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May 4, 1926. 1,583,188

J. SCHUMACHER

MACHINE FOR SEVERING PLASTER BOARD

Filed June 30, 1925 4 Sheets-Sheet 1

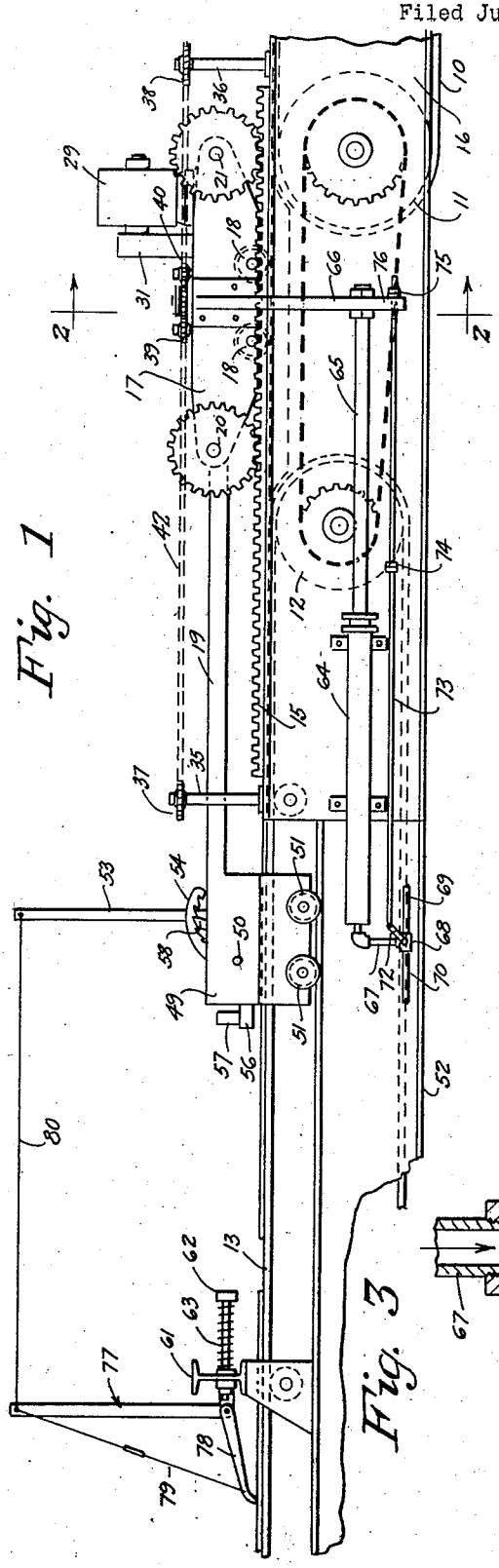


