

1,062,814.

4 SHEETS—SHEET 1.



Witnesses:
 Wm. J. Manning
 G. J. Arnold



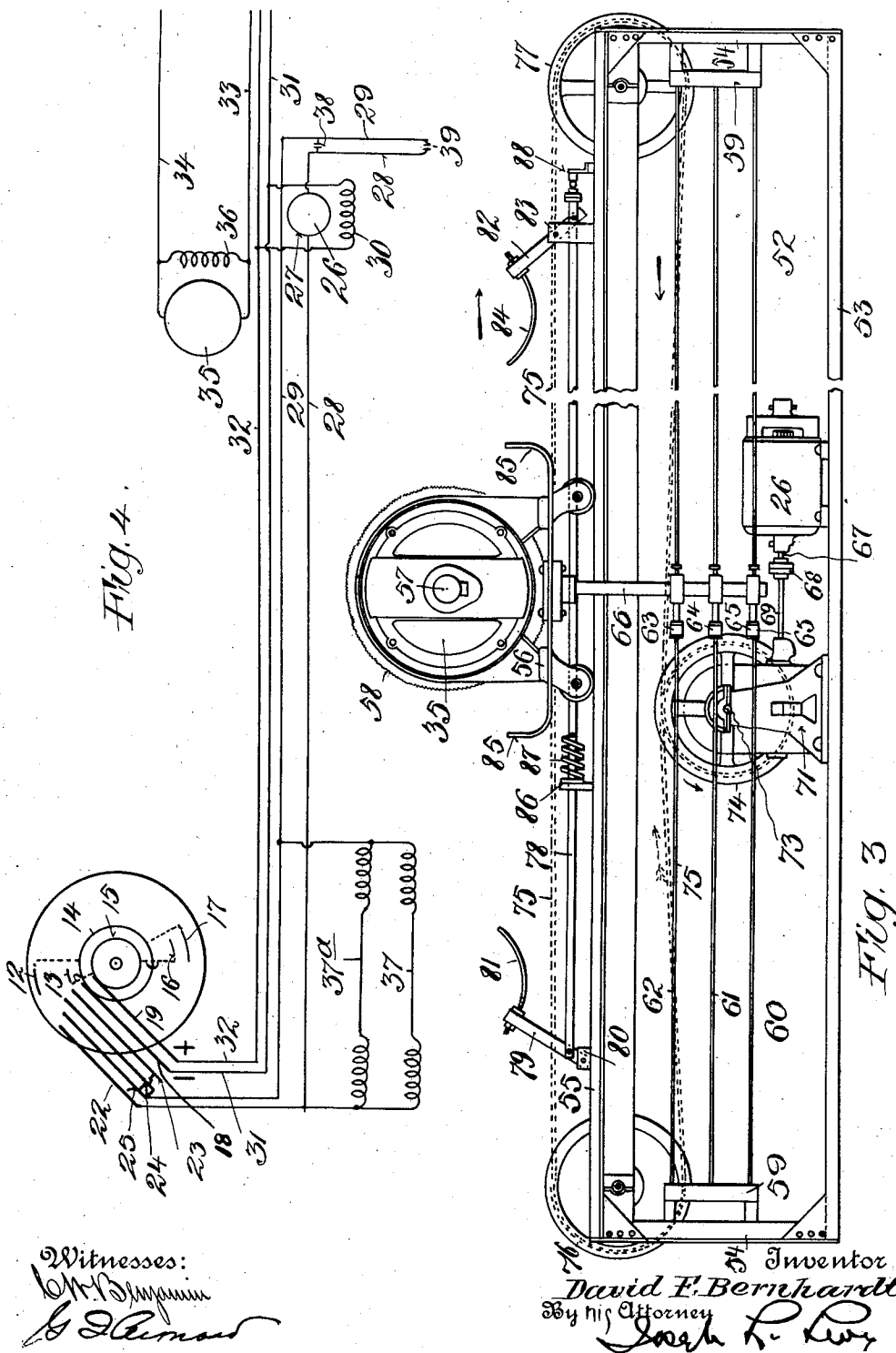
Inventor
David F. Bernhardt
By his Attorney
Joseph L. Levy

D. F. BERNHARDT.
PLASTER BOARD CUTTING MACHINE.
APPLICATION FILED AUG. 3, 1910.

1,062,814.

