Nov. 11, 1924. 1,515,397

J. F. MAKOWSKI

PLASTER BOARD HANDLING APPARATUS

Filed June 14, 1922 3 Sheets-Sheet 1

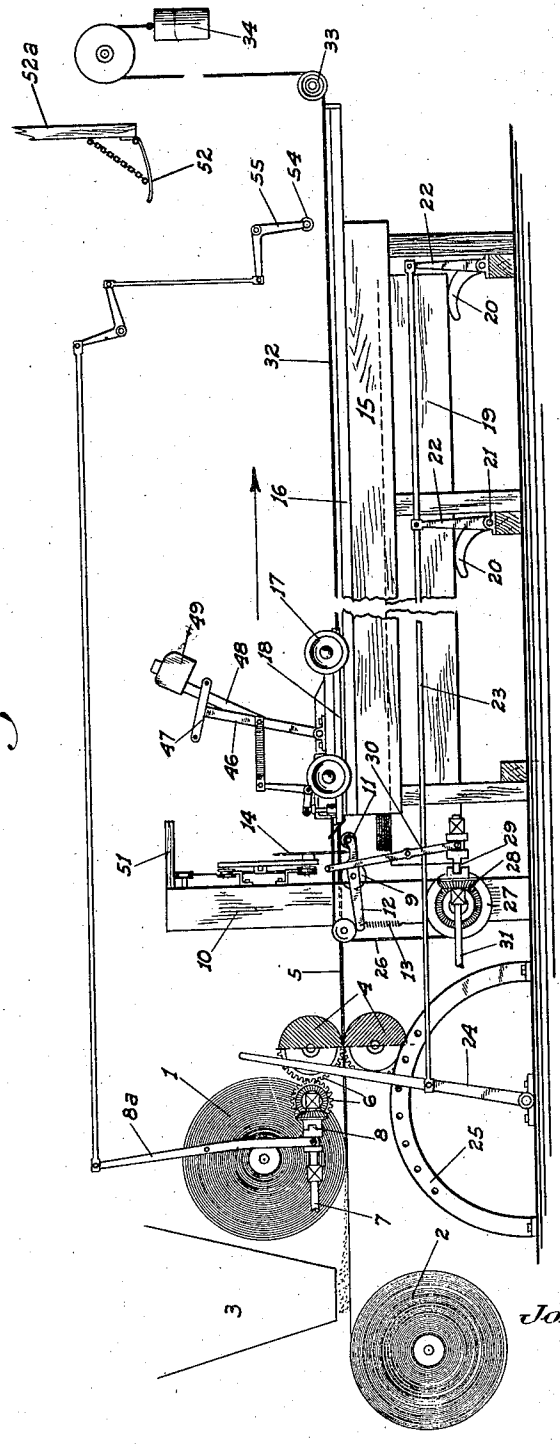


Fig. 1

INVENTOR.
John F. Makowski
BY Campbell & Clinton
