D. E. E. ROLAND.

CUTTING ATTACHMENT FOR TUBE FORMING MACHINES.

APPLICATION FILED MAY 24, 1920.

1,413,191. Patented Apr. 18, 1922.

3 SHEETS—SHEET 1.

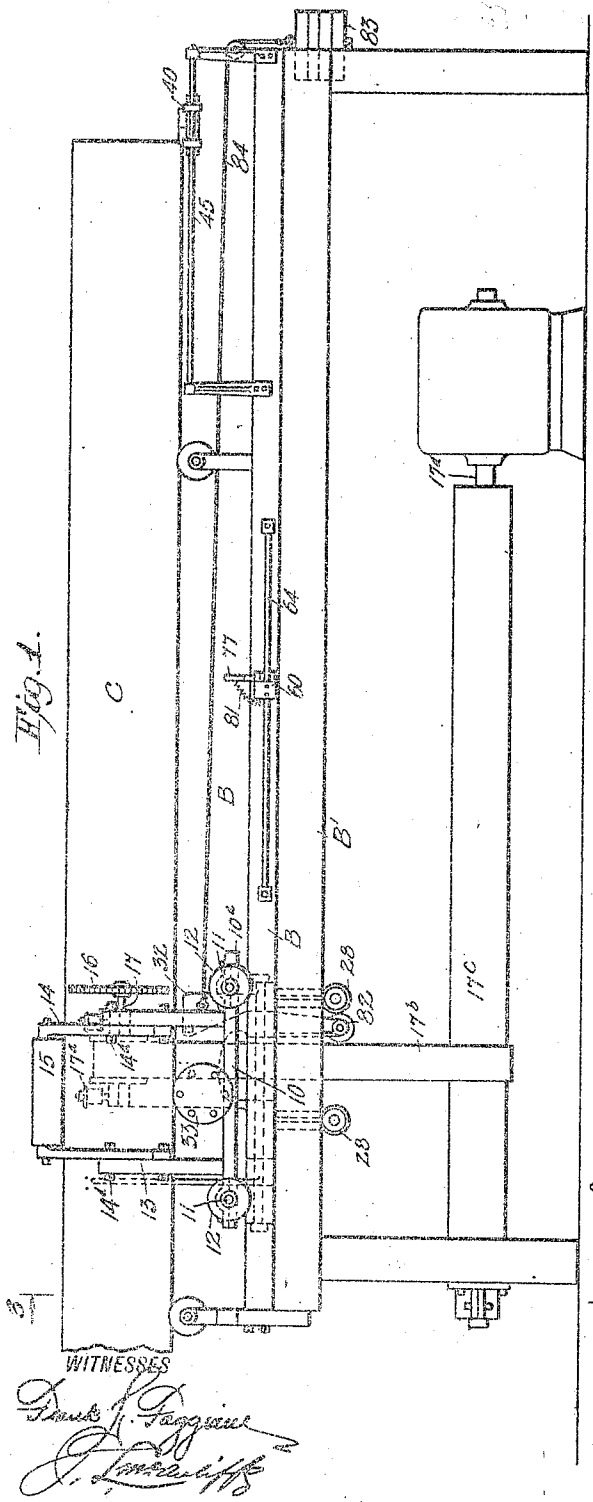


Fig. 1.