Patented May 27, 1913.

4 SHEETS-SHEET 2.



Witnesses:
W. H. Symington
G. L. Luman

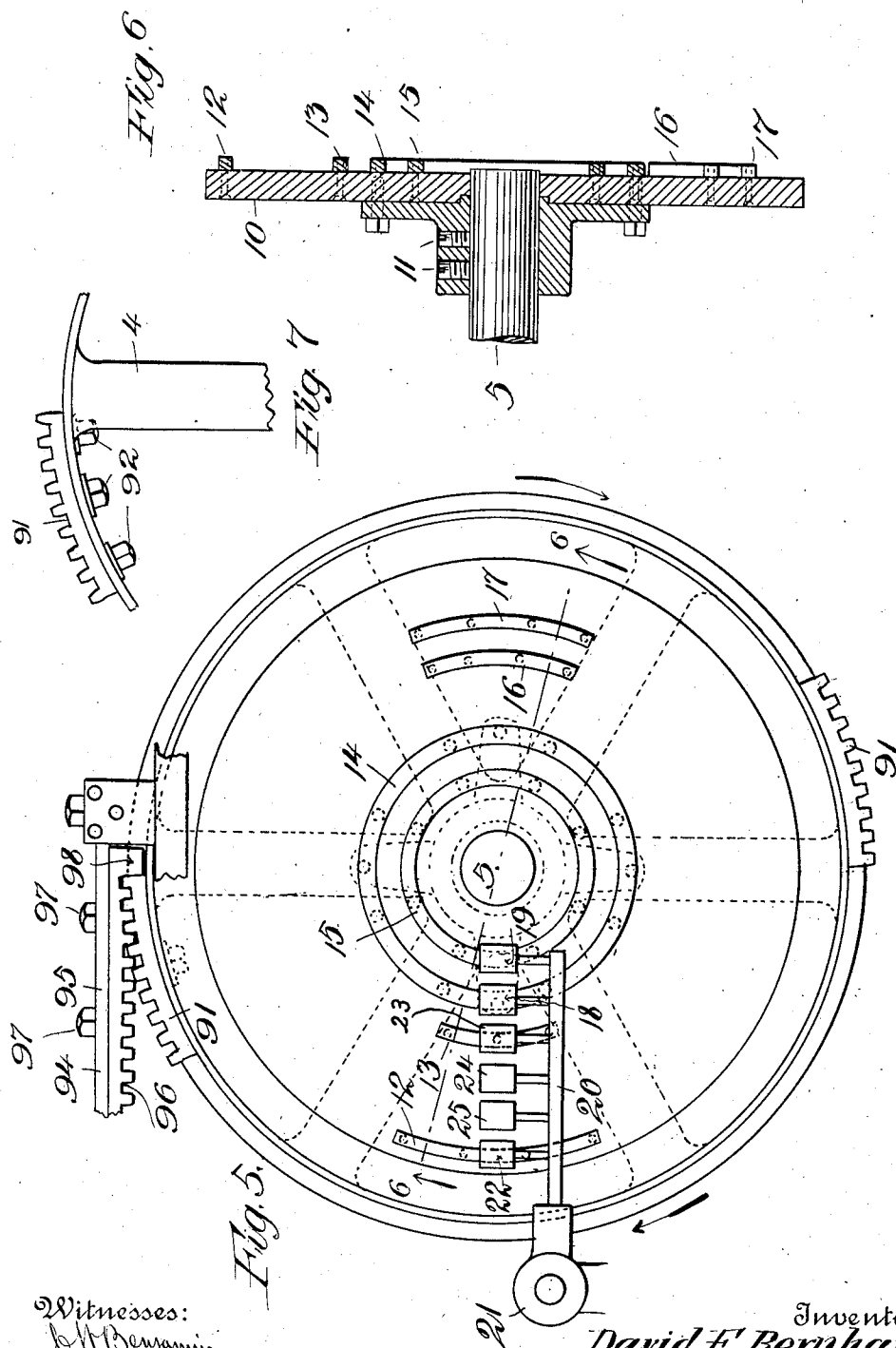
Inventor
David F. Bernhardt
By his Attorney
Joseph L. Luman