ATTORNEY

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J. F. MAKOWSKI

PLASTER BOARD HANDLING APPARATUS

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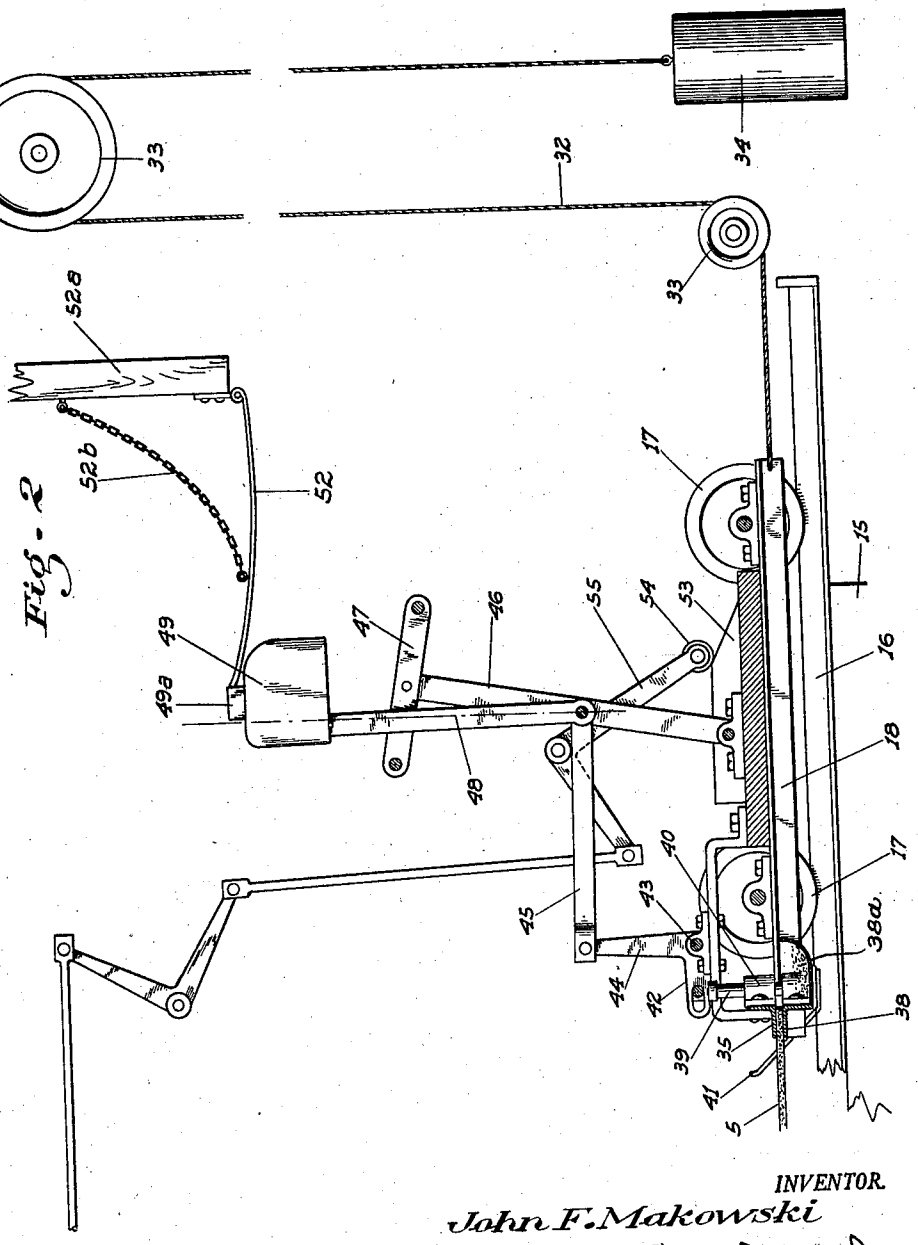