Fig. 1

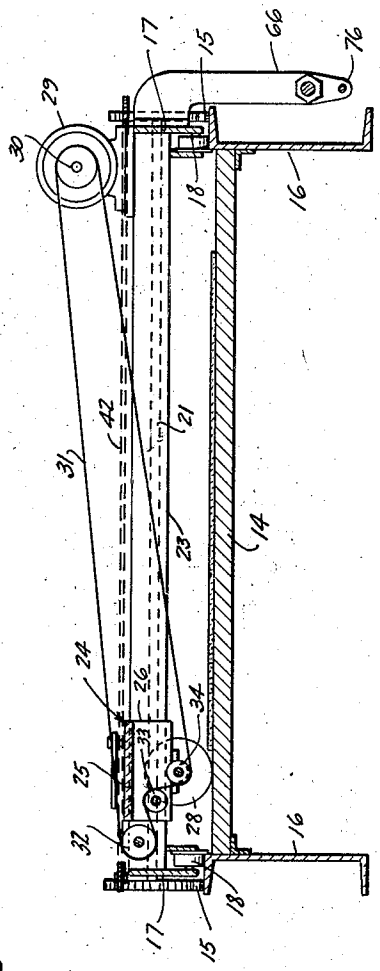


Fig. 2

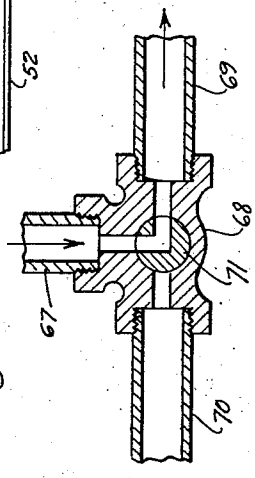


Fig. 3

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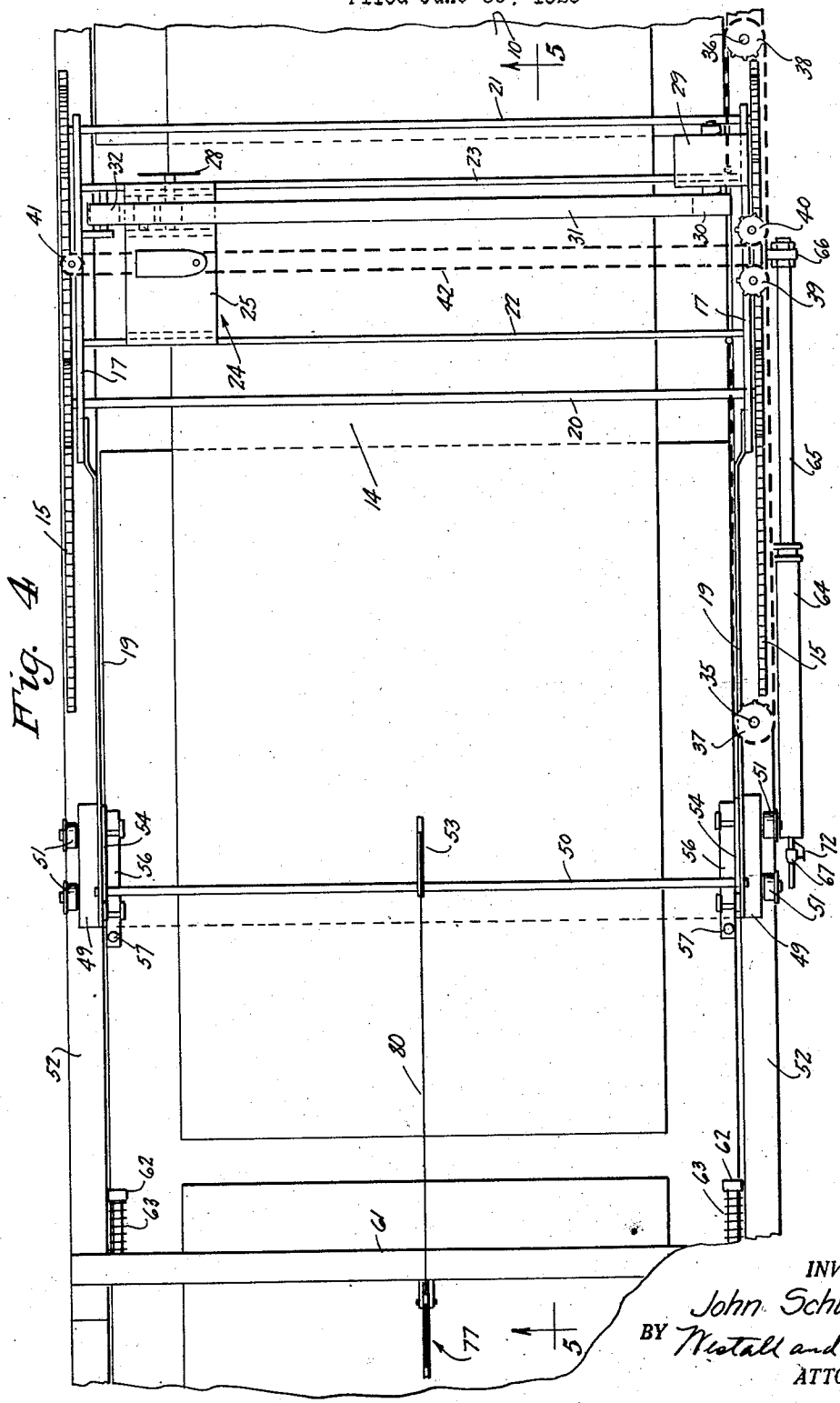