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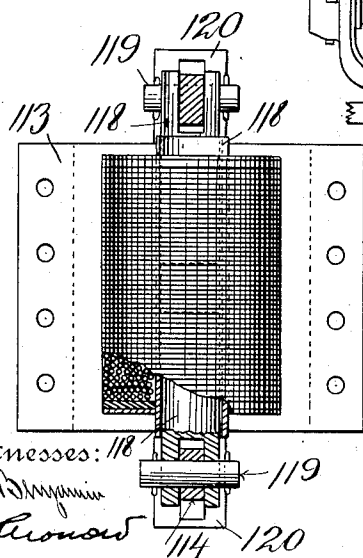
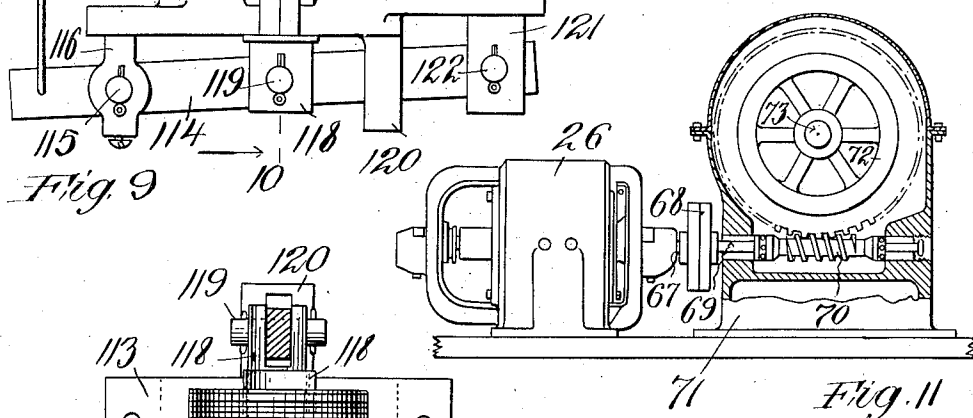
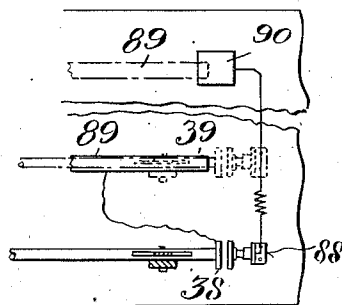
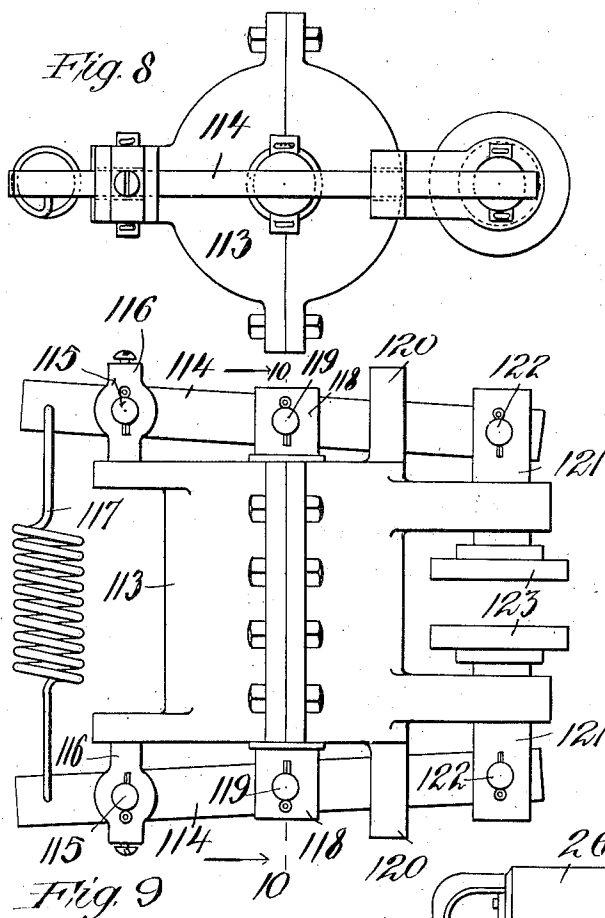


Witnesses:
J. H. Benjamin
G. L. Luman

Inventor
David F. Bernhardt
By his Attorney
Joseph R. Lury

1,062,814.

4 SHEETS—SHEET 4.



Witnesses: 118

W. B. Thompson
G. H. Brown

Inventor
David F. Bernhardt
By his Attorney
Josh. L. Perry

UNITED STATES PATENT OFFICE.

DAVID F. BERNHARDT, OF NEW BRIGHTON, NEW YORK, ASSIGNOR TO J.-B. KING & CO.,
OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PLASTER-BOARD-CUTTING MACHINE.

1,062,814.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed August 3, 1910. Serial No. 575,274.

To all whom it may concern:

Be it known that I, DAVID F. BERNHARDT, a citizen of the United States, and a resident of New Brighton, county of Richmond, city of New York, and State of New York, and whose post-office address is care of J. B. King & Company, New Brighton, in said city, have invented a new and useful Improvement in Plaster-Board-Cutting Machines, of which the following is a specification.

The object of my invention is to make a machine of this class which will be simple in construction, durable and efficient in operation, and which will sever plaster-board in any desired length without in any way interfering with the continuous movement of the board through the machine so that the machine can be operated continuously and indefinitely. This object is accomplished by my invention, one embodiment of which is hereinafter set forth and further pointed out in the claims.

For a more particular description of my invention, reference is to be had to the accompanying drawings, forming a part hereof, in which:

Figure 1 is a plan view of a portion of a plaster-board machine provided with my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a view taken at right angles to the views shown in Figs. 1 and 2 and shows the cutting mechanism and its supporting means. Fig. 4 is a diagrammatic view of the electrical connections. Fig. 5 is a side elevation of a disk on which the electrical connections are made. This view also shows other details. Fig. 6 is a sectional view taken on the line 6-6, Fig. 7 looking in the direction of the arrows. Fig. 7 shows a portion of a segmental gear. Figs. 8 and 9 are a plan and side elevations respectively of a magnetic clamp. Fig. 10 is a sectional view taken on the line 10-10, Fig. 9 looking in the direction of the arrows. Fig. 11 is an elevation partially in section of a motor and connections with the cutting member for its transverse movement. Fig. 12 is a diagrammatic view of electrical contacts at one end by which the connection is made or broken.

Throughout the various views of the drawings, similar reference characters designate similar parts.

My cutting device 1 may be applied to

any plaster-board machine and is particularly adapted to a machine 2 which forms plaster-board in continuous lengths with a continuous movement so that it is unnecessary for me to describe any precise form of the plaster-board machine. It is sufficient to say that this machine 2 is one of the endless belt type having a belt 3 which runs over a suitable supporting and feed drum 4 in the conventional manner.

The roller 4 is mounted on a suitable axle 5 journaled in suitable bearings 6, which are carried in any suitable manner directly from the floor 7, on which the machine rests or otherwise. The shaft 5 also carries a pulley 8 driven by any suitable belt 9, which belt drives the machine 2. The other end of the shaft 5 is provided with a disk 10, which is secured thereto by means of set screws 11, and so may be adjusted thereon. This disk 11 is made of some insulating material such as fiber, rubber or some similar substance and carries concentric conductors 12, 13, 14, 15, 16 and 17. The conductors 14 and 15 are annular and closest to the center of the shaft 5 and remain in constant contact with the brushes 18 and 19 respectively, which are carried on an arm 20 in a suitable manner, which arm is supported by a bracket 21 that rests on the floor 7. The bar 12, is adapted to come in contact with a brush 22. The bar 13 is adapted to come in contact with a brush 23, the bar 16 with a brush 24, and the bar 17 with a brush 25. The bars 12, 13, 16 and 17 all have about the same angular length, *i. e.*, about 50 degrees. On the rear of the disk 10, or otherwise, the bar 12 is connected with the ring 14, and the bar 13 is connected with the ring 15. The ring 15 is also connected with the bar 16 and the ring 14 with the bar 17. The brush 23 is connected to the brush 25, and the brush 24 to the brush 22. The brush 18 is connected with one pole of the dynamo, say the negative pole, and the brush 19 with the positive pole, or vice versa.

From the foregoing, it is evident that when the brushes 24 and 25 are in contact with their respective bars 16 and 17, the current will flow in one direction through the wires connected with the brushes, and when the bars 12 and 13 are in contact with the brushes 22 and 23, the current will flow through the same wires in the reverse direc-

tion. The object of this is to reverse the direction of the flow of current through the armature of a motor without reversing the direction of flow of current through the fields, whereby the direction of revolution of the armature is reversed. An examination of Fig. 4 will make this clear. The motor 26 has its armature 27 connected to wires 28 and 29, which wires run to the brushes 22 and 25 respectively and, of course, the wire 28 is cross-connected with the brush 24, and the wire 29 is cross-connected with the brush 23. The fields 30 of the motor 26 are connected directly with the bus-bars 31 and 32 respectively, which are connected with the brushes 18 and 19 respectively. These bus-bars 31 and 32 are also connected by any suitable means, not shown, with the wires 33 and 34 respectively, which run to a motor 35 with a shunt field 36.

37 are clamping magnets which are connected directly between the wires 28 and 29 in a manner shown. The wires 28 and 29 are also connected by a knock-out switch 38 and a starting switch 39, which will be described below. The ordinary rheostat and starting switch for the main circuit are omitted as unnecessary for the purpose of illustration, as these are of the conventional form and used in the conventional manner. It is to be understood that they are used in the usual manner when the apparatus is in operation.

In Fig. 4 the motor 35 is shown connected in the simplest manner. As will be pointed out below, this is not the most desirable manner because the speed of this motor ought to be regulated and to do this a slight change in the wiring is necessary. For the purposes of illustration, Fig. 4 is sufficiently correct for all practical purposes. The floor 7, supports uprights 40 on which are parallel rails 41 that run longitudinally of the machine and under the roller 4. These rails 41 carry flanged wheels 42, which carry a crane 43 in the conventional manner. This crane 43 is the principal part of the cutter 1 and carries cutting mechanism. It consists of a bottom sill 44, a top chord 45 and uprights 46 and 47, as well as an additional pair of uprights 48 that carry suitable top arms 49 for a purpose that will appear below. The bottom sills 44 are connected by suitable crossings 50, which are shown in dotted lines in Fig. 1 and pedestals 51 extending upwardly from the axles of the forward wheels 42, and the bottom sills 44 are connected by a frame 52 which carries the cutting mechanism. This frame 52 has a bottom member 53, uprights 54, and a top track 55 upon which is mounted a truck 56 that carries the motor 35. The motor 35 has an armature shaft 57, at one end of which is fixed a saw 58 which

cuts or severs the plaster-board in a manner described below. The uprights 54 have suitable insulators 59 on which are strung three electrical conductors, 60, 61 and 62 which are adapted to be engaged by three contacts or plows 63, 64 and 65 mounted on a suitable bar 66 and suitably connected through said bar to the motor 35, so that as the motor is moved on the track 55 in a manner described below, it will always be supplied with electricity and the speed thereof may be regulated by placing resistance either in the field or in the armature circuits, as may be desired. If it were not for this regulation, the wire 61, would be done away with and then the electrical connections would be as shown in Fig. 4. The preferable way is to regulate the speed of the motor 35 by putting resistance in the field circuits.

The floor or sills 53 carry a motor 26 which, as explained above, may be run in either direction as will more fully appear below. The shaft 67 of the armature 27 of this motor 26 is connected to a coupling 68 fixed on a second shaft 69 provided with a worm 70 (see Fig. 11) which worm revolves in a suitable casing 71 and drives a worm gear 72 mounted on a suitable shaft 73. The shaft 73 also carries a suitable drum 74, which is preferably provided with spiral grooves, and to which the ends of a cable 75 are attached. This cable 75 runs over suitable pulleys 76 and 77 on each end of the track 55 and suitably mounted therein and is fixed to the truck 56 which carries the motor 35. By this construction the rotation of the armature 27 of the motor 26 in one direction will cause the saw 58 to travel in the corresponding direction and the reverse movement of the armature carries the saw 58 in the other direction.

The apparatus for limiting the movement of the saw 58 and truck 56 on the track 55 and for determining the direction of their movement will now be described: A link 78 is supported at one end by a lever 79 fulcrumed at its lower end in a bracket 80 and provided at its upper end with an adjustable horn 81. The other end of the link 78 is supported by a lever 82 of the first order fulcrumed near its middle in a bracket 83 and pivotally connected at its lower end with the link 78. The upper end of this lever 82 is provided with a suitable contact horn 84 the same as the horn 81, except that it extends in the opposite direction. These contact horns 81 and 84 are adapted to be engaged by springs 85 carried by the truck 56. The link 78 moves through a suitable slide 86, which has a coiled spring 87 in contact therewith and surrounding the link 78, and secured at the end removed from the guide 86 so as to normally press one end of the rod 78 against the electrical contact

88 carried by the track 55. It is obvious that any contact of the springs 85 with either of the horns 81 or 84 will break the contact at 88 and thereby open the circuit.

5 The contact 88 with the end of the rod 78 is indicated by the switch 38 on Fig. 4. The switch 39 is formed by the arm 89 carried by the track 55 which is adapted to engage a fixed contact 90 on the machine 2 when the
10 cutter is at its starting point. This contact and its function will be described below more in detail. The bar 89 is electrically connected with the end of the rod 78, and the contact 90 with the contact 88. These
15 horns serve to give a sliding sweep to the arm allowing a perfect mechanical movement without shock as would be the case if a straight rod were employed in lieu of the horn.

20 The drum 4 on the shaft 5 is provided at each end with suitable segmental gears 91 which are held in place by suitable cap screws 92, or in any other suitable manner. The length of these segmental gears and
25 their position on the drum 4 are substantially as shown in Fig. 5, *i. e.*, proportionate to the side position of the segmental bars 12, 13, 16 and 17. The set screws 11 permit the disks 10 to be set at any desired angular
30 position on the shaft 5, so that it is easy to set the segmental gears and bars in proper relation. The top chord 45 of the crane 43 carries suitable uprights 93, which are fixed in position in any desired manner and connected
35 at their upper end by a rack-bar 94, which meshes with the segmental gears 91. The rack-bar 94 is preferably composed of two parts, one a metal bar 95 and the other a rack 96, the two parts being held together
40 by suitable cap screws 97, so that the rack 96 may be adjusted on the bar 95, if necessary. The rack 96 is provided with a downwardly extending catch 98 adjacent to the
45 last tooth and adapted to be engaged by the forward end of the segmental gears 91, so as to insure a proper meshing of the teeth in the segmental gears and rack. As the drum 4 moves continuously, the rack-bar 94 is driven intermittently by the segmental gears
50 91 and only in one direction. It is obvious that the rack 94 is driven toward the rear of the machine along with the rest of the cutting apparatus which is carried by a crane 43 by the wheels 42 on the track 41.

55 The return movement is provided for by a weight 99 on a cable 100 which runs over a suitably supported pulley 101 to the crane 43 where it is secured. The crossing 50 carries a rod 102 with a piston in its end that enters a suitable dash-pot 103 suspended from the frame of the machine 2, and preferably trunnioned, so as to allow for any
60 inequalities. The function of the dash-pot 103 is to cushion the return movement of the crane 43 under the influence of the

weight 99, and to prevent any jarring of the uprights that might be destructive.

The uprights 47 and 48 support a table of a peculiar construction. This table is slotted for a distance equal to the width of the belt 3, so as to permit the saw 58 to pass freely
70 therethrough. It is also divided at right angles to this slot so as to permit a projection 104 on a table 105 to pass between certain rollers 106 on the table carried by the
75 sill 49 in a manner which will be described below. Additional rollers 107 are carried by the table and parallel to the rollers 106 and separated therefrom by the slot, through which the saw 58 passes. An additional set
80 of rollers 108 are carried between the rollers 107 and suitably supported from the crane 43 in any desired manner, so as not to interfere with the movement of the saw 58 on the crane 43, and this set of rollers 108 are
85 adapted to coöperate with the rollers 109 on the projection 104 and support the plaster-board while the same is being severed by the saw 58. The precise mounting of the rollers 106, 107 and 108 is immaterial provided that
90 it is sufficient and so no detailed description is necessary.

The rear end of the machine 2 is provided with a table 105 with a projection 104 in its front on which suitable rollers 109 are
95 mounted. The correct position of this table 105 is shown in Fig. 2. In Fig. 1 it is removed a little from the machine so as not to conceal parts thereof. The table 105 may be constructed of angle metal, as shown, or in
100 any other suitable manner. In addition to rollers 108 it is provided with short rollers 110 at each side of the rollers 109 and long rollers 111 which serve to support the severed plaster-board.
105

The plaster-board 112 passes on the belt 3 where it gets its initial set to the rollers 108 and 107 and thence over the rollers 106. Meanwhile the saw 58 is not in the center,
110 as shown in Fig. 1, but is at one side or the other. When the saw 58 starts its transverse movement, the plaster-board may be held on the belt 3 and rollers by its own weight. However, as this may not be sufficient and it
115 is preferable to clamp it in position so that it will be cut true and will not shift during the severing operation. The clamps for effecting this are shown diagrammatically in Fig. 4 and designated 37. They are shown
120 in detail in Figs. 8, 9 and 10. Another set of clamps differing slightly in style and form straddle the saw 58 at either limit of its movement. These magnets are connected the same as the magnets 37 and are designated generically by the character 37.
125

The magnets 37 each comprise a casing 113 which is fixed to the upper chord 45 and at the forward end thereof in any suitable manner. The casings have levers 114 fulcrumed at 115 in brackets 116 extending
130

from the casing 113 and the rear ends of these levers 114 are connected by a suitable coil spring 117. The centers of these levers 114 are pivotally connected to cores 118 by means of suitable pins 119. These levers 114 pass through suitable guides 120 and the forward ends of these levers are pivotally connected to plungers 121 by suitable pivots 122 and the rear ends of these plungers have suitable clamping faces 123 which are adapted to take under the belt 3 and over the plaster-board 112 and fix the two together. The magnets 37^a are simple solenoids with a bifurcated core 124 adapted to straddle the saw 58 and press the plaster-board on a base 125 on which said solenoids rest, and which is suitably slotted to permit the saw 58 to pass therethrough.

In view of the foregoing, the operation of my improved severing device will be readily understood. It operates beginning with the position of the crane 43 at the forward limit of its movement, and the saw 58 may then be at either side of the machine. This saw cuts continuously at any desired speed and always rotates in the same direction. The length of plaster-board between the two adjacent cuts depends entirely upon the circumference of the roller 4 plus the thickness of the belt 3 and the pitch circle of the rack 94 and segmental gear 91 is made to correspond. Assuming the parts to be in position to begin the first operation, it commences when a segment 91 strikes the projection 98 when the bars 12 and 13 have just begun to have contact with their respective brushes 22 and 23 thus completing the circuit through the armature 27 and starting switch 39. The circuit through the switch 39 is soon broken by the movement of the crane 43 in the direction of movement of the plaster board but before this break occurs, the switch 38 is closed by the spring 87 upon the release of the spring 85. As soon as this circuit is established, the magnetic clamps 37 and 37^a act automatically and continue to act until the circuit is broken at the disk 10. The rack 94 forces the crane 43 to move rearwardly simultaneously with the transverse movement of the saw 58 on its truck 56 which runs on the track 55 and continues to run until the spring 85 engages the horn 81 or the horn 84, as the case may be, and opens the circuit through the switch 38 at the contact 88. Whichever horn the spring 85 engages, the link 78, which forms a contact with the projection 88 as soon as the spring 85 gets away from the horn with which it was in contact (84 or 81), has this contact broken and thereby opens the circuit through the armature, but not through the holding magnets 37 and 37^a. Soon or immediately thereafter a second break occurs when the bars 12 and 13 cease to be engaged by their respective brushes 22 and 23,

and then the rack 94 ceases to be engaged by the segmental gear 91. The cable 100 then acts because of the weight 99 and against the resistance of the dash-pot 103 and draws the crane 43 and the parts remaining therewith back to the initial position, except that the saw and its attendant mechanism is on the opposite side of the machine. The magnetic clamps release as soon as the bars 12 and 13 escape from their respective brushes. The parts of the cutter then remain at rest and the severed board is shoved forward over the various rollers and is greatly assisted in this movement by always being on some supporting rollers of the table 105 and the rollers 106 which in a sense overlap because of the projection 104 above described. There is no gap of varying length where the plasterboard is unsupported as there would be, if there were no projection 104. When the bars 16 and 17 get under the brushes 23 and 24, the circuit is again complete through the armature 27, above described but in the opposite direction, and the switch 39 has been closed by the return movement of the crane 43. The switch 38 is open. The reverse movement of the armature 27 of the motor 26 reverses the direction of movement of the truck 56 that supports the saw 58 and causes the same to return to its initial position, when the contact at 88 is broken as before, and the movement of the truck 56 ceases immediately. There can be no further movement due to inertia because the worm gear 72 cannot transmit power to drive the shaft 69 through the worm 70. The magnetic clamps 37 and 37^a act the same as before. When the cut is finished and the magnetic clamps have released the plaster-board, the crane 43 and the parts carried thereby are returned to the initial and forward position by the cable 100 in the manner above described. The sequence of operations just above described, is repeated indefinitely as long as the machine is in operation, and it is obvious that the transverse movement of the saw is accompanied by a longitudinal movement, so that the saw cuts true across the board without in any way disturbing the operation of the machine or interrupting the same.

While I have shown and described one embodiment of my invention, it is obvious that it is not restricted thereto, but is broad enough to cover all structures that come within the scope of the annexed claims.

What I claim is:

1. In a machine of the class described, a shaft, a disk with electrical contacts mounted on said disk, plaster-board supporting belt, a shaft, which also carries said disk, and a roller on said shaft, a crane mounted for movement in the direction of the belt and in the opposite direction, means for mounting said crane, brushes and means for

supporting the same so they will engage said contacts on said disk, a saw, an electric motor and means for driving the same, means for supporting said motor so that the same may run transversely of said crane said motor being shifted and controlled by said brushes and contacts to cause the saw to sever plaster-board during the movement of the crane in the same direction as the movement of the plaster-board.

2. In a machine of the class described, an endless belt, a roller supporting the same, segmental gears on said roller, a shaft supporting said roller, means for supporting said shaft, a disk with electrical contacts fixed on said shaft, brushes adapted to engage said contacts, means for supporting said brushes, a crane and means for supporting the same so that the crane may move either in the direction of the movement of the belt while carrying the plaster-board or in the opposite direction, racks carried by said crane adapted to engage said segmental gears, said contacts and brushes being so related that while the gears are intermeshing some of the brushes and contacts are in engagement, a saw, a motor and means connecting the same with the supporting mechanism of the saw and electrical switches and contacts and conductors so arranged and disposed that said saw will move transversely of the crane while the gears are in contact and not otherwise, so that the said saw cuts without interfering with the forward movement of the plaster-board.

3. In a machine of the class described, a fixed frame carrying a contact, a shaft, a disk thereon carrying contacts, means for supporting brushes which are adapted to engage said disk contacts, a crane and means for supporting the same, segmental gears and means for supporting the same, racks on said crane adapted to engage said gears whereby the said crane is moved for a short distance in one direction, means for moving said crane in the other direction, a saw carried by said crane and adapted to move transversely thereof, a motor, a windlass having a worm gear and a worm connected to said motor, cables connecting said saw supporting means whereby the saw is moved transversely of the crane and on the crane with the aid of said motor, means connected with said saw for opening the armature circuit of said motor whereby the movement of the saw transversely of the crane is terminated and a contact on said crane adapted to

engage the contact on said fixed part so that said armature circuit may again be closed when the crane returns to its initial position, and while the opening means operated by the saw is open, whereby the armature circuit may be closed so that the saw may be shifted in the opposite direction.

4. The combination with means for severing plaster-board, and means for causing such severing means to travel both transversely of and longitudinally with the plaster board, of a support through which the severing means travels transversely, comprising independent, interlapping means for supporting different portions transversely of the plaster board, one of which supporting means moves longitudinally with the severing means.

5. In a machine of the class described, a saw, a carriage carrying said saw, means for supporting said carriage so that it may move both transversely and longitudinally, means for moving said carriage longitudinally in one direction, means for moving said carriage longitudinally in the other direction, rollers adjacent said saw and carried by the carriage supporting means and having an interrupted space and not extending across said carriage supporting means, and a fixed table having rollers projecting into said interrupted portion, so that the plaster board will be supported at all times without a large gap while being severed by the saw.

6. In a machine of the class described, a belt and means for supporting the same so that said belt may always run continuously and move plaster-board, a saw mounted for movement in the direction of said plaster-board and simultaneously transversely thereof to sever said plaster-board without interrupting its movement, means for placing said saw after it has severed a board so as to be ready for the next cut, a table adapted to receive the severed plaster-board with rollers carried therefrom, a saw carriage, saw carriage supporting means and rollers adjacent to said saw and carried by said carriage supporting means so as to be on each side of the rollers supported by the table.

Signed at the city, county and State of New York, this 2d day of August, 1910.

DAVID F. BERNHARDT.

Witnesses:

GUSTAVE I. ARONOW,
H. RADZINSKY.