Fig. 2

INVENTOR.
John F. Makowski
BY
ATTORNEY

Nov. 11, 1924. 1,515,397

J. F. MAKOWSKI

PLASTER BOARD HANDLING APPARATUS

Filed June 14, 1922 3 Sheets-Sheet 3

Fig. 4

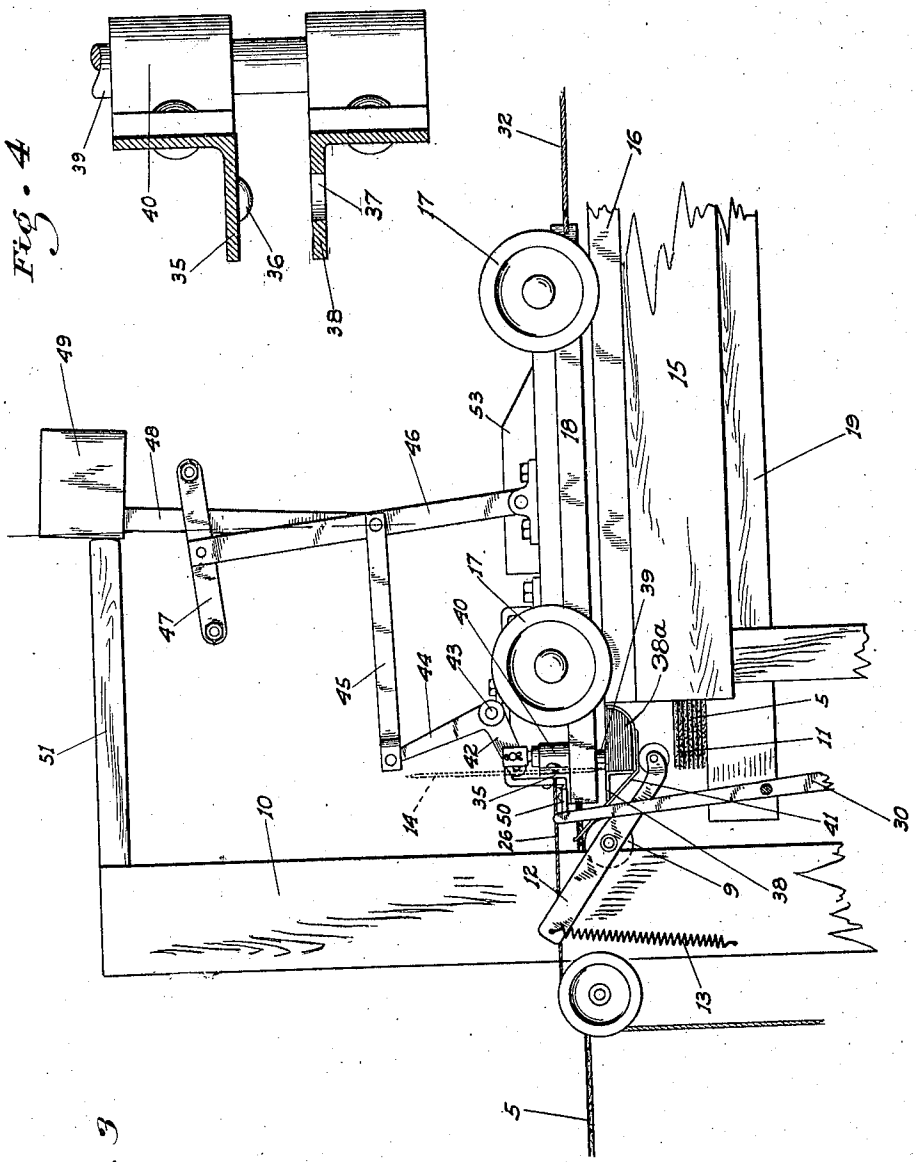


Fig. 3

INVENTOR.
John F. Makowski
BY
ATTORNEY

Patented Nov. 11, 1924. 1,515,397

UNITED STATES PATENT OFFICE.

JOHN F. MAKOWSKI, OF STOCKTON, CALIFORNIA, ASSIGNOR TO CALIFORNIA CEDAR PRODUCTS COMPANY, OF STOCKTON, CALIFORNIA, A CORPORATION.

PLASTER-BOARD-HANDLING APPARATUS.

Application filed June 14, 1922. Serial No. 568,362.

To all whom it may concern:

Be it known that I, JOHN F. MAKOWSKI, a citizen of the United States, residing at Stockton, county of San Joaquin, State of California, have invented certain new and useful Improvements in Plaster-Board-Handling Apparatus; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in the handling of plaster wall-board during its manufacture, the principal object being to provide means for grasping the board firmly for its entire width as it emerges from between the rolls. and for then drawing the board along so that it may be evenly laid on a table.

Another object is to provide means for insuring that each board will be released from the pulling member at the same instance, so that the ends of the boards as they lie in superimposed order on the table will all be in vertical alinement. and the boards will all be the same length, thereby eliminating the time and labor now necessary to trim up the boards, and the waste of material occasioned by this operation.

A further object is to provide means for automatically disengaging the power from the feed-rollers at the same instant as the board is released from the pulling means, thus avoiding further feeding of the board from the rolls after the other end of the board has been released, and preventing crumpling or kinking of the board, and at the same time eliminating the need of the careful attention of the operator to effect disengagement of the power at the proper time.

A fourth object is to provide means for drawing the board-hauling device mechanically in both directions, and for causing said device to automatically grasp the board as it arrives at the end of its travel adjacent the rolls.

