaging means to limit the swinging movement thereof toward said conveyor.

4. A combination as in claim 1 including sheet jogging means positioned below the discharge end of said conveyor.

5. A combination as in claim 1 wherein said supporting means is mounted on a fixed horizontal shaft and a compression spring on said shaft engageable with said supporting means for yieldingly holding said supporting means in position relative to said platform.

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