

May 24, 1927.

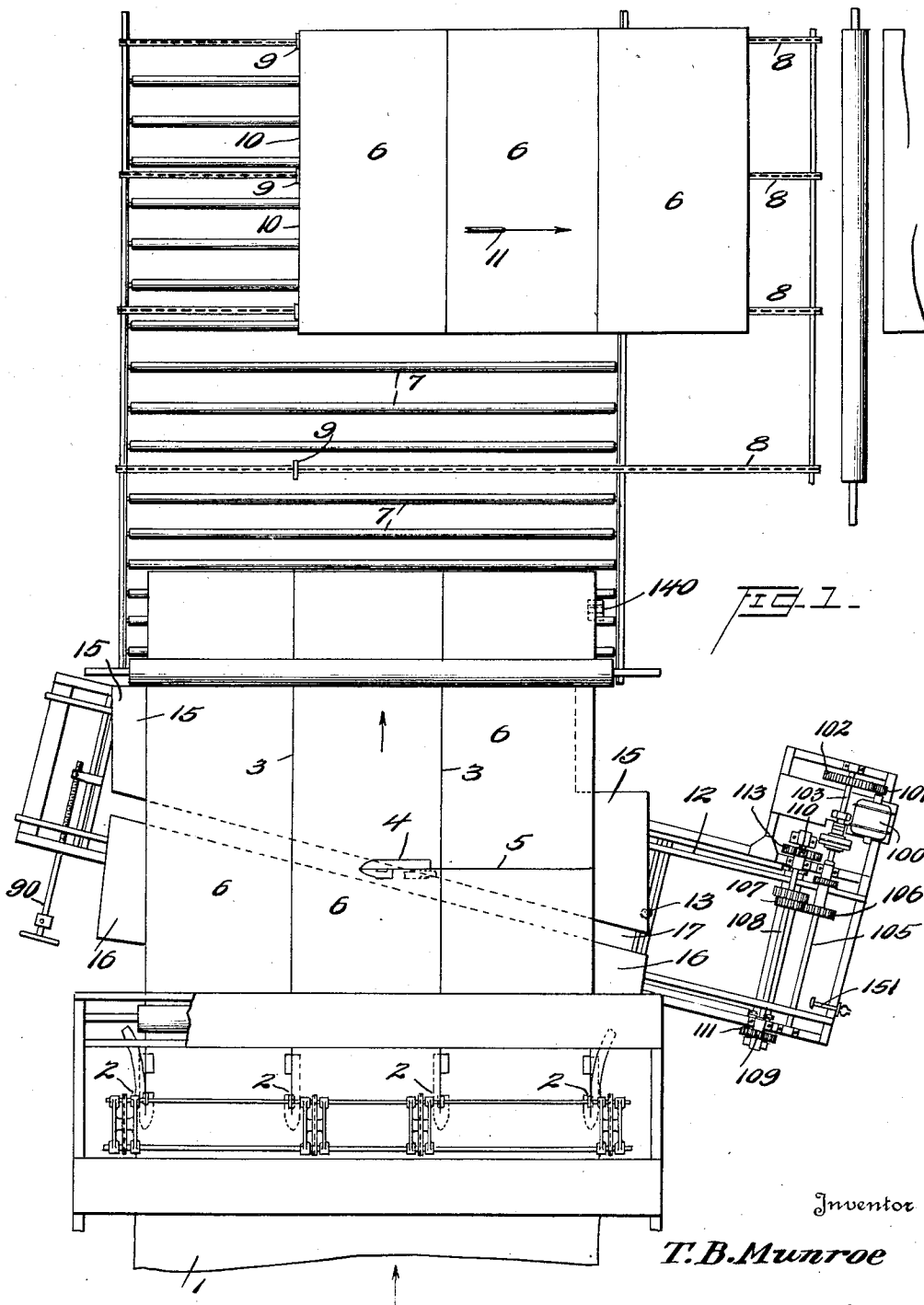
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T. B. MUNROE