In the manufacture of plaster board, the plaster is fed between two layers of heavy paper, which, with the plaster therebetween are then drawn between a pair of rolls to form the board. Some means must then be provided to pull the board thus formed from beyond the rolls, since it is in a very flexible condition, and being somewhat heavy, tends to drop immediately, and will then of course crumple up, which renders it useless. With present methods, the ends of the board are grasped at each corner by a number of workmen, who walk away from the rolls hauling the board between them for whatever distance may be the length of board desired as a unit. Now if the handlers on one side walk faster than those on the other, the board is pulled sideways, and of course becomes warped and will not lie straight on the table. In any event, when they reach the limit of their travel and release the board, the roll-operator must be constantly on watch to stop the rolls at the same instant, which he may fail to do, resulting in an over-feeding of the board and a crumpling thereof.

After this operation, the board is cut across near the rolls, and the handlers return to pull another length along, to lie on the table on top of the one first laid thereon.

Now if the handlers then do not accurately gauge their travel, and should go too far, the end of the upper board will overlap the under one, resulting in a waste when the boards are trimmed up, since the opposite ends of the boards, where they are cut across, will always be in alinement, as the cutting means operates in a fixed plane.

On the other hand if the roll-operator disengages the power from the rolls while the outer end of the upper board is short of the under one, he must operate the rolls again a trifle so that the upper board may be pulled further along, as it is impossible for the board to be pulled along with the rolls idle.

The above in the main are the defects and disadvantages of operation with present methods, and it will therefore be seen that with my improved apparatus, these defects are avoided, and the time of manufacture, and the cost, both as to labor and materials, is reduced considerably with its use.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is a side assembly of the entire board making apparatus, showing my improved handling device just after making connections with a board.

Fig. 2 is a view of the board-handling carriage or truck and certain co-operating members, just prior to the release of a board.

Fig. 3 is a view of the truck in connection with co-operating features, at the initial end of the apparatus, showing the position of the truck parts just prior to the closing of the board-clamping jaws.

Fig. 4 is an enlarged detached section of the jaw members.

Referring now more particularly to the characters of reference on the drawings, the numerals 1 and 2 denote rolls of paper, the latter to the rear of the former, with a hopper 3 thereabove to feed plaster onto the upper surface of the lower layer of paper.

The two thicknesses of paper, with the plaster therebetween, then pass horizontally between a pair of feed rolls 4, from which it emerges as the plaster-board 5, still of course in a plastic and flexible condition, wet and heavy.

The rolls are geared together, and are driven in any suitable manner, such as by gearing 6 connected with a drive shaft 7, there being clutch means 8 between the shaft and gearing.

The board 5 then passes over an idler roller 9 journaled in vertical frame members 10 straddling the board, and also over another roller 11 somewhat therebeyond, which latter roller is journaled at the outer end of arms 12 pivoted on the frame 10, spring means 13 being employed to hold the roller up against the board while allowing it to be lowered therefrom at times, as will be seen hereinafter.

Mounted on the frame 10 for horizontal and transverse movement relative thereto is a cutting member 14, preferably a rotatable cutting-wheel, which is located in a vertical plane between the rollers 9 and 11, and adapted to be drawn across from one side of the frame to the other by hand or otherwise, to sever the board, in a plane at right angles to its length, the two rollers forming a double support between which the cut is made.

Beyond the frame 10 are spaced frames 15 of suitable length, carrying horizontal tracks 16 to guide the wheels 17 of a carriage or truck 18, the tracks being at right angles to the rolls.

Between the frames 15 is a table 19 supported on curved arms 20 fixed on shafts 21 suitably journaled in fixed positions, the curature of the arms being eccentric to the shafts to a considerable degree. The shafts are rotated to turn the arms and raise and lower the table by means of arms 22 connected by rods 23 to an operating lever 24, operating in connection with a quadrant 25 provided with means of some sort for allowing the lever to be held in any set position desired.

To the end of the carriage nearest the rolls is fastened one end of a cable 26 passing thence over a drum 27, driven by suitable means such as gearing 28 with a clutch 29 controlled by a lever 30 interposed between the gearing and the drive shaft 31.

To the opposite end of the carriage or truck 18 is fixed one end of a cable 32 which extends thence around suitably disposed pulleys 33 beyond the tracks 16, and terminates in a counterweight 34, the counterweight being so hung that it is free to exert its influence in drawing the truck for its entire extent of travel.