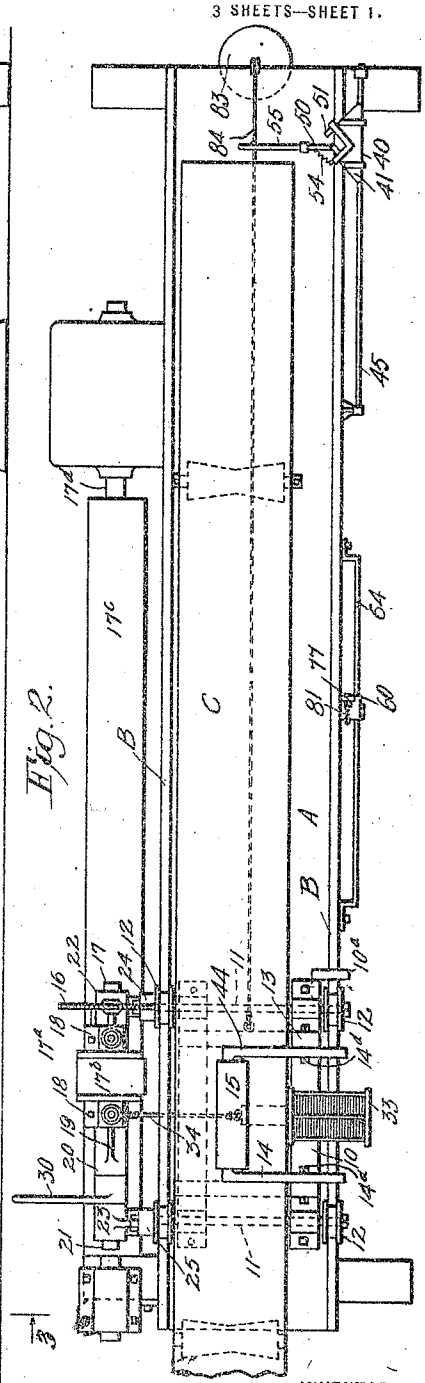


Fig. 2.

WITNESSES

Louis K. Faggiani

J. Lawrence Iffs

INVENTOR

DUANE E.E. ROLAND

BY Munn & Co

ATTORNEYS

D. E. E. ROLAND.

CUTTING ATTACHMENT FOR TUBE FORMING MACHINES.

APPLICATION FILED MAY 24, 1920.

1,413,191. Patented Apr. 18, 1922.

3 SHEETS—SHEET 2.

Fig. 3.