MEANS FOR SLITTING SHEET MATERIAL

Filed Sept. 4, 1925

5 Sheets-Sheet 1



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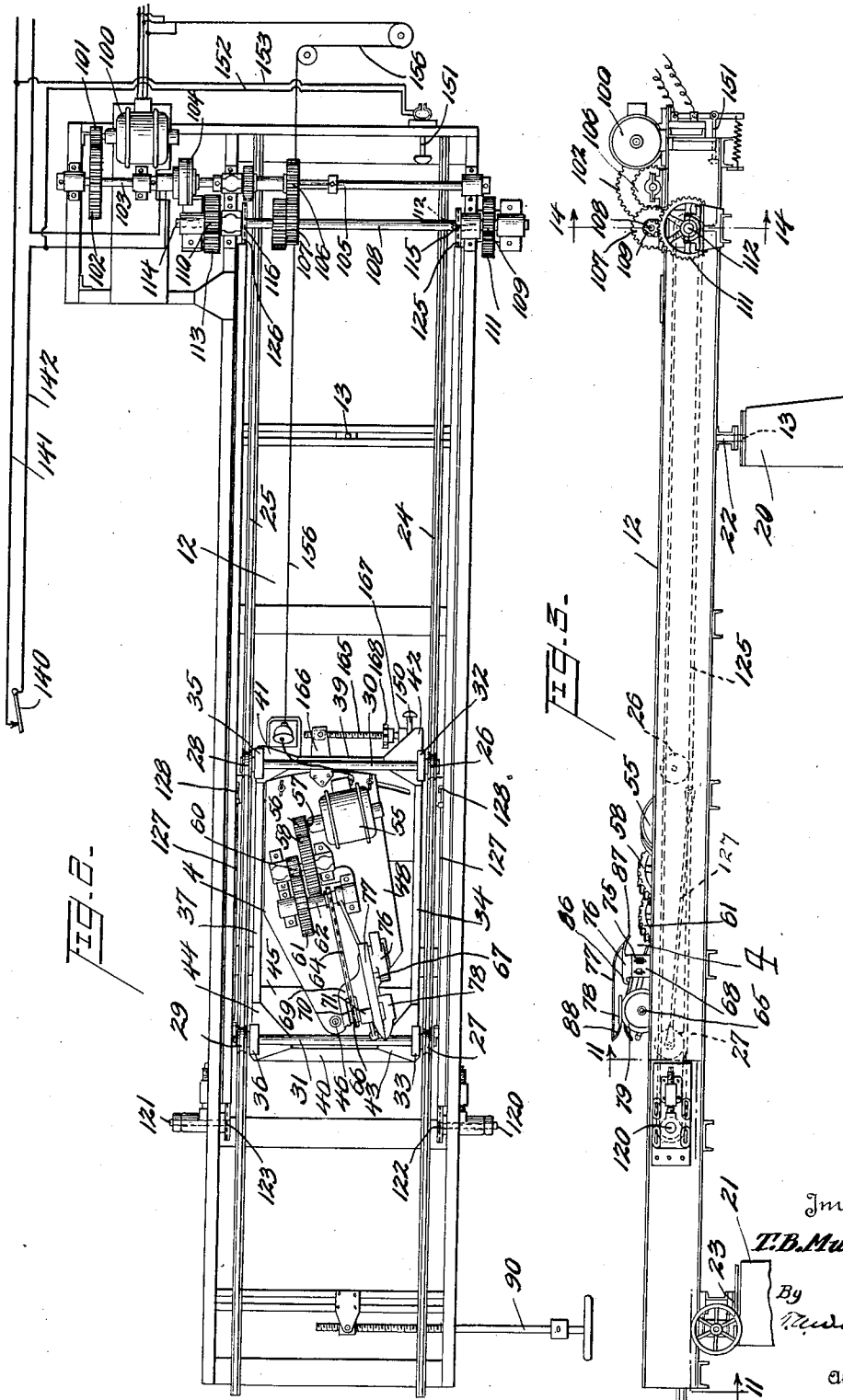
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MEANS FOR SLITTING SHEET MATERIAL

Filed Sept. 4, 1925

5 Sheets-Sheet 2



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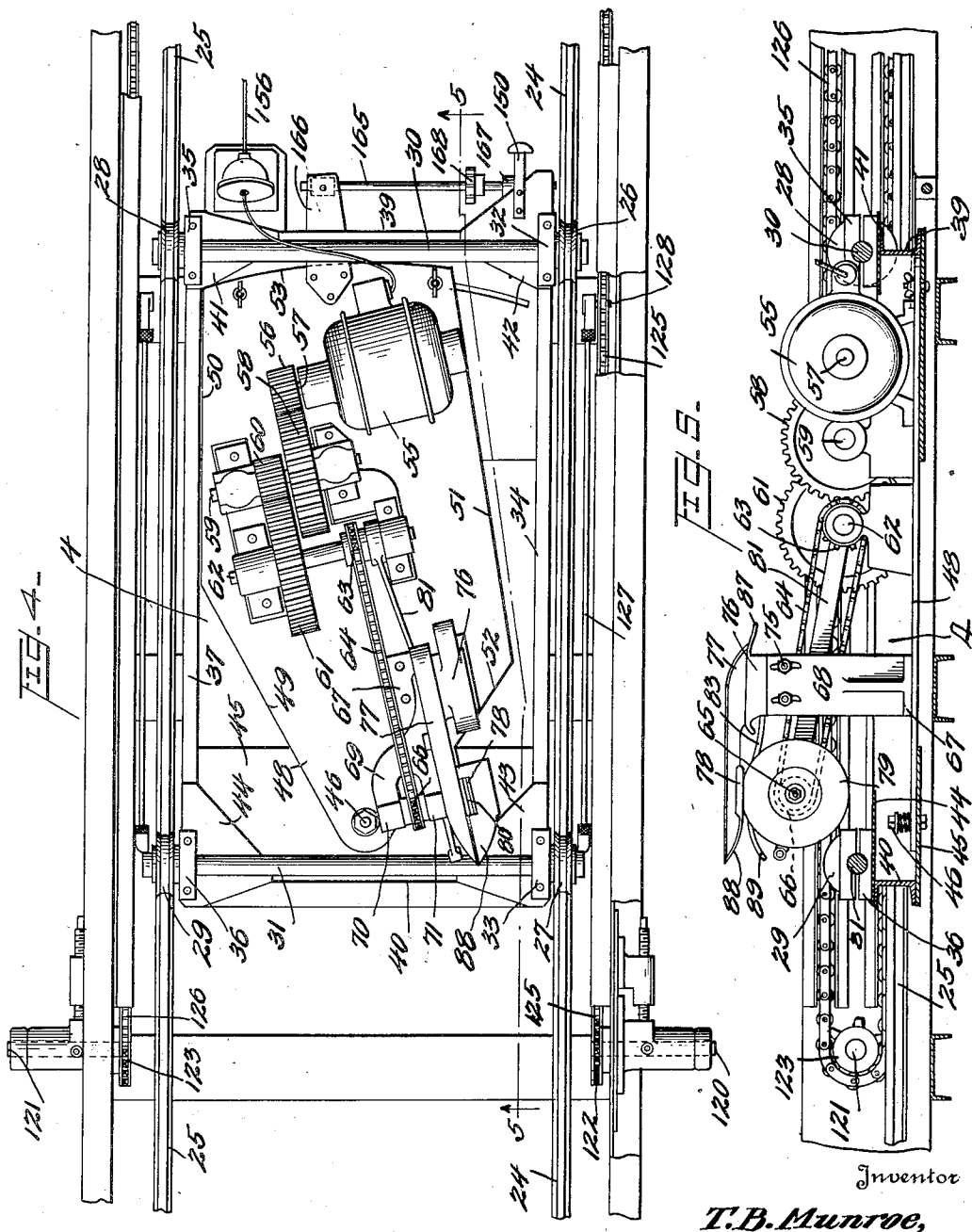
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MEANS FOR SLITTING SHEET MATERIAL