Fig. 4

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Fig. 5

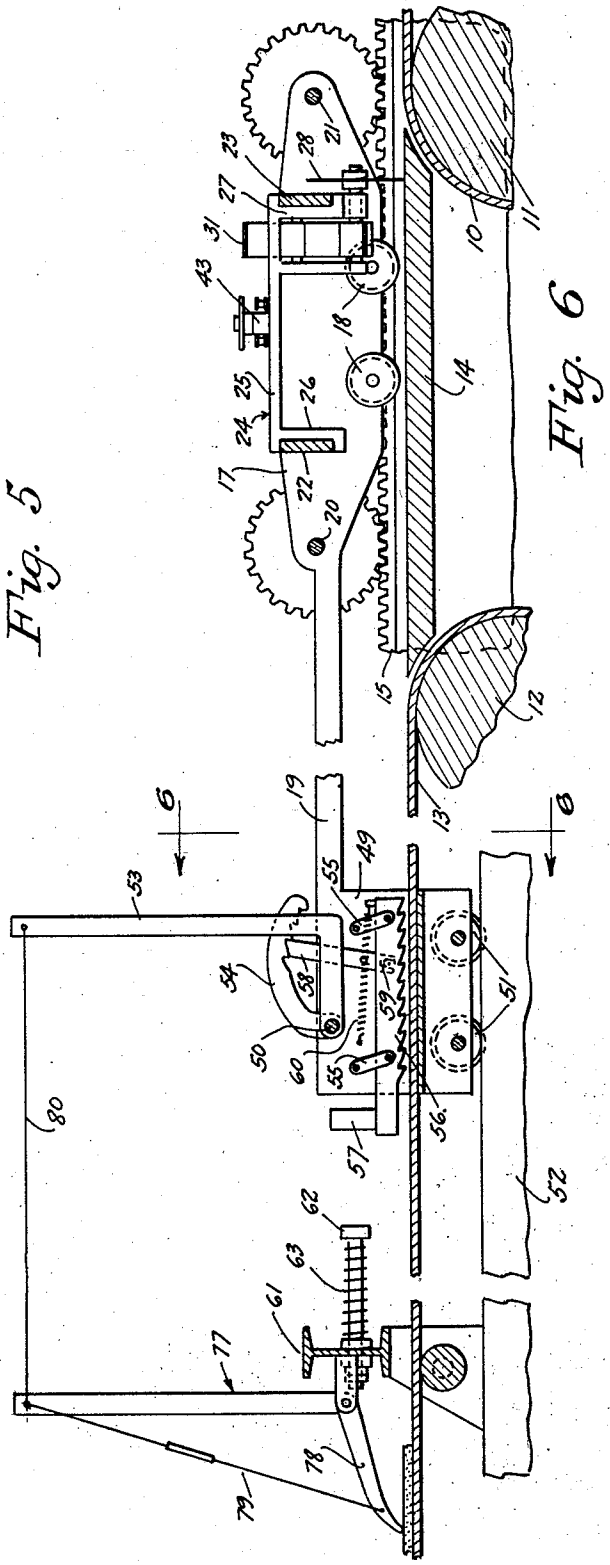
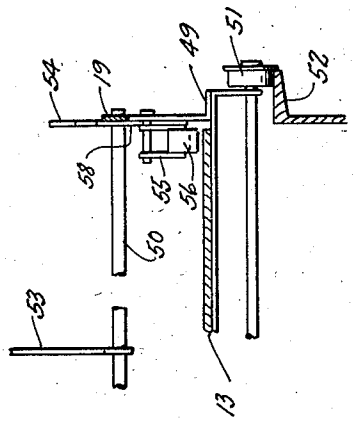