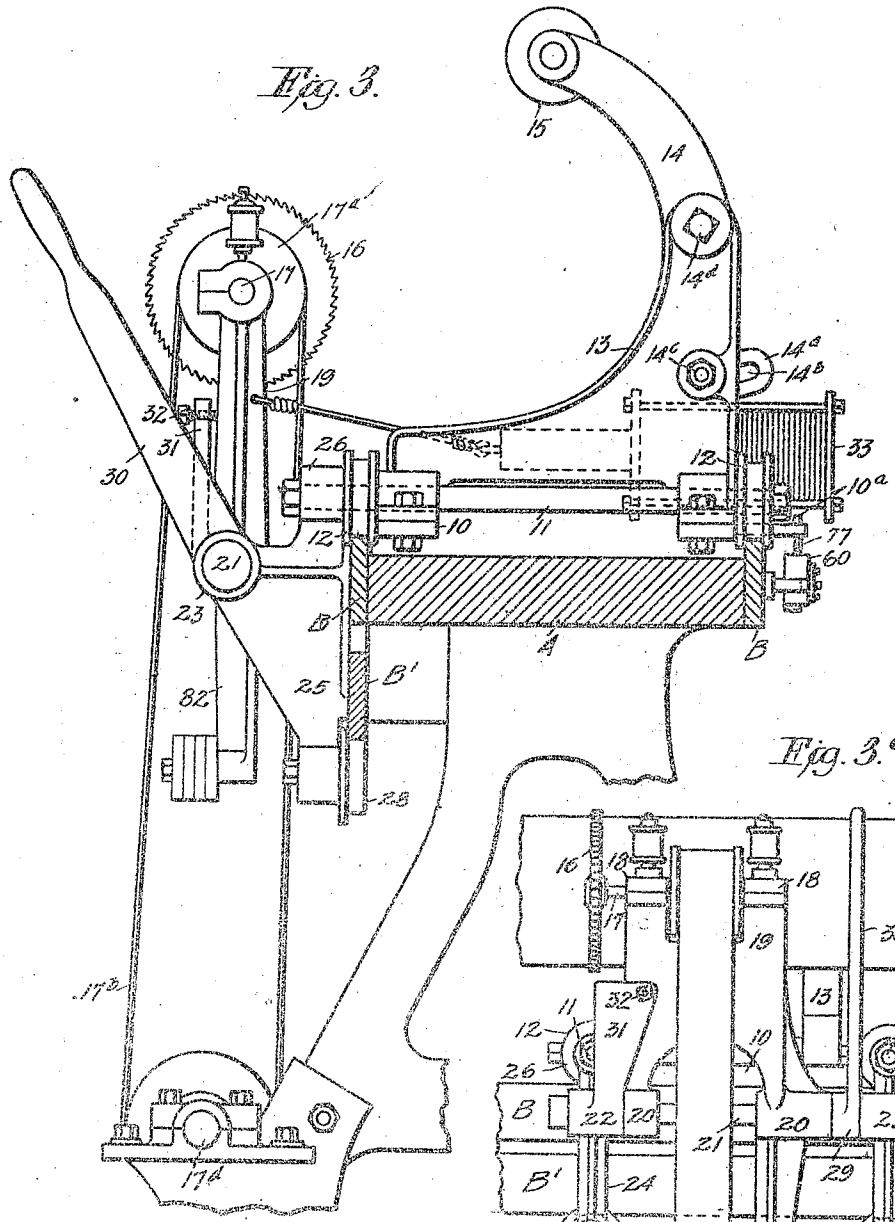


Fig. 3.a

WITNESSES

Frank J. Faggiani

A. Zimmerly

INVENTOR

DUANE E. E. ROLAND

BY Munn & Co

ATTORNEYS

D. E. E. ROLAND.

CUTTING ATTACHMENT FOR TUBE FORMING MACHINES.

APPLICATION FILED MAY 24, 1920.

1,413,191. Patented Apr. 18, 1922.

3 SHEETS—SHEET 3.

Fig. 4.

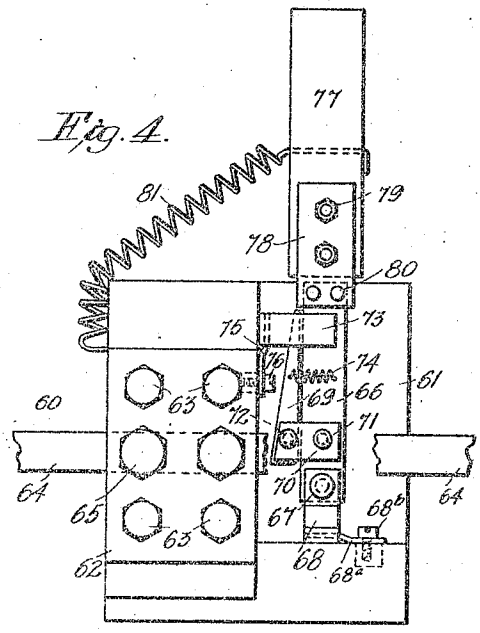


Fig. 5.

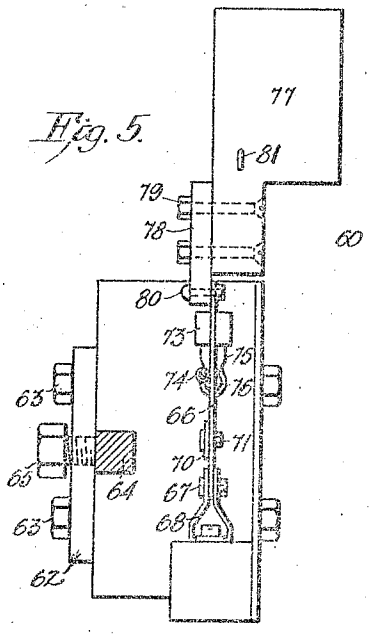


Fig. 6.