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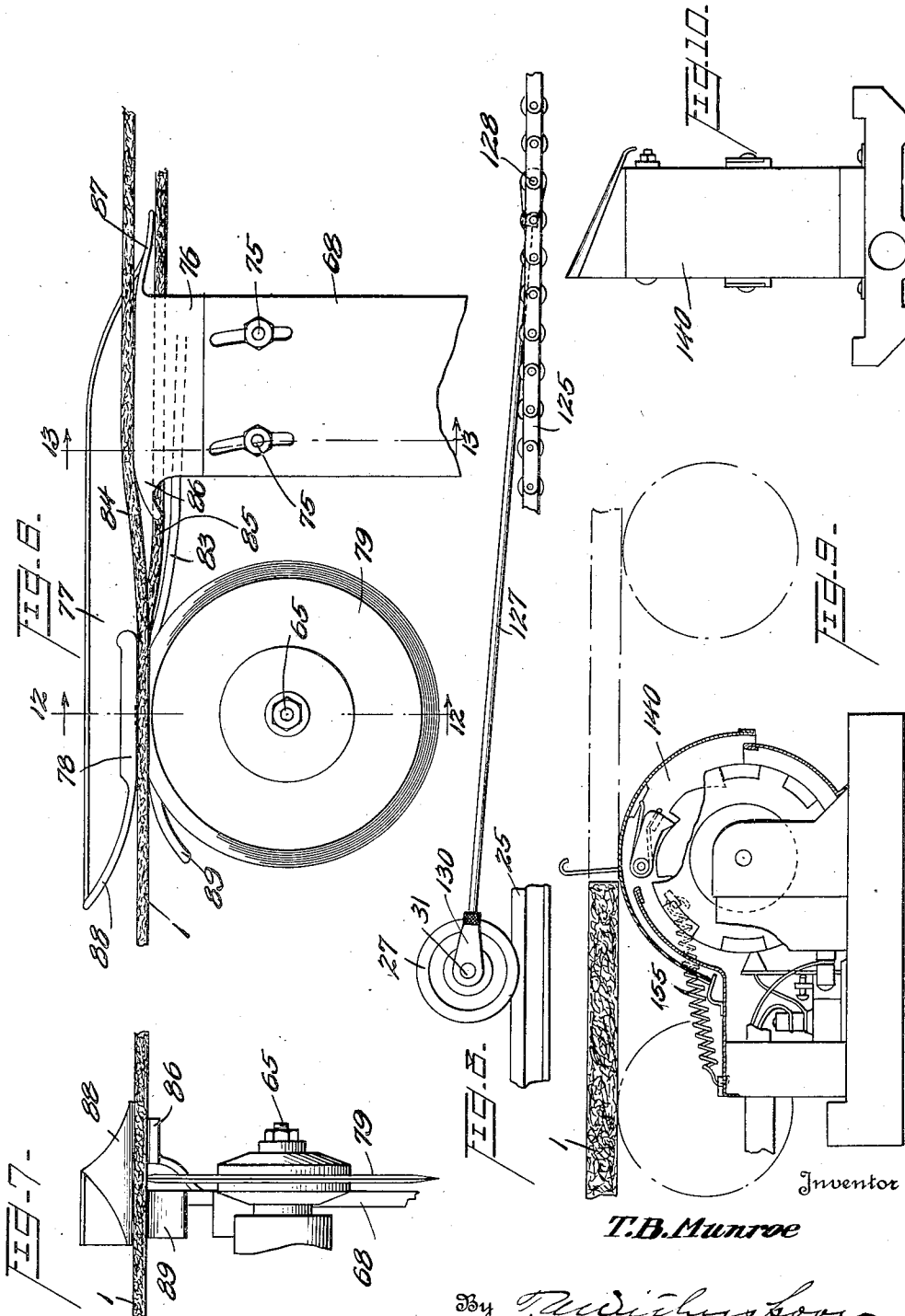
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T. B. MUNROE