The truck has fixed at its end nearest the roll a transverse rigid bar or jaw member 35, provided with a row of small knobs or projections 36 on its under face, adapted to seat in holes or recesses 37 formed in a movable rigid bar or co-operating jaw or clamp member 38 movable vertically under the bar 35, and maintained in constant alinement therewith by means of pins 39 fixed to the bar 38 and slidable through bearings 40 fixed on the bar 35.

Extending lengthwise of, and under the lower jaw 38 is a trough 38^a, extending somewhat ahead of the jaws. The purpose of this trough is to catch any plaster sqeezed from the board with the clamping of the jaws thereon, and which would otherwise drop onto the finished board on the table below.

Angled trips or shoes 41 are fixed to the bar 38 at the ends thereof, being arranged to bear against and depress the roller 11 when the truck is adjacent the latter.

The movement of the jaw 38 is controlled by means of arms 42 flexibly connected to the pins 39 above the bearings 40 and fixed on a pivoted shaft 43 journaled on the truck, from which shaft arms 44 project upwardly a certain distance, and are there connected by links 45 to an arm structure 46, intermediate the ends of the latter, this structure being formed of a pair of closely spaced members pivoted onto the truck-frame and terminating at their upper end in a longitudinal guide member 47 closed together at their ends. Pivoted between the arms 46, preferably using the pivotal pin of the links 45 for this purpose but turnable thereon, is another arm 48, which passes between the guides 47, and carrying on its end above the guides a weight 49.

Fixed on one side of the carriage and at the end nearest the rolls is a bumper 50, adapted to engage and throw out the clutch lever 30 when the carriage arrives at that end of its travel.

Projecting from the frame 10 in the vertical and transverse plane of the weight 49 is a bumper 51, adapted to engage and throw said weight and the arm 48 back at the same time that the clutch-lever 30 is thrown.

Positioned in substantially the same plane as the bumper 51 but at the opposite end of travel of the truck is a trip arm 52, hinged at its end opposite the weight 49 on a beam 52^a and adapted to engage a lug 49 on the latter and cause the same to be thrown in the opposite direction from that imparted thereto by the bumper 51. This trip is held from downward movement by a flexible member 52^b, but is free to be lifted at its outer end, and is so arranged relative to the weight that when the latter is thrown over into its jaw-opening position, the truck and weight may move further back if desired, as the trip will then be free of direct engagement with the lug 49^a, and will be tilted up out of the way with the movement of the weight theretoward.

Mounted on the carriage is a cam 53 adapted to engage a roller 54 carried by a bell crank 55 operatively connected by suitable means to the clutch lever 8^a of the clutch 8 in such a manner that as the roller rises up on the cam, the clutch 8 will be thrown out, this operation being timed to take place at the same time the bumper 52 throws the weight 49.

By the use of the weight arrangement shown, a sudden movement of the lower board-clamping jaw, such as is necessary, will be had, and yet the actuating means may act gradually. This is because the weight normally is to one side or the other of a vertical or dead center line, and until the weight has passed such dead center, no movement will be imparted to the jaw-operating arms.

As soon as either bumper has moved the weight to this point, the latter then moves rapidly of its own weight in the same direction, causing an almost instantaneous throwing of the jaw 36 either to close or open the same.

The operation of the system or apparatus is as follows:

Presume that the truck-jaws have grasped the end of the board, and that the truck is moving to the rear end of the board, and that the truck is moving to the rear end of the frame 15, or toward the right as shown in Fig. 1. The drum-clutch 30 will then be thrown out, and the truck is being pulled along by the counterweight 34, aided by the driven-feed rolls 4, the clutch 8 having been thrown in by the operator, which causes the roller 54 to lie in a plane level with the bottom of the cam 53.

When the truck is about at the end of its travel away from the rolls (about 20 feet in practice) the weight 49 is thrown forward, the jaw 36 opened, allowing the board to drop therefrom onto the table 19, and at the same time the clutch 8^a is thrown out in the manner previously described, stopping the rolls simultaneously with the releasing of the board from the jaws. If it is desired or necessary to move the truck further back, the bumper or trip 52 automatically tilts upwardly to allow the weight 49 to pass thereunder.