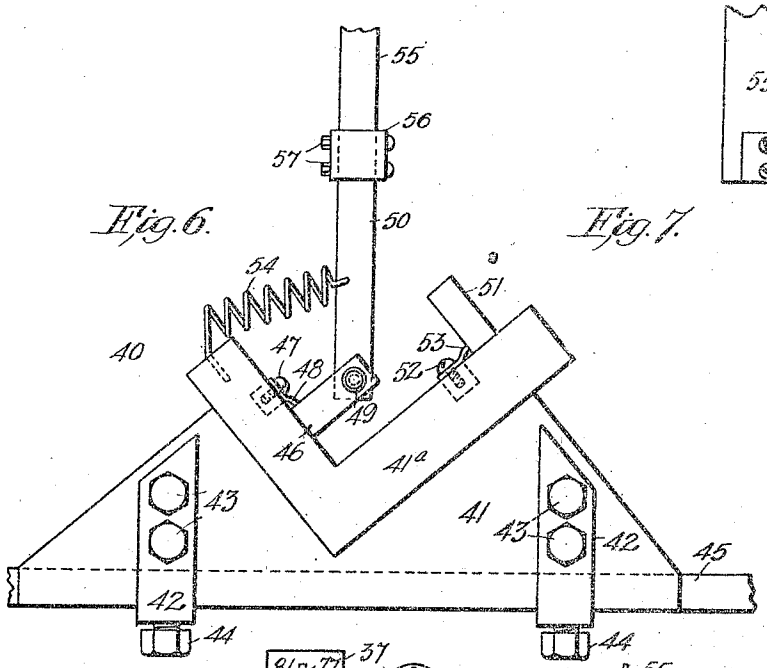


Fig. 7.

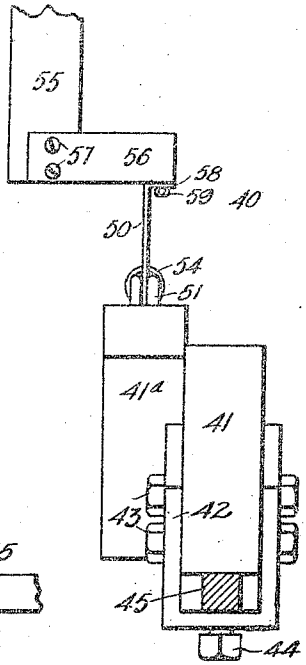
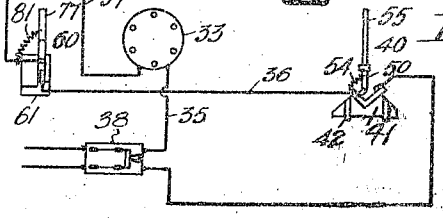


Fig. 8.



WITNESSES

Frank J. Faggan

INVENTOR

DUANE E. E. ROLAND

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

DUANE ERNEST ECKERT ROLAND, OF PHILADELPHIA, PENNSYLVANIA.

CUTTING ATTACHMENT FOR TUBE-FORMING MACHINES.

1,413,191. Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed May 24, 1920. Serial No. 383,977.

To all whom it may concern:

Be it known that I, DUANE E. E. ROLAND, a citizen of the United States, and a resident of Roxborough, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Cutting Attachment for Tube-Forming Machines, of which the following is a description.

My invention relates to that type of machines in which tubes are formed of heavy paper of many plies to produce so-called fiber-board tubing to be subsequently made into drums or barrels by the addition of attached heads and bottoms and the application of hoops. The tubes are formed by wrapping the material in successive layers on a steel cylinder, the layers being glued to one another. The tubing is formed continuously by the machine referred to and as it moves forwardly it is slowly revolved. At present the formed tubing passes to a part of the machine for the second or cutting operation by which the tube is cut into long lengths, usually about seventy-two inches long and these pieces are then carried along for the third operation which cuts the pieces up into the desired lengths, twelve, fifteen or twenty-four inches in length for example.

My invention particularly relates to the second operation or cutting of the tubes into long lengths in the machine in question, the operation now being entirely manually controlled, the object of my invention being to perform the operation largely automatically.