MEANS FOR SLITTING SHEET MATERIAL

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5 Sheets-Sheet 4



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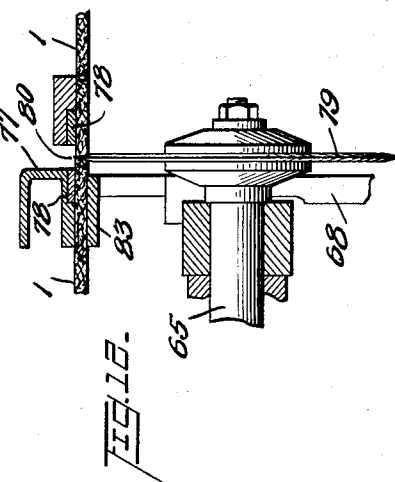
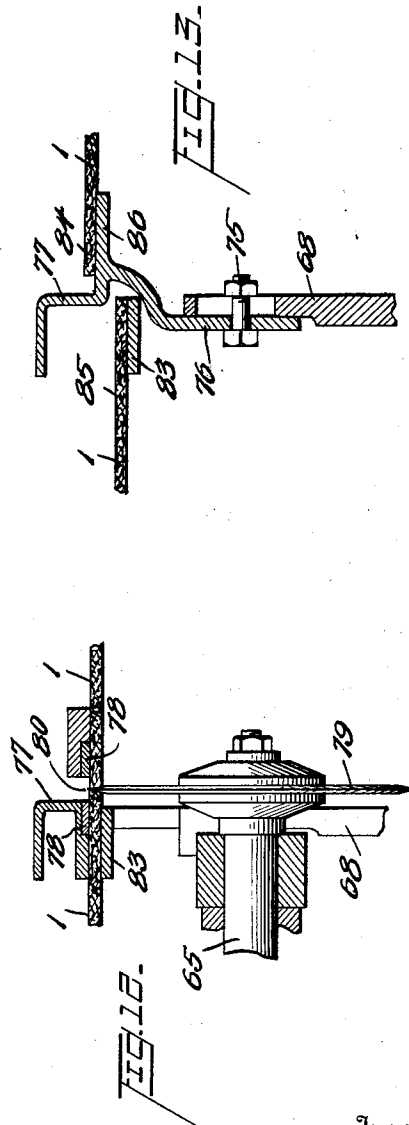
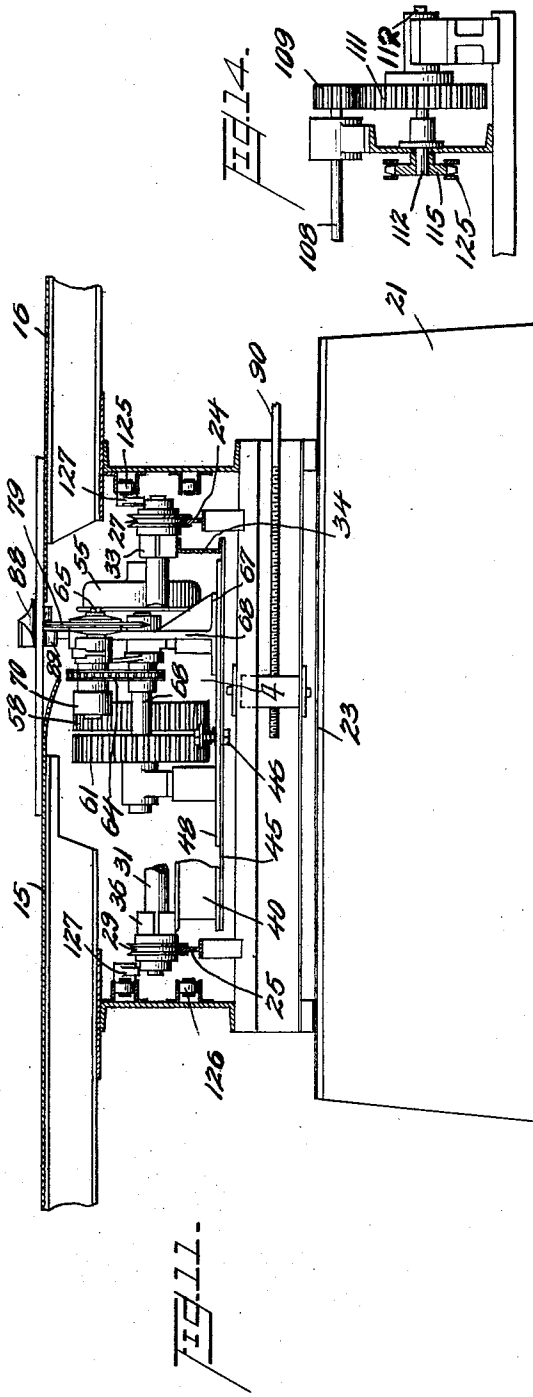
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MEANS FOR SLITTING SHEET MATERIAL

Filed Sept. 4, 1925

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

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MEANS FOR SLITTING SHEET MATERIAL.

Application filed September 4, 1925. Serial No. 54,528.

This invention relates to mechanisms for slitting and cross cutting a continuously moving web of material, and has for its object to improve the procedures which have been heretofore proposed.

With this and other objects in view, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals designate like parts in all the views—

Figure 1 is a diagrammatic plan view partially broken away of a slitting and cross cutting apparatus made in accordance with this invention;

Figure 2 is a plan view of a traversing carriage and trackway adapted to be used in connection with the apparatus shown in Fig. 1;

Figure 3 is a side elevational view of the parts shown in Fig. 2;

Figure 4 is a detail top plan view of the traversing carriage and its associated parts;

Figure 5 is a sectional view taken on the line 5—5 of Fig. 4 looking in the direction of the arrows;

Figure 6 is an enlarged side elevational view of the cutter disk and its associated parts;

Figure 7 is an end elevational view of the parts shown in Fig. 6;

Figure 8 is a detail view illustrating the connection between the traversing carriage and the operating means therefor;

Figure 9 is a detail view partly in section of the target controlling the rotary electric motor for the traversing carriage;

Figure 10 is a side elevational view of the target mechanism shown in Fig. 9;

Figure 11 is a sectional view taken on the line 11—11 of Fig. 3 looking in the direction of the arrows;

Figure 12 is a sectional view taken on the line 12—12 of Fig. 6 and looking in the direction of the arrows;

Figure 13 is a sectional view taken on the line 13—13 of Fig. 6 and looking in the direction of the arrows; and

Figure 14 is a sectional view taken on the line 14—14, Fig. 3, looking in the direction of the arrows.

In order that this invention may be the

better understood it is said:—It is now well known that there is on the market sheets of fibrous material known as "Celotex" which are used as a substitute for lumber, for wall boards, and for many other purposes, and that these sheets are made out of bagasse, or the waste fibers derived from sugar cane stalks. These said bagasse fibers are floated in water to and over a sheet forming machine, whereupon the sheets are formed in widths of some 8, 10 or 12 feet and continuously, so that as the wet sheets are passed through a drier, they may be some 10 or 12 feet wide and say from 600 to 1000 feet long before they are thoroughly dried. Owing to these abnormally large dimensions of the manufactured Celotex sheets, it is necessary to cut them up into suitable lengths, and these lengths or dimensions usually produce boards of about say 4 feet wide and from 6 to 8, 10 to 12 feet long, according to the uses to which they are to be put. As the original finished Celotex sheets are generally about $\frac{1}{2}$ inch in thickness the cut boards are usually say $\frac{1}{2}$ inch in thickness, 4 feet wide, and 8 or 10 feet long.