In ordinary operation however, enough space is had between the bumper and weight after the latter has moved automatically, to allow for the necessary movement of the truck so as to move the jaws clear of the board, so that dependence is not placed on the tendency of the board to fall clear merely of its own weight.

The operator at the roll end of the machine then draws the cutter 14 across the board between the rollers 9 and 11, the free end dropping onto the table, leaving an end projecting over the roller 9, which end is too short to sag. The drum-clutch 29 is then thrown in, thus reversing the position of the clutch lever 30, or moving the same forward.

The truck will then move toward the rolls, with the jaws spread, until just as the projecting end of the board 5 passes between the jaws, the trip or bumper 51 acts to close the same, firmly gripping the board not only by reason of the weight 49 acting to hold the jaws together, but on account of the protrusions 36 which bite into the board, positively holding the same against slipping.

At the same time as the jaws close the trip 50 acts against the lever 30, disengaging the clutch 29, and so stopping the rotation of the drum and the movement of the truck.

Just before the jaws reach the end of the board, the shoes 41 engage and depress the ends of the roller 11, so as to leave a clear path for the movement of the jaws toward the board.

The counterweight is now exerting its influence to draw the truck along, but it is not powerful enough to do this unless the rolls are being driven, the operator then throwing the lever 8^a to put the rolls into operation.

The members are now in substantially the same position as at the beginning of this description of operation, a complete cycle of movement having been had.

The boards are laid one on the other on the table, until a pile of sufficient height has accumulated, the table being lowered from time to time by manipulation of the lever 24 as the height of the pile increases.

The truck is then run beyond the table, and the latter, with its load, lifted bodily off its supports 20, the boards thereon being then put to further treatment, which forms

no part of this invention, while another empty table is hoisted into place.

It will therefore be evident that with my apparatus, the time of operation and the number of operatives necessary is cut down, the boards cannot but lie in true alinement on each other, and their ends will all lie in a common vertical plane without any deviation rendering unnecessary the time and waste incident to trimming the edges as formerly.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A plaster-board handling device comprising a truck movable longitudinally of the board, means carried by the truck for grasping the end of the board, yieldable drive means tending to automatically move the truck along with the board, said drive means exerting a constantly uniform effort, and power means for moving the truck in the opposite direction.

2. A plaster-board handling device comprising a truck movable longitudinally of the board, jaws carried by the truck for grasping the end of the board, a common control means mounted on the truck for opening and closing the jaws, means for engaging said control means to oppositely actuate the same when the truck reaches the opposite ends of its limit of travel, and means whereby while the last named means and the control means are engaged for an appreciable time, the opening and closing movement of the jaws will be practically instantaneous.

3. A plaster-board handling device comprising a board grasping means movable longitudinally of the board, power means for moving the gripping means in a certain direction, and means for automatically stopping said power means each time the gripping means reaches its limit of movement in that direction.

4. A plaster-board handling device comprising a truck movable longitudinally of the board, means carried by the truck for grasping the end of the board, power means for moving the truck in a certain direction, and means actuated by the movement of the truck each time it arrives at its limit of travel in that direction for stopping the power means.

5. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, clutch means interposed in said drive means, a truck movable lengthwise of the board beyond the rolls and provided with means for grasping the end of the board, and means whereby as the truck approaches its limit of travel away from the rolls the clutch means will be automatically disengaged.

6. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, clutch means interposed in said drive means, a truck movable lengthwise of the board beyond the rolls, jaw means on the truck for grasping the end of the board, and means whereby when the truck approaches its limit of travel away from the rolls the jaws will be automatically opened and the clutch means simultaneously disengaged.

7. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, clutch means interposed in said drive means, a truck movable lengthwise of the board beyond the rolls and provided with means for grasping the end of the board, clutch actuating means arranged near the limit of the path of movement of the truck away from the rolls, and means carried by the truck for engaging said actuating means at a predetermined time to disengage the clutch.

8. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, clutch means interposed in said drive means, a truck movable lengthwise of the board beyond the rolls, jaw means on the truck for grasping the end of the board, means carried by the truck for opening and closing the jaws, clutch actuating means arranged near the limit of the path of movement of the truck away from the rolls, means carried by the truck for engaging said clutch actuating means at a predetermined time to disengage the clutch, and fixed means for simultaneously engaging the jaw-control means on the truck for opening the jaws.

9. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, a truck movable lengthwise of the board beyond the rolls, and means whereby as the truck approaches its limit of travel away from the rolls the driving of the rolls will be discontinued.

10. In a plaster-board making machine, a pair of driven rolls between which the board passes in the making, drive means for said rolls, a truck movable lengthwise of the board beyond the rolls, and means actuated by the truck as it approaches its limit

of travel away from the rolls for discontinuing the driving of the rolls.

11. A plaster-board handling device comprising a truck movable longitudinally of the board, means carried by the truck for grasping the end of the board, power means for moving the truck in a certain direction, clutch means interposed in said power means, and means carried by the truck for actuating and disengaging said clutch means as the truck approaches its limit of travel in that direction.

12. A plaster-board handling device comprising a truck movable longitudinally of the board, means carried by the truck for grasping the end of the board, counterweight means for moving the truck along with the board, and power means for moving the truck in the opposite direction against the action of the counterweights.

13. In a plaster board making machine, a fixed member over which the board is fed, a vertically movable member horizontally spaced from the first named member in the direction of movement of the board, means for cutting the board between the members, board engaging means movable theretoward, and means whereby the movable member will be moved out of the way as the board engaging means approaches to engage the board.

14. In a plaster board making machine, a fixed member over which the board is fed, a vertically movable member horizontally spaced from the first named member in the direction of movement of the board, means for cutting the board between the members, a truck movable theretoward, jaw means carried by the truck on the end nearest the members for engaging the severed end of the board, and means carried by the truck for depressing the movable member as the jaws approach the end of the board.

15. In a plaster board making machine, a fixed roller over which the board is fed, another roller disposed beyond the first named roller in the direction of movement of the board, horizontal and pivoted arms between which the last named roller is mounted, means normally holding the latter roller level with the former, cutting means movable across the board between the rollers, a truck movable theretoward, transverse jaws carried by the truck and adapted to engage the severed end of the board, and shoes carried by the truck at the ends of the jaws for engaging and depressing the arm-mounted roller as the jaws approach the board.

16. A device for handling plaster board comprising a movable frame, a fixed jaw member mounted on the frame, a movable jaw co-operating therewith, arms pivoted to the frame and operatively connected with the movable jaw, a substantially vertical arm pivoted on the frame and operatively connected to the first named arms, and an arm weighted at its upper end pivoted to the second named arm and adapted to be swung in either direction past a vertical dead center and stop means carried by said second named arm for limiting the movement of said weighted arm with respect thereto.

17. A device for handling plaster board comprising a movable frame, a fixed jaw member mounted on the frame, a movable jaw co-operating therewith, an arm and link structure mounted on the frame and operatively connected with the movable jaw, another arm mounted on said structure for movement with respect thereto, and means whereby after said arm is moved a predetermined distance the arm and link structure will be actuated to move the jaw.

18. A device for handling plaster board comprising a movable frame, a fixed jaw member mounted on the frame, a movable jaw co-operating therewith, an arm and link structure mounted on the frame and operatively connected with the movable jaw, another arm mounted on said structure for movement with respect thereto, and means whereby after said arm is moved a predetermined distance in one direction the arm and link structure will be moved to open the movable jaw, and after said arm is then moved a corresponding distance in the other direction said structure will be moved to close the jaw.

19. In a plaster-board handling apparatus, board-gripping means movable longitudinally of the board, and gravity means for moving the latter along with the board.

20. A device for handling plaster board comprising a movable frame, a fixed jaw member mounted on the frame, a movable jaw co-operating therewith, arms pivoted to the frame and operatively connected with the movable jaw, a substantially vertical arm pivoted on the frame and operatively connected to the first named arms, a horizontal extension at the upper end of said arm, projecting on both sides thereof, stops projecting from the extension at the ends thereof, and an arm pivoted to the second named arm and movable relative thereto between the stops; said last named arm being weighted above its pivotal connection.