The nature of the invention, its distinctive features and advantages can best be stated in connection with the specific description of a practical embodiment of the invention as hereinafter given.

Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a side elevation of a portion of a tube-forming machine equipped with my attachment;

Figure 2 is a plan view;

Figure 3 is an enlarged end elevation of my attachment, a portion of the tube-forming machine being shown in transverse vertical section in a plane indicated by line 3—3, Figure 1;

Figure 3^a is an elevation of the carriage at the opposite side from that shown in Figure 1;

Figure 4 is a front elevation of one of the automatically controlled circuit breakers for causing the cutting saw to be thrown out of operation;

Figure 5 is a side elevation of said circuit breaker;

Figure 6 is a front elevation of an automatic circuit closer employed in carrying out my invention for causing the saw to be automatically moved to a cutting position;

Figure 7 is a side elevation of said circuit closer;

Figure 8 is a diagrammatical view of a circuit that may be employed.

In the illustrated example, A represents a machine bed having track rails B at the sides, and C indicates a tube requiring to be cut into lengths. A carriage here designated generally by the numeral 10 is provided with axles 11 having wheels 12 running on the rails B. At one side said carriage has upwardly extending brackets 13 to which arms 14 are secured as by bolts 14^a, said arms carrying a presser roller 15 to bear against the tube C at one side at the top. On the carriage 10 at the opposite side from the roller 15, the saw 16 for cutting the tube into lengths is located and is mounted upon a mandrel 17 turning in bearings 18, on a bracket or frame 19 having hubs or fixed bearings 20 fixedly secured to a longitudinal shaft 21 turning in bearings 22, 23 on standards 24, 25, said standards providing bearings 26 for the axles 11 of wheels 12 and provided with stud axles 27 for wheels 28, running at the under side of the track rails B'. The shaft 21 has fixed thereto the hub 29 of a handle 30 for manually swinging of the saw toward or from the tube C when desired, rocking the shaft 21 in the bearings 22, 23. On the carriage outside of the saw a stop means is provided to limit the outward swinging of the movement of the saw and its frame. For the purpose in the illustrated example an upwardly extending member 31 is provided on one of the bearings as 22 and is provided with a set screw 32 adjustable to variously limit the outward swinging movement permitted the saw frame. The arrangement of the carriage and saw is such that when the saw is swung inwardly to the tube C (which is fed continuously from the tube-forming machine) and as it cuts through the wall of the tube, the engagement of the tube and saw causes the carriage to be dragged along with

the tube, the saw and tube at the same time revolving and in accordance with my invention, the saw having completely severed the tube the carriage is automatically arrested, the arresting of the saw thereupon, permitting the overbalanced saw frame with the saw to swing laterally outward away from the tube. The carriage, in accordance with the illustrated form of my invention, is manually returned to its original position by the attendant, all the other operations of the carriage and saw being automatic, means being provided to automatically swing the saw frame inwardly to the sawing position. In the present instance electro-magnetic means in circuit with an automatic circuit closer and a circuit breaker serves to swing the saw laterally inward, the illustrated means for the mentioned purpose being as next described.