Therefore, this invention when more specifically stated relates to a machine for continuously cutting the original sheets while they are in motion and coming from the drier into suitable dimensions. Briefly stated, the invention consists in a machine provided with a plurality of knife edged disks which slit the sheet lengthwise as it travels from the drier, all as will appear more fully below. After the original sheet is thus slit into say three strips each 4 feet wide, while it is still in motion, a traversing mechanism also provided with a knife edged cutting disk cuts the slitted strips perpendicular to their line of motion into predetermined lengths, and thus forms the above mentioned boards of say 4 feet wide and from 6 to 10 or 12 feet long.

Referring to the accompanying drawings and more especially to Fig. 1, the traveling sheet as it comes from the drier is indicated at 1, the slitting mechanisms are indicated at 2, the slits in the sheet are indicated at 3, the disk cutter and its associated parts which cuts the slitted sheets crosswise of their path of travel is indicated at 4, while the cuts made by said cutter 4 is indicated at 5, and the cut or formed boards of proper dimen-

sions are indicated at 6. After the boards 6 are thus cut into proper dimensions they are received upon the rollers 7 which are turned by suitable power (not shown) and which deliver said boards 6 onto the sprocket chains or cross conveyor indicated at 8 which chains are provided with the dogs 9 adapted to catch against the edges 10 of the boards 6 and to move the latter in a direction perpendicular to the original line of travel, all as indicated by the arrow 11 in Fig. 1.

At 12 is indicated the traversing mechanism for carrying the cutter 4 across the path of travel of said sheets 1, to sever the slitted boards 6. Said traversing mechanism is pivoted at the point 13 for a purpose which will be more particularly described below. Suffice it, however, at this point to state that beneath the slitted sheet there is disposed a pair of steel supporting plates 15 and 16 separated by a slot or space 17, in which slot 17 operates the cutting mechanism 4 as will be presently described.

Referring now more particularly to Figs. 2 and 4, the track or frame 12 of the traversing mechanism above mentioned and which is pivoted at the point 13, is supported on the concrete block 20 at said point 13 by the pivot pin 22 and by the block 21 and the circular or arcuate member 23 with which the pillar 21 is provided. This said track or frame 12 is provided with two supporting rails 24 and 25. On the rail 24 rests the grooved wheels 26 and 27 and on the rail 25 rests the grooved wheels 28 and 29, while the shaft 30 supports the wheels 26 and 28 and the shaft 31 supports the wheels 27 and 29.

On the ends of the shafts carrying the wheels 26 and 27 are disposed the bearing blocks 32 and 33, respectively, and these bearing blocks support side frames 34. On the ends of the shafts carrying the wheels 28 and 29 are disposed the bearing blocks 35 and 36 and from these bearing blocks are supported the side frame 37. Tying the side frames 34 and 37 together and disposed parallel to the shaft 30 is the end frame member 39, while tying the other ends of the side frames 34 and 37 together is disposed the end frame member 40, as illustrated. At the corner between the members 37 and 39 is disposed the bracing member 41, at the corner connecting the frame 34 and 39 is the bracing member 42, at the corner connecting the frame members 34 and 40 is the bracing member 43, and at the corner connecting the frame members 37 and 40 is the bracing member 44. Disposed underneath the members 34, 37 and 40 and rigidly secured thereto is a flat steel plate 45, as will be clear from Figs. 2, 4 and 11. To this plate 45 is pivoted as at the point 46, the supporting plate 48 of the irregular shape shown in Fig. 4. That is to say, this

plate 48 is provided with the straight sides 49, 51 and 52 and the curved back edge 53, as shown, and supports the cross cutting mechanism. This said plate 48 lies in a horizontal plane as best seen in Figs. 2, 4 and 11, and mounted thereon is the electric motor 55 provided with the shaft 57 on which is mounted the pinion 56 meshing with the gear 58, driving the shaft 59, on which is mounted the pinion 60, meshing with the gear 61, mounted on and driving the shaft 62, all as will be clear from Figs. 4 and 5. Mounted on the shaft 62 is the sprocket wheel 63 over which passes the sprocket chain 64, and mounted on the shaft 65 is another sprocket wheel 66 over which said sprocket chain 64 also passes. See Figs. 4 and 5. Mounted on the plate member 48 is a foot plate 67, see Figs. 4, 5 and 11, and rigid with this foot plate 67 is the upstanding bracing member 68 to which is secured a casting 69, see Fig. 4, provided with the bearings 70 and 71 for said shaft 65. Bolted to the member 68 as at 75 is the member 76 rigidly secured to the shoe 77 provided with the steel anvil blocks 78, all as will be clear from Figs. 4, 5, 12 and 13. Also mounted on the shaft 65 is the disk cutter 79, one edge of which extends up through the slot 80 between the anvil blocks 78 as clearly shown in Figs. 5 and 12. The member 81, Fig. 4, connects the shafts 62 and 65 so as to insure that the sprocket chain 64 and its associated parts will run smoothly.

From what has now been disclosed and referring more particularly to Figs. 5, 12 and 13, it will be observed that the slitted sheet 1 is cross cut by the disk cutter 79, see Fig. 12, as said sheet passes under the anvil blocks 78 and over the supporting member 83. Referring more particularly now to Fig. 6 it will be observed that the cutter 79 after severing the slitted sheet 1 divides it into two parts 84 and 85, which are separated from each other in different horizontal planes. That is to say, the upper part or edge 84 passes up over the member 86 and the other part 85 passes down over the projecting member 83, see Figs. 5, 6, 12 and 13. It will be observed from Figs. 5, 6, and 13 that the bolts 75 secure to the member 68 the member 76, which is provided with the curved supporting member 86 above mentioned, over which the upper portion 84 of the sheet 1 passes. In other words, said member 76 is provided on one side with a curved member 86 to guide upwardly the portion 84 of the sheet and it is provided on its other side with the member 87 to guide downwardly the portion 85 of the slitted sheet 1. The member 77 is provided with the upturned curved portion or toe 88 and the member 83 is provided with the downwardly curved portion or toe 89, the two

members 88 and 89 constituting guides to govern the movement of the sheet 1 to the cross cutting disk 79, see Fig. 6.