21. A device for handling plaster board comprising a movable frame, a fixed jaw member mounted on the frame, a movable jaw co-operating therewith, arms pivoted to the frame and operatively connected with the movable jaw, a substantially vertical arm pivoted on the frame and operatively connected to the first named arms, a horizontal extension at the upper end of said arm, opposed stops projecting from the extension, said stops being positioned to be at all times on opposite sides of a vertical line through the arm axis, and an arm

weighted at its upper end pivoted to the second named arm and movable relative thereto between the stops.

22. In a plaster-board handling apparatus, a fixed member extending transversely of the board and supporting the same, and a vertically movable member beyond the fixed member and also normally supporting the board but adapted to be depressed therefrom.

23. A plaster board handling device comprising a truck movable longitudinally of the board, jaws carried by the truck for grasping the end of the board, a common movable weight means for holding the jaws in open and closed positions, and means for moving the weight to cause it to oppositely exert its influence upon the jaws.

24. A plaster board handling device comprising a truck movable longitudinally of the board, jaws carried by the truck for grasping the end of the board, a common movable weight means for holding the jaws in open and closed positions, and means brought into action at the opposite limits of movement of the truck for oppositely and alternately actuating the weight means.

25. In a plaster board making machine, driven rolls between which the board passes in the making, means for engaging the formed board and drawing it away from the rolls, and means for discontinuing the driving of the rolls when the engaging means reaches its limit of travel away from the rolls.

26. In a plaster board making machine, driven rolls between which the board passes in the making, means for engaging the formed board and drawing it away from the rolls, and means actuated by said engaging means upon its arrival adjacent its limit of travel away from the rolls for discontinuing the driving of the rolls.

27. In a plaster board making machine, driven rolls between which the board passes in the making, means for engaging the formed board and drawing it away from the rolls, and means actuated by said engaging means upon its arrival adjacent its limit of travel away from the rolls for discontinuing the driving of the rolls, and for also disengaging said means from the board at the same time.

28. In a plaster board handling apparatus, a fixed member extending transversely of the board and supporting the same, means for gripping the board and moving it in a plane at right angles to said member, and cutting means for the board arranged to cut the same a sufficient distance beyond the supporting member to leave a piece of the board projecting for engagement with the gripping means.

29. In a plaster board handling apparatus, a fixed member extending transversely of the board and supporting the same, means for gripping the board and moving it in a plane at right angles to said member, and cutting means for the board arranged to cut the same a sufficient distance beyond the supporting member to leave a piece of the board projecting for engagement with the gripping means, and additional supporting means for the board beyond the line of cut to prevent deflection of the board while being cut.

30. In a plaster board handling apparatus, a fixed member extending transversely of the board and supporting the same, means for gripping the board and moving it in a plane at right angles to said member, and cutting means for the board arranged to cut the same a sufficient distance beyond the supporting member to leave a piece of the board projecting for engagement with the gripping means, additional supporting means for the board beyond the line of cut to prevent deflection of the board while being cut, and means whereby said additional supporting means is prevented from interference with the gripping means as the latter approaches to engage the projecting edge of the board after the latter has been cut.

31. In a plaster board handling apparatus, driven rolls between which the board passes in the making, means for gripping the end of the board, and drive means for said gripping means whereby to draw the board away from the rolls, said drive means being effective only while the rolls are being driven.

32. In a plaster board handling apparatus, driven rolls between which the board passes in the making, means for gripping the end of the board, and weight means for drawing said gripping means along with the board, said weight means having a pulling force relative to the resistance of the rolls to only cause movement of the board when the rolls are driven.

33. In a plaster board handling apparatus in which the board as formed is drawn out to a length and then cut and deposited on a smooth supporting surface, jaw means for gripping the edge of the board and drawing it out over such surface, and trough means secured to and travelling with the jaw means to catch any plaster squeezed from the board by the jaw means, and preventing it from dropping on the surface during the travel of the board thereover, whereby the board when cut will fall always upon a clean smooth surface.

In testimony whereof I affix my signature.

JOHN F. MAKOWSKI.