Fig. 6



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Fig. 7

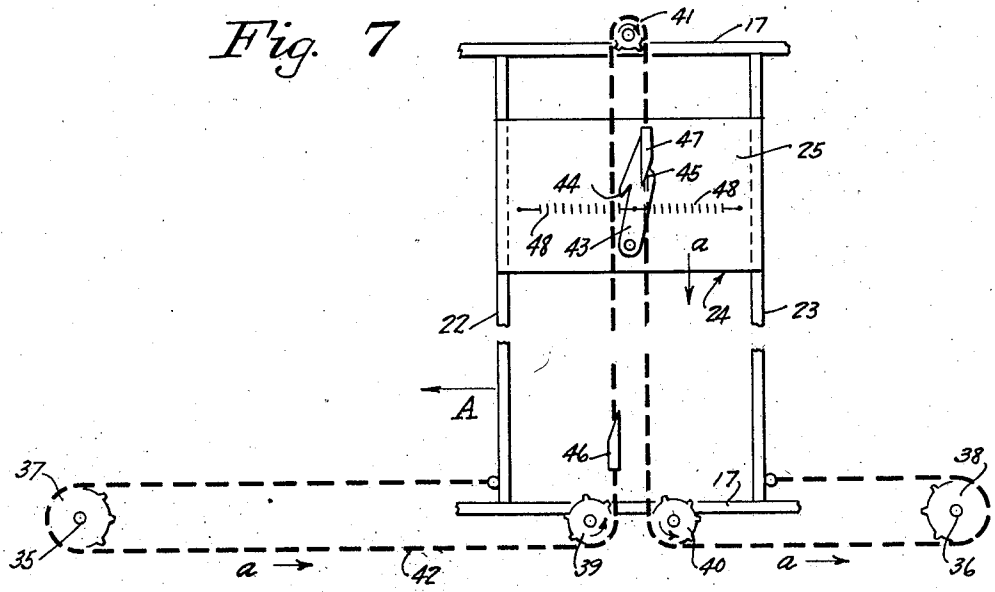


Fig. 8

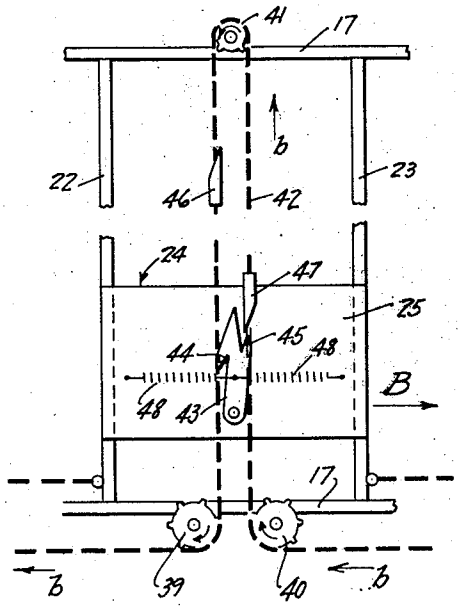
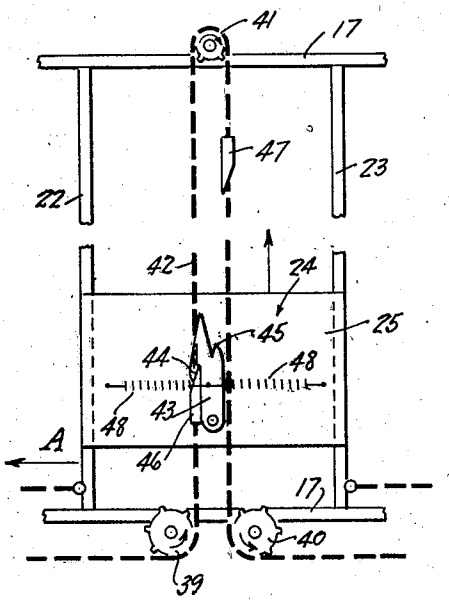


Fig. 9



INVENTOR.
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Patented May 4, 1926. 1,583,188

UNITED STATES PATENT OFFICE.

JOHN SCHUMACHER, OF LOS ANGELES, CALIFORNIA.

MACHINE FOR SEVERING PLASTER BOARD.

Application filed June 30, 1925. Serial No. 40,551.

To all whom it may concern:

Be it known that I, JOHN SCHUMACHER, a citizen of the United States, and resident of Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Machines for Severing Plaster Board, of which the following is a specification.

This invention relates to apparatus for feeding and severing into suitable lengths a continously advancing product of sheet form without stopping or altering the progress of the product. The embodiment of the invention disclosed herein is intended for the division of a strip of plaster board which is being continuously formed and advanced, the division occurring during advance so as to form panels ready for stacking and further treatment.

The objects of this invention are first, to provide a machine wherein a cutter is reciprocated longitudinally of the advancing product, the cutter being moved transversely of the product during its travel with the latter so as to sever the same, and which will be maintained inoperative during movement in the reverse direction; second, to provide a cutter and mounting therefor which is caused to travel at substantially the same speed as the product; and third, to provide details of construction, whereby a durable, simple mechanism, positive in operation is obtained.

The present invention is intended to be interposed in the line of conveying mechanism which receives a strip of plaster board being continuously formed and advanced. The objects above set forth together with other objects and corresponding accomplishments are obtained by means of the embodiments of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a portion of a plaster board machine showing the cutting mechanism; Fig. 2 is a section as seen on the line 2—2 of Fig. 1; Fig. 3 is an enlarged section in elevation through the control valve for the hydraulic motor for returning the cutting mechanism; Fig. 4 is a plan view of the structure shown in Fig. 1; Fig. 5 is a section as seen on the line 5—5 of Fig. 4; Fig. 6 is a fragmentary section as seen on the line 6—6 of Fig. 5; Fig. 7 is a diagrammatic plan view of the means for moving the cutters transversely of the board; and Figs. 8 and 9 are views similar to Fig. 7 showing the parts in different positions.

Referring more particularly to the drawing, a conveyor belt 10 of endless type is shown passed over a roller 11. This conveyor advances a strip of plaster board which is formed by mechanism not shown herein and forming no portion of the present invention. A plaster board of this character comprises an upper and lower sheet of paper, between which a plaster such as gypsum has been interposed, thereby forming a soft green board. It is now the practice to cut this board into lengths by means of a cutter which is manually operated. A cutter of this type is disclosed in Patent 1,197,553, issued to John Schumacher and Joseph E. Schumacher, September 5, 1916. The present invention is intended to automatically perform this cutting operation.

In line with roller 11 is a roller 12 having an endless conveyor belt 13 passed thereover. There is a gap between rollers 11 and 12 which is bridged by a plate 14. Plaster board in a strip is advanced by conveyor belt 10, being slid across plate 14 whereon it is severed into suitable lengths forming panels, and these panels are passed onto conveyor belt 13 which advances them to the point of delivery. The severing mechanism operates at the bridge plate 14. This plate is preferably made of some soft and ductile metal, such as lead or a composition thereof.