From what has now been disclosed and referring back to Fig. 1 it will be clear that if the traversing mechanism 12 is swung on its pivot 13, by any suitable means such as the hand wheel and worm gear 90, the cutting mechanism 4 including the disk cutter 79 which does not show in Fig. 1, may be kept always above the slot 17, as it is made to traverse the path of travel of the sheet 1 and thus may the slitted portion 6 of the sheets 1 be properly cut off into boards of the predetermined dimensions described above. That is to say, the cutting mechanism 4 of Fig. 1 is automatically reciprocated across the path of travel of the slitted sheets after the mechanism 90 has swung the said traversing mechanism 12 on its pivot 13 to the proper angle which will cause the cutting mechanism 4 including the disk 79 to follow the path of the fixed slot 17. This angle to which the traversing mechanism must be set, depends upon the speed of the sheet, and a table of angles for given speeds is empirically made out, whereupon for any given speed the corresponding angle becomes fixed. When this is done, then the cutting mechanism 4 is automatically reciprocated in the fixed slot 17 by the following means.

Referring more particularly to Figs. 2 and 3, 100 indicates a motor provided with a pinion 101 meshing with gear 102 mounted on shaft 103, transmitting power to one member of the magnetic clutch 104, transmitting power to the shaft 105, on which is mounted the gear 106 meshing with the gear 107 rigid with the shaft 108 carrying the gear pinion 109. On the other end of said shaft 108 is also a companion gear pinion 110. The pinion 109 meshes with a gear 111 beneath it, and carried by the short shaft 112, as best shown in Figs. 3 and 14. In like manner, the pinion 110 meshes with the larger gear 113 beneath it and which gear 113 is likewise carried by a short shaft 114 similar to shaft 112 but not shown, except for its end, see Fig. 2. The shaft 112 carries a sprocket wheel 115 and the shaft 114 carries a sprocket wheel 116. As best shown in Figs. 2, 3, 4, 5, and 11, at the opposite end of the tracks 24 and 25 from the end supporting the shaft 108, there is provided two other short shafts 120 and 121. Mounted on the short shaft 120 is a sprocket gear 122 and mounted on the short shaft 121 is the sprocket gear 123. A sprocket chain 125 passes over the sprocket gears 115 and 122 and a sprocket chain 126 passes over the sprocket gears 116 and 123. As will be clear from Figs. 2, 3 and 8 the member 130 is attached to the axle 31 of the traversing mechanism and is provided with a link 127,

and this link is also attached to the sprocket chain 125 as at the point 128 Fig. 8. To the other end of the axle 31 there is a similar mechanism in all respects a duplicate of that shown in Fig. 8, attached thereto and which is given the same reference characters.

It will now be clear that as the sprocket chains 125 and 126 move toward the right, as seen in Figs. 2 and 8, the member 128 on each chain will cause the cutting mechanism to move from one end of the tracks 24 and 25 to the other, or until said members 128 reach the sprocket wheels 115 and 116, respectively. When these members 128 reach said sprocket wheels they will revolve right around said sprocket wheels due to the fact that said sprocket wheels are on the short shafts 112 and 114 located under the shaft 108, and to the fact that there is no continuous shaft in line with the short shafts to obstruct the passage of said members 128. Further, said members 128 are disposed on the inner sides of their respective sprocket chains 125 and 126. It results from this that the upper bight of the sprocket chains 125 and 126 will carry the cross cutting traversing carriage to the right, as just described, until the said sprocket wheels are reached, whereupon the members 128 will revolve around said sprocket wheels and said carriage or cutting mechanism will be then carried back toward the left as seen in Fig. 2. This movement toward the left will continue until the members 128 reach the sprocket wheels 122 and 123, which are likewise mounted on short shafts 120 and 121 and therefore said members 128 will move around said last mentioned sprocket wheels and cause the carriage together with the disk cutter 79 to move again toward the right as seen in Fig. 2. This motion will continue from right to left so long as power is applied by the power shaft 105.

On the other hand, it is obvious that the cross cutting of the disk cutter 79 should cease while moving in one of the above mentioned directions, say for example after returning or moving toward the right as seen in Fig. 2, in order that there should be a length of the slitted sheet disposed beyond said cutter 79 and in order that when it begins its new cutting action the proper length of the slitted sheet will be severed to form the desired boards 6. This is provided for by the following means: The gears are so proportioned that the movement of the cutting mechanism 4, including cutter 79, Fig. 1, will move many times faster than will the sheet. For example, suppose the original sheet is twelve feet across and in order to fix the idea suppose the boards 6 that are severed by cutter 79 from said sheet are 8 feet long, the cutting mechanism 4 must move 12 feet across the sheet in one direction and 12 feet back, making in all 24

feet of travel while the sheet only moves a distance depending upon the angle of the slot 17 and in any case, less than 8 feet, thus making the ratio greater than 3 to 1 in the instance mentioned. Stated in other language, not only must the speed of the cutter 4 shown in Fig. 1 be much greater than the speed of the sheet, but there must be a dwell after the cutter 4 has crossed the sheet 1 in one direction and has returned to its starting point, before a new cross cut is made. In order to get this dwell, the severed boards 6 are made to contact against a target, or circuit breaker 140 which has the effect of cutting off the power from shaft 105 as will be disclosed below. That is, the boards 6 already severed are delivered to the above mentioned feed rollers 7 which travel at a faster rate than the sheet 1 and which therefore move the previously severed boards out of the way of the oncoming unsevered boards so that the latter may strike the target and make the circuit through the magnetic clutch, in order to start the cross cutting means 4 into action.