The automatically operated circuit closer, designated generally by the numeral 40, and shown in detail in Figures 6 and 7 is operated to close the circuit by the advancing end of the tube C and the automatic circuit breaker designated generally by the numeral 60 is operated to break the circuit by the action of the advancing carriage 10, said circuit breaker being so positioned as to cause disengagement of the cutter only after the severing of the tube is completed. On the carriage is an electro-magnetic device, here shown as a solenoid 33, the core of which is connected as by a short cable or other flexible element 34 with the saw frame 19 and a conductor wire 35 runs from said solenoid to the circuit closer 40, the conductor 36 running from said circuit closer to circuit breaker 60, the latter being connected by a conductor wire 37 with the solenoid 33. A manually operable switch 38 is included in one of the conductor wires. The circuit closer 40 as illustrated includes an insulating base 41 to which is secured by bolts 43 or the like yoke-like clamps 42 of U-shape having a clamp screw 44, said yokes extending beneath a rail 45 along which the circuit closer is adjustable, the screws 44 serving to secure it in adjusted position. The offset upper end 41^a of base 41 presents members at approximately right angles, the one having rigid therewith the metallic base 46 of a switch blade 50 pivoted to said base 46 as at 49. A binding screw 47 serves to secure a short conductor strip 48 running from the base 46 and is adapted to secure also the conductor wire 36. The blade 50 is adapted to engage a switch clip 51 on the base 41, said clip having a conductor member 53 through which a binding screw 52 passes for securing the conductor wire 35. A retractile spring 54 is secured to the base 41 and to switch blade 50 and normally tends to maintain the blade out of engagement with the clip 51 and therefore with the circuit broken. A switch handle 55 is secured by an insulating block 56 to the blade 50, said block being suitably secured as by screws 57 to the handle and secured by screws or bolts 59 to the laterally offset upper end 58 of blade 50. The handle 55 may be operated manually should occasion require it and it lies in the path of the tube C to be engaged and tripped by the latter by moving the switch blade 50 into clip 51 and closing the circuit.

The circuit breaker 60 includes a fiber base 61 to which is secured by bolts 63 or the like a plate 62 which serves to slidably clamp the base to a longitudinal rail 64 for permitting adjustment of the circuit closer to a proper point along said rail, a set screw 65 serving to secure the circuit closer in adjusted position. The main switch blade 66 is pivotally secured to its relatively fixed base part 68, having a conductor piece 68^a through which a binding screw 68^b passes into the fiber base 61 for securing the conductor wire 36. A secondary switch blade 69 is pivotally secured to the blade 66 by plate 70, secured at one end as by a rivet or bolt 71, and secured by a pivot 72 to said auxiliary blade. Said blades are adapted to engage a contact clip 73 secured to the base 61, a conductor piece 75 running from said clip to a binding post 76 that secures the conductor wire 37. A spring 74 connects the main and auxiliary switch blades to disengage the auxiliary blade from the clip 73 without sparking. The main blade 66 is provided with a handle 77 secured thereto by an insulating block 78 which is bolted as at 79 to said handle and bolted as at 80 to said blade. A spring 81 secured at its respective ends to the fiber base 61 and to which handle 77 normally tends to maintain the switch closed. The saw arbor 17 is driven by any suitable means for revolving the saw, there being shown a belt pulley 17^a thereon, over which the belt 17^b runs from an elongated pulley 17^c on the motor shaft 17^a on the machine frame, the arrangement permitting the saw frame to swing laterally on the shaft 21 without interference with the belt drive.

With the described arrangement, the circuit closer 40 having been secured in a position at the proper point along its rail 45 and the circuit breaker 60 having been secured in the proper position along its rail 64, in the operation of the tube-forming machine as the forward end of the tube C reaches the trip handle 55, the latter will be engaged by said tube and the switch blade 50 moved on its pivot 49 against the tension of the spring 54 and into the clip 51, thereby closing the circuit and thus energizing the solenoid 33 which causes the saw frame 19 and the saw to be swung laterally inward. As the saw cuts into the tube C the forward

movement of the latter will cause the carriage to travel forward so that the saw makes the cut in a single plane. As the carriage continues to move forward and the tube is severed by the saw, the carriage will have arrived at the circuit breaker 60 and will have engaged the handle 77 thereof, thereby throwing the blades 66, 69 out of engagement with the clip 73, thus breaking the circuit and de-energizing the solenoid 33. The saw frame 19 is so balanced that it tends to normally maintain a position with the saw out of engagement with the tube C and therefore upon the solenoid being de-energized, the saw frame will rock and will withdraw the saw from the tube and automatically assume the outer position. The severed length of tube is manually removed and the carriage is then moved manually by the attendant to its original position for another forward and cutting movement when the circuit is again closed by the end of the tube acting on the circuit closer 40. The saw frame 19 may be balanced suitably as by the distribution of the total mass of metal therein, said frame being shown also as provided with an overbalancing arm 82 which is disposed in pendant position when the said frame is in the outer position and to rise in an arcuate path as the saw frame swings inwardly.

In order that the carriage 10 may be readily moved forwardly by the engagement of the saw with the tube C, means is provided in connection with the carriage and having sufficient tendency to move it forward to counter-act the traction of the carriage on the tracks B, there being provided for the purpose in the illustrated example a weight 83 suspended on a cable or other flexible element 84 secured to the carriage.

I would here explain that in the operation of the tube-forming machine as now constructed, the manual throwing of the saw into or out of action results in a waste of material due to the lack of precision in determining the successive operations of the saw, so that when the tube is finally cut into the desired lengths for the making of the barrels, short ends are produced and the loss constitutes an important item of cost in the manufacture. This loss is wholly eliminated by the use of my invention because the initial cutting of the tube into lengths of for example, seventy-two inches, is with precision, so that the severed length will cut exactly into a given number of shorter lengths suitable for the barrels and without any short pieces of tube remaining. The positions of the circuit closer 40 and circuit breaker 60 can be accurately determined so that the saw will be thrown into action unfailingly at the proper time and thrown out of action instantly when the tube has been severed.

The trip member on the carriage 10 for engaging the trip handle 77 of the circuit breaker 60 may consist of a projection 10^a. The arms 14 carrying the presser roller 15 may be adjusted laterally about their pivot bolts 15, said arms at the lower ends having members 14^a formed with slots 14^b to receive adjusting bolts 14^c, as best seen in Figure 3.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the mechanical details herein illustrated, since manifestly the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. In a machine in which material to be severed is given longitudinal movement; a carriage, cutting means mounted on said carriage to move toward or from the material and normally tending to maintain a position away from the cutting position, said carriage being adapted to be given longitudinal movement by the engagement of the cutting means with the material, means mounted on the carriage and operative to throw said cutting means to cutting position, and means subject to the advance of the material to cause said second means on the carriage to function.

2. In a machine in which material to be severed is given longitudinal movement; a carriage, cutting means mounted on said carriage to move toward or from the material and normally tending to maintain a position away from the cutting position, said carriage being adapted to be given longitudinal movement by the engagement of the cutting means with the material, means mounted on the carriage and operative to throw said cutting means to cutting position, and means subject to the advance of the material to cause said second means on the carriage to function; together with means subject to the carriage after a predetermined travel thereof for throwing the first and second means out of action and arresting the travel of the carriage.

3. In a machine in which material to be severed is given longitudinal movement; a carriage, a saw frame thereon, a circular saw on said frame, said frame being mounted on the carriage to have transverse rocking movement toward or from the path of movement of the material for throwing the saw to and from cutting position, means to drive said saw, means on the carriage to move said frame to bring the saw into cutting position, said frame tending to move the saw away from cutting position, and means to throw said second-mentioned means out of action upon a predetermined travel of the carriage

and saw, for permitting said frame to carry the saw away from the material.

4. In a machine in which material to be severed is given longitudinal movement; cutting means, a carriage on which said cutting means is mounted to have lateral movement toward or from the path of movement of the material, said carriage being mounted to travel when the cutting means engages the material, an electro-magnetic device on the carriage to throw the cutting means to cutting position, and a circuit closer in circuit with said device for energizing the latter.

5. In a machine in which material to be severed is given longitudinal movement, cutting means, a carriage on which said cutting means is mounted to have lateral movement toward or from the path of movement of the material, said carriage being mounted to travel when the cutting means engages the material, an electro-magnetic device on the carriage to throw the cutting means to cutting position, a circuit closer in circuit with said device and in the path of movement of the material, and a circuit breaker in said circuit and subject to the carriage upon a predetermined movement thereof for de-energizing said electro-magnetic device.

DUANE ERNEST ECKERT ROLAND.