Mounted at the sides of the plate 14 and supported by the frame of the machine so as to be stationary are racks 15. A truck is arranged to ride upon tracks 16. This truck comprises side plates 17 provided with wheels 18. The side plates have forwardly extending arms 19 which end forwardly in plates forming portions of a tractor mechanism for the truck. This tractor mechanism will be later described. Spanning the side plates 17 are shafts 20 and 21. Affixed to the ends of the shafts are gear wheels riding upon the racks 15. In this manner the truck is compelled to travel in alignment. Extending between the side plates 17 are cross bars 22 and 23 which serve as rails for a cutter carriage 24 which may slide thereon. The carriage consists of a top plate 25 and of legs 26 formed at the sides with recesses to receive the rails as best shown in Fig. 5.

It will be apparent that the carriage may be moved transversely of the machine, and the truck carrying the carriage may be moved longitudinally thereof. Journalled in the carriage and suspended therefrom is a disk cutter 28. The edge of the cutter is disposed flush with the surface of bridge plate 14, or it may enter the body thereof and form a kerf in which to travel. The cutter may be operated from a motor 29 mounted on the truck at one end thereof and having a drive pulley 30 over which is passed a belt 31. Belt 31 is passed over a pulley 32 journalled at the opposite side of the truck. The lower beat of the belt is passed about a pulley 33 journalled in the carriage and then over a pulley 34 fixed to the shaft driving the cutter 28. This structure is best shown in Fig. 2. The arrangement is such as to permit driving of the cutter disk at all times during the travel of the carriage.

Means is provided for moving the carriage backwardly and forwardly across the truck. Figures 7, 8, and 9 show the means diagrammatically. Secured to the frame of the machine at one side thereof are upright shafts 35 and 36. Journalled upon the upper ends of the shafts are sprocket wheels 37 and 38. Journalled upon the truck are guide sprocket wheels 39 and 40. Journalled upon the truck at the opposite side to wheels 39 and 40 is a sprocket wheel 41. Passed about the sprocket wheels last described is a sprocket chain 42 anchored at both ends to the truck. Opposing leads of the bight of chain 42 are passed along the opposite sides of a clutch device on the carriage plate 25. The clutch mechanism comprises a catch finger 43 suitably pivoted and having on opposite sides thereof oppositely directed notches 44 and 45. These notches are arranged to be engaged by finger abutments 46 and 47 fixed to the chain 42. It is obvious that upon moving the truck back and forth, chain 42 will be caused to travel over the carriage first-in one direction and then in the other as indicated in Figs. 7, 8, and 9. Springs 48 tend to maintain the catch 43 in central position as shown in Fig. 8. The abutments 46 and 47 have bevelled ends arranged to engage notches 44 and 45, respectively. Suppose the truck is being moved in the direction of the arrow in Fig. 7. The chain 42 will be travelling in the direction indicated by the arrow *a*, abutment 47 will engage with catch 43 resting in notch 45 and will thereby move the carriage in the direction *a*. The proportions are such that the carriage will have completed its travel at the time the truck reaches the end of its travel. The truck is then returned, travelling in the direction of the arrow B of Fig. 8. This causes the chain to travel in the direction of the arrow *b*. Abutment 47 is free to ride out of notch 45 in the catch, and the carriage will remain in position during the return of the truck. Abutment 46 will slide over the nose of catch 43 so that it is in the position shown in Fig. 9, at the end of the travel of the truck. Return movement of the truck, as shown in Fig. 9 and indicated by arrow A will cause abutment 46 to engage in notch 44 of the catch and return the carriage to the opposite side of the truck. It will be noticed that at the end of the travel of the carriage in either direction, it remains in position during the return of the truck.

Tractor means is provided for moving the truck. This tractor means is at the forward end of arms 19, which terminate in plates 49. Extending between the plates is a shaft 50. The tractor is provided with wheels 51, which ride upon rails 52. Fixed to the shaft 50 is an elbow lever 53. At opposite ends of the shaft 50 adjacent the plates are arcuate toothed latches 54 so arranged that rocking of lever 53 will cause the latches to be rocked. Upon each plate 49 are links 55 supporting a serrated grip bar 56. Each bar 56 is so hung, that when the links 55 are vertical, the teeth on bar 56 will be in engagement with the belt 13. The teeth are of such form that movement of belt 13 so as to discharge the plaster board thereon will tend to cause the teeth to bite into the belt and obtain a better hold thereon. At the forward end of each grip bar is a head 57 disposed to engage an abutment later described. Pivotally mounted upon each plate 49 is a lock lever 58. The lock lever has an elongated opening in the lower end through which extends a pin 59 which is secured to a grip bar 56. A tension spring 60 is secured to a plate at one end and to a grip bar at the other and tends to swing the grip bar downwardly against the belt 13. Suppose that the grip bar is depressed so that it bites into the belt 13. Movement of the upper beat of the belt outwardly will cause the tractor to be moved with the belt, and it will so move until it is released.

Extending across the machine at the discharge end is a cross bar 61. Slidably mounted in the cross bar is an abutment 62 disposed in the path of the heads 57. Compression springs 63 tend to hold the abutments in their outer position. The arrangement is such that the abutments have resiliency, and when the heads 57 ride against the abutments, the latter will be moved storing up energy in the springs and aiding in moving the grip bars 56 out of engagement with the belt. Movement of the grip bars out of engagement with the belt will cause them to swing and rock the lock levers 58 so that the latter are swung and held in position by the latches 54. They will remain in this position until the latches are elevated, which is effected by

swinging the elbow lever 53. Means is provided for returning the truck to its inner position. This means comprises a hydraulic motor shown in Figs. 1, 3, and 4.

Mounted upon a side bar 16 is a hydraulic cylinder 64 provided with a plunger to which a plunger rod 65 is secured. The cylinder and plunger comprise parts of a single acting hydraulic motor. Plunger rod 65 is fixed to a bracket 66 mounted on the truck. Thus, movement of the plunger will cause corresponding movement of the truck. Fluid under pressure is supplied to the cylinder through conduits 67 controlled by a three way valve 68. There is a discharge or exhaust line 69 connected to the valve and an inlet line 70 leading to a source of fluid supply under pressure. It is obvious that by swinging the valve plug 71 the hydraulic cylinder may be connected to the fluid supply under pressure or to the exhaust. For operation of the valve plug there is an arm 72 connected to the plug and secured to its end is an operating rod 73.

Mounted upon the operating rod are stops 74 and 75 arranged to be engaged by the tappet 76 depending from the bracket 66. The stops are so arranged that they will be engaged by the tappet at the ends of travel of the truck. Thus, at one end of the travel of the truck, valve 68 will be operated to connect the hydraulic cylinder with the discharge, and at the other end of the travel, the valve will be operated to connect the hydraulic cylinder with the fluid under pressure. This latter condition is effected when the truck reaches its outermost limit of travel. Means is thus provided for returning the truck to its inner position. The tractor serves to move the truck from its inner to its outer position.

The tractor on its inner movement has its grip bars disposed out of engagement with the belt, and they are locked in such position by the lock levers 58 and the latches 54. Means must be provided for releasing the lock levers to allow the grip bars to drop so that the tractor will take hold of the belt and move the truck to its outer position. This means may be operated by the severed panels of boards in order that the correct length of board may be cut. Pivotally mounted upon the cross bar 61 is an elbow lever 77. It has a finger which may rest upon the belt as shown particularly in Fig. 5. The finger 78 and the upper arm of the elbow lever may be adjustably connected by a tie rod 79. A cable 80 connects elbow lever 77 and elbow lever 53. The length of this cable is so adjusted that when the tractor and truck are in their innermost position, movement of the finger 78 upwardly a slight distance will cause the lever 53 to be swung and the latches 54 to be raised so as to release lock levers 58 and permit the grip bars 56 to engage the belt. The movement of the finger 78 to a distance equal to the thickness of a plaster board is sufficient to cause this operation. When plaster board is disposed beneath the finger 78, the elbow lever 77 is in such position as to permit latches 54 to retain lock levers 58. Upon dropping of the finger 78 so that it contacts with the belt, which may be effected by the finger dropping into the gap between plaster board panels just severed. There is a drag of the unsevered strip of plaster board upon the belt conveying it. This drag is such that the plaster board moves at a slightly less speed than the belt. When the plaster board is severed, the panels are free to move with the speed of the belt, and the gap between severed sections begins widening. The width of this gap as the panels reach the tip of finger 78 is sufficient to permit the finger to drop therebetween. At the moment finger 78 drops over the cut edge of a plaster board panel, the truck should be in its inner position and the movement of the finger will cause an elevation of catch 54 and a release of the grip bar. The bar drops and clutches the belt causing the tractor to move the truck to its outer position. During movement of the truck to its outer position, the carriage 24 is moved transversely of the plaster board strip and the cutter 28 severs the same. When the truck reaches its outer position, the abutments 62 engage the grip bar heads and release the tractor from the belt. The hydraulic motor is then operated to return the truck. The newly cut panel travels forwardly, advancing a little bit faster than the unsevered strip. This causes the gap to widen so that the finger may drop therebetween. The finger 78 will ride on the surface of the plaster board panel, and will not drop over the edge thereof until a cut has been reached.

What I claim is:

1. In a machine for severing an advancing strip while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter mechanism movable with said conveyor and having a transversely movable cutter, means for moving said cutter mechanism with said conveyor and at the same time moving said cutter transversely, and means operated by said strip in its travel to control movement of said mechanism.

2. In a machine as specified in claim 1 means to return said mechanism to initial cutting position.

3. In a machine for severing an advancing strip while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter mechanism movable with said conveyor and having a

transversely movable cutter, means actuated by travel of said mechanism with said conveyor to move said cutter transversely thereof, means for moving said cutter with said conveyor, and means operated by said strip in its travel to control movement of said mechanism.

4. In a machine as specified in claim 3, means to return said mechanism to initial cutting position.

5. In a machine for severing an advancing strip while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter truck movable with the conveyor, a cutter carriage transversely movable on said truck, means operated by travel of said truck to move said carriage transversely thereof upon advance of said truck and to release said carriage from transverse movement upon return of said truck, means for advancing said truck with said conveyor, and means operated by travel of said strip to control movement of said truck.

6. In a machine as specified in claim 5 means to return said truck to initial cutting position.

7. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter mechanism movable with said conveyor and having a transversely movable cutter, means actuated by travel of said mechanism with said conveyor to move said cutter transversely thereof, means for moving said mechanism with said conveyor, and means operated by a transverse edge of the board to control movement of the said mechanism.

8. In a machine as specified in claim 7 means to return said mechanism to initial cutting position.

9. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter truck movable with said conveyor, a cutter carriage transversely movable on said truck, means operated by travel of said truck to move said carriage transversely thereof upon advance of said truck and to release said carriage from transverse movement upon return of said truck, means for advancing said truck with said conveyor, and means operated by a transverse edge of the board to control movement of said truck.

10. In a machine as specified in claim 9 means to return said truck to initial cutting position.

11. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutting mechanism movable with said conveyor and having a transversely movable cutter, means to couple said mechanism to said conveyor to cause said mechanism to travel therewith, and means operated by said board in its travel to couple said mechanism in its initial cutting position to said conveyor and to uncouple said mechanism at the end of its cutting position.

12. In a machine as specified in claim 11 means to return said mechanism to initial cutting position.

13. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutting mechanism movable with said conveyor and having a transversely movable cutter, means actuated by travel of said mechanism with said conveyor to move said cutter transversely thereof, means to couple said mechanism to said conveyor to cause said mechanism to travel therewith, and means operated by said board in its travel to couple said mechanism in its initial cutting position to said conveyor and to uncouple said mechanism at the end of its cutting position.

14. In a machine as specified in claim 13 means to return said mechanism to initial cutting position.

15. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter truck movable with said conveyor, a cutter carriage transversely movable on said truck, means operated by travel of said truck to move said carriage transversely thereof upon advance of said truck and to release said carriage from transverse movement upon return of said truck, means to couple said truck to said conveyor to cause said truck to travel with said conveyor, and means operated by said board in its travel to couple said truck in its initial cutting position to said conveyor and to uncouple said truck at the end of its cutting position.

16. In a machine as specified in claim 15 means to return said truck to initial cutting position.

17. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter mechanism movable with the belt and having a transversely movable cutter, means actuated by travel of said mechanism with said belt to move said cutter transversely thereof, a tractor for coupling said mechanism to said belt comprising a grip bar disposed to be swung into engagement with said belt to couple said mechanism thereto and to be swung out of engagement therewith to uncouple said mechanism, means operated by said board in its travel to control said bar whereby the latter is clutched to said belt at the initial cutting position of said

mechanism, and means to release said bar at the end of the cutting position of said mechanism.

18. In a machine as specified in claim 17, means to return said mechanism to initial cutting position.

19. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter truck movable with said belt, a cutter carriage transversely movable on said truck, means operated by travel of said truck to move said carriage transversely thereof upon advance of said truck and to release said carriage from transverse movement upon return of said truck, a tractor for coupling said truck to said belt comprising a grip bar disposed to be swung in to engagement with said belt and to couple said truck thereto and to be swung out of engagement therewith to uncouple said truck, means operated by said board in its travel to control said bar whereby the latter is clutched to said belt at the initial cutting position of said truck, and means to release said bar at the end of the cutting position of said truck.

20. In a machine as specified in claim 19, means to return said truck to initial cutting position.

21. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter mechanism movable with the belt and having a transversely movable cutter, means actuated by travel of said mechanism with said belt to move said cutter transversely thereof, a tractor mechanism for coupling said cutter mechanism to said belt comprising a grip bar disposed to be depressed against said belt whereby to couple said cutting mechanism thereto, means tending to cause said bar to be depressed, latch means tending to lock said bar in elevated position out of engagement with said belt, means to elevate said grip bar at the outer end of travel of said cutting mechanism, said latch means thereon locking said bar in elevated position, means operated by travel of said board to release said bar and unclutch said tractor mechanism from said belt, and means to return said cutting mechanism to initial cutting position.

22. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter truck movable with said belt, a cutter carriage transversely movable on said truck, means operated by travel of said truck to move said carriage transversely thereof upon advance of said truck and to release said carriage from said transverse movement upon return of said truck, a tractor mechanism for coupling said truck to said belt comprising a grip bar disposed to be depressed against said belt whereby to couple said truck thereto, means tending to cause said bar to be depressed, latch means tending to lock said bar in elevated position out of engagement with said belt, means to elevate said bar at the outer end of travel of said truck, said latch means thereon locking said bar in elevated position, means operated by travel of said board to release said bar and unclutch said tractor means, and means to return said truck to initial cutting position.

23. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter truck movable with said belt, a cutter carriage transversely movable on said truck, a flexible line anchored at opposite ends to said truck, guides fixed in stationary position, guides on said truck, said line being passed about said guides to form a bight on said truck and so that movement of said truck will cause the travel of said line on said truck, one way clutch means on each beat of said bight to clutch said carriage and move it transversely upon movement of the line in one direction whereby said carriage is moved transversely on advance of said truck, means for moving said truck with the conveyor, and means to return said truck.

24. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter truck movable with the conveyor belt, a cutter carriage transversely movable on said truck, a flexible line anchored at opposite ends to said truck, guides fixed in stationary position, guides on said truck, said line being passed about said guides to form a bight on said truck and movement of said truck will cause travel of said line thereon, one way clutch means on each beat of said bight to clutch said carriage and move it transversely upon movement of said line in one direction, whereby said carriage is moved transversely on advance of said truck, means for advancing said truck with said conveyor, means operated by travel of said board to control movement of said truck, and means to return said truck to initial cutting position.

25. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving belt for continously advancing said strip, a cutter truck movable with said belt, a cutter carriage transversely movable on said truck, a flexible line anchored at opposite ends to said truck, guides fixed in stationary position,

guides upon said truck, said line being passed about said guides to form a bight on said truck and so that movement of said truck will cause travel of said line thereon, one way clutch means on each beat of said bight to clutch said carriage and move it transversely upon movement of said line in one direction whereby said carriage is moved transversely on the advance of said truck, a tractor mechanism for coupling said truck to said belt comprising a grip bar disposed to be depressed against said belt whereby to couple said truck thereto, means tending to cause said bar to be depressed, catch means tending to lock said bar in elevated position out of engagement with said belt, means to elevate said bar at the outer end of travel of said truck, said catch means thereon locking said bar in elevated position, means operated by said board in its travel to release said bar and uncouple said tractor means, and means to return said truck to initial cutting position.

26. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter truck movable with the belt, a cutter carriage transversely movable on said truck, a chain anchored at opposite ends to said truck, wheels fixed in stationary position, wheels on said truck, said chain being passed about said wheels to form a bight on said truck and so that movement of said truck will cause travel of said chain thereon, coupling fingers on the opposite beats of said bight, a catch pivotally mounted on said carriage and having oppositely disposed notches to receive the corresponding fingers forming therewith one way clutch means so as to clutch said carriage to said chain and move it transversely upon the travel of said chain in one direction whereby said carriage is moved transversely upon advance of said truck, means for advancing said truck with said conveyor, means to return said truck to initial cutting position, and means operated by travel of said board to control the movement of said truck.

27. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt for continuously advancing said strip, a cutter carriage transversely movable on said truck, a chain anchored at opposite ends to said truck, wheels fixed in stationary position, wheels on said truck, said chain being passed about said wheels to form a bight on said truck so that movement of said truck will cause travel of said chain thereon, coupling fingers on the opposite beats of said bight, a catch pivotally mounted on said carriage and having oppositely disposed notches to receive the corresponding fingers forming therewith one way clutch means so as to clutch said carriage to said chain and move it transversely upon travel of the chain in one direction whereby the carriage is moved transversely on the advance of said truck.

28. In a machine for severing an advancing strip of plaster board while in motion, the combination of a moving conveyor belt, a truck movable with said belt, a tractor mechanism for coupling said truck to said belt comprising a grip bar disposed to be depressed against said belt whereby to couple said belt thereto, means tending to cause said bar to be depressed, catch means tending to lock said bar in elevated position out of engagement with said belt, means to elevate said bar at the outer end of travel of said truck so as to release the latter, said catch means thereon locking said bar in elevated position, means operated by said board in its travel to release said bar and unclutch said tractor means, and means to return said truck to initial cutting position.

29. In a machine for serving an advancing strip of plaster board while in motion, the combination of a moving conveyor for continuously advancing said strip, a cutter mechanism movable with the conveyor and having a transversely movable cutter, and means for moving the cutter with the conveyor, means adapted to be supported upon the surface of said strip or upon the surface of said conveyor, said means controlling movement of said mechanism with the conveyor.

In witness that I claim the foregoing I have hereunto subscribed my name this 25th day of June, 1925.

JOHN SCHUMACHER.