Stated in other words, the circuit through the clutch 104 is closed both at the switch 140, and at the cut out switch 151. The circuit at the target or switch 140 is momentarily closed and immediately broken when the front edge of the oncoming sheet 1 strikes it, and the circuit at the cut out switch 151 is closed immediately afterwards. That is, the parts are so timed that the severing mechanism 4 completes its cross cutting action and returns to its initial position near the said cut out switch 151, see Fig. 1, just before the severed board leaves the target 140, and this return of said means 4 causes the bumper 150 to contact with the cut out switch and to break one of the circuits through the clutch 104 over the wires 152 and 153 just before the severed board 6 finally leaves the target or switch 140. Said board 6 while in contact with the target 140 holds the latter in a depressed condition against the tension of the spring 155, see Fig. 9, and therefore as said board leaves said target said spring 155 returns the latter to its upright position. The circuit over the wires 141 and 142 through the clutch 104 being already broken, this condition leaves the cutting mechanism 4 including the cutter 79 at its initial position with no power at all on the shaft 105, because all current to the clutch 104 is cut off. Therefore, the above mentioned dwell of the means 4 takes place, and the severing cross cutting mechanism remains stationary until the oncoming slitted sheet 1 reaches said target 140, depresses the same and thus again makes the circuit over the wires 141 and 142 through the clutch 104 and starts the cross cutting mechanism 4 on its journey to sever a new set of boards 6. This last named circuit

is made only momentarily, but long enough for the means 4 and bumper 150 to recede from the switch 151 and close the circuit through the clutch 104 over the wires 152 and 153. This circuit over the wires 152 and 153 now remains closed until the mechanism 4 has completely traversed the sheet 1 and returned to its initial position when the switch 151 is again opened and the cycle of operations repeated.

The motor 55 on the means 4, see Fig. 2, is fed by the flexible cable 156.

It should be pointed out that as the cutter 79 begins its forward motion across the sheet 1, the upwardly curved end 88 of the shoe member 77 rides up over the said sheet and facilitates the cutting action by aiding in holding the sheet in place. On the other hand, when said cutter 79 begins its return travel after completing its cross cutting action, the downwardly curved portion 87 of said shoe member 77 naturally points under said sheet 1 and therefore lifts the latter upwardly to a degree sufficient to enable the whole mechanism to return to its starting point underneath said sheet 1.

The operation of the foregoing mechanism will be clear from what has been said but may be briefly summarized as follows:—

The oncoming sheet 1 is slitted in a plurality of places 3 by the slitting members 2 not claimed herein and the traversing cutting mechanism indicated generally by the numeral 4 and which is disclosed in detail in Figs. 4, 5, 6 and 7, is started from a point near the cut-out switch 151 which is at this time open. The starting of this said traversing mechanism 4 is effected by the forward edge of the sheet 1 striking the target or starting switch 140 which momentarily closes the circuit over the wires 141 and 142 through the magnetic clutch 104, and thus permits power from the motor 100 to turn the power shaft 105 which through the gearing described turns the shaft 108 and the sprocket wheels 115 and 116. These said wheels 115 and 116 turn the sprocket chains 125 and 126 which pass over the sprocket wheels 122 and 123 and these chains are connected by the members 127 and 128 to the traversing carriage carrying the mechanism 4 and reciprocates said traversing carriage across the path of travel of the sheet 1 from its starting point back to its initial position due to the fact that the sprocket wheels above mentioned are mounted on short shafts 112 and 114, disposed underneath the shaft 108 as well as on the short shafts 120 and 121. These short shafts permit the connections 127 and 128 to pass entirely around the sprocket wheels with the sprocket chains, and thus to continuously reciprocate the traversing carriage with the severing mechanism 4 and cutter 79 as long as power is applied to the power shaft 105

through the clutch 104. On the other hand, said clutch 104 is not only controlled by the target or switch 140 through current passing over the wires 141 and 142, but it is also controlled by current passing over the wires 152 and 153, Fig. 2, at the cut-out switch 151, which latter is operated by the buffer 150 carried by said traversing means or carriage 4. It thus happens that after the cutter 79 on the severing mechanism 4 has returned to its initial position, the buffer 150 opens the switch 151 and cuts off current from the clutch 104. The current through the target or switch 140 has been previously cut off due to the fact that the switch 140 is or may be of the well known type which momentarily makes circuit and then immediately opens the same. That is to say, as soon as the traveling forward edge of the sheet 1 strikes said switch 140, circuit is momentarily made and the magnetic clutch 104 is energized, whereupon the circuit is then immediately broken. The target 140 accompanying this switch is held depressed by the sheet as long as it is passing thereover, but as soon as said switch is released from said sheet 1, the spring 155 thereof restores the target to its upright position and it is ready for another depression or action. As this switch forms no part of this invention and as switches of this character are well known, it is not deemed necessary to describe it further herein. Suffice it to say that when the traversing carriage 4 has severed the plurality of boards 6 from the traveling sheet and has returned to its initial position, it is necessary that it dwell for a predetermined time near the switch 151 before starting another cut, in order that the relatively slow moving sheet 1 will have time to pass the said cutter 4 for a sufficient distance to insure that the cutter 4 will sever the right lengths of material. In order to get this dwell, the said severing mechanism 4 through its buffer 150, opens the circuit at the switch 151 upon its return to its starting point, and the circuit through the switch 140 being already open, said severing means 4 of necessity dwells or ceases its motion until a circuit is again made through said clutch 104. In other words, the dwell of the cutting mechanism 4, continues until the oncoming edge of the sheet 1 again strikes the target 140 and momentarily closes the circuit through the clutch 104 and thus starts the said severing mechanism 4 again on its traversing cutting action. Although the circuit is made through the switch 140, and almost immediately broken, yet said circuit is closed for a time sufficient for the cutting means 4 to be started on its motion across the sheet and therefore the switch 151 is automatically closed and remains closed until the means 4 has made its complete reciprocation

and returned back to its normal position, whereupon the cycle of operations is repeated.

The breaking of the circuit through the switch 151 also, of course, breaks the circuit through the flexible cable 156 and therefore stops the motor 55 and the rotation of the cutter 79.

It is apparent that the said cutter 79 should be so adjusted as to travel along the center of the slot 17, and in order to effect this there is provided the screw 165, Figs. 2 and 4, pivotally mounted at one end on the bracket 166 rigid with the plate 48 and rotatably mounted at its other end in the boss 167 rigid with the carriage member 42. A hand operated nut 168 serves to adjust the whole plate 48 including the cutter 79 around the pivot point 46 as a center and to thus enable the operator to keep the line of travel of said cutter in the center of the slot 17. In order to get the severed board 6 out of the way of the oncoming boards to be severed the rollers 7 as above stated are driven at a faster speed by means not shown than is the speed of the sheet 1 and said severed boards are delivered to the sprocket chains 8 as illustrated in Fig. 1 which chains pull them away from the path of travel of the oncoming boards. It is found in practice that a cutting disk such as 79 provided with a knife edge and continually sharpened by means not shown is peculiarly adapted for cutting bagasse sheets, and especially when it is revolved at a relatively low speed, but this invention is not limited to such cutting means as other forms of cutters may be substituted therefor.

It is obvious that those skilled in the art may vary the arrangement of parts as well as the material operated upon and also the individual elements of the mechanism, without departing from the spirit of the invention and therefore it is not desired to be limited to the foregoing disclosure except as may be required by the claims.

What is claimed is:—

1. In an apparatus for cutting a traveling sheet of material the combination of means for propelling a cutter transversely of the line of travel of said sheet and at an angle thereto proportional to the relative speeds of said cutter and sheet; automatic means to cause said cutter to return to its starting point after its severing operation is completed; and automatic means to cause said cutter after returning to dwell at said starting point for a predetermined time before starting a new cut.

2. In an apparatus for cutting a traveling sheet of material the combination of means for propelling a cutter transversely of the line of travel of said sheet and at an angle thereto proportional to the relative speeds of said cutter and sheet; means for

changing said angle when said speeds change; automatic means to cause said cutter to return to its starting point after its severing operation is completed; and automatic means to cause said cutter after returning to dwell at said starting point for a predetermined time before starting a new cut.

3. In an apparatus for cutting a traveling sheet of material the combination of means for propelling a cutter transversely of the line of travel of said sheet and at an angle thereto proportional to the relative speeds of said cutter and sheet; pivoted means for changing said angle when said speeds change; automatic means to cause said cutter to return to its starting point after its severing operation is completed; and automatic means comprising a cut out switch to cause said cutter after returning to dwell at said starting point for a predetermined time before starting a new cut.

4. In an apparatus for cutting a slitted traveling sheet of material into predetermined lengths the combination of a cutting means; a motor and connections for moving said cutting means across the path of travel of said sheet and back to its starting point; means provided with a slot in which a portion of said cutting means travels; and a circuit making and breaking switch adapted to be operated by said traveling sheet adapted to control the movements of said cutting means.

5. In an apparatus for cutting a slitted traveling sheet of material into predetermined lengths the combination of a cutting means; a motor and connections for moving said cutting means across the path of travel of said sheet and back to its starting point; means provided with a slot in which a portion of said cutting means travels; a circuit making and breaking switch adapted to be operated by said traveling sheet adapted to control the movements of said cutting means; and a cutout switch adapted to be operated by said cutting means for also controlling the movements of said cutting means.

6. In an apparatus for cutting a slitted traveling sheet of material into predetermined lengths, the combination of a cutting means; an electric motor and connections for reciprocating said cutting means across the path of travel of said sheet; means provided with a slot in which a portion of said cutting means travels; means for adjusting said slot at an angle to the line of travel of said sheet proportional to the relative speeds of said sheet and cutting means; and circuit making and circuit breaking switches controlling said motor adapted to cause a dwell of said cutting means for a predetermined interval after each complete reciprocation thereof.

7. In an apparatus for cutting a slitted traveling sheet of material into predetermined lengths, the combination of a rotating cutting means; a carriage on which said cutting means is carried; a track over which said carriage moves; an electric motor and connections for reciprocating said cutting means and carriage over said track and across the path of travel of said sheet; means provided with a slot in which a portion of said cutting means travels; means for adjusting said slot at an angle to the line of travel of said sheet proportional to the relative speeds of said sheet and cutting means; and circuit making and circuit breaking switches controlling said motor adapted to cause a dwell of said cutting means for a predetermined interval after each complete reciprocation thereof.

8. In an apparatus for cutting a slitted traveling sheet of material into predetermined lengths, the combination of a cutting means; an electric motor and connections comprising a magnetic clutch for reciprocating said cutting means across the path of travel of said sheet; adjustable pivoted means provided with a slot in which a portion of said cutting means travels; means for adjusting said slot at an angle to the line of travel of said sheet proportional to the relative speeds of said sheet and cutting means; an electric motor for rotating said cutting means and circuit making and circuit breaking switches controlling both said motors and adapted to cause a dwell of said cutting means for a predetermined interval after each complete reciprocation thereof.

9. In an apparatus for cutting a traveling sheet of material into a predetermined length the combination of a traversing means provided with a shoe curved upwardly at one end and curved downwardly at its other end; a cutter carried by said traversing means; an electric motor and connections comprising an electrically controlled clutch for moving said traversing means and cutter across the path of travel of said sheet and back to its starting point; a pivoted adjustable means provided with a slot in which a portion of said cutter travels; and circuit making and breaking switches adapted to be controlled respectively by said traveling sheet and by said traversing means to effect the starting and stopping of said last named means and said cutter and to cause said traversing means to dwell for a predetermined interval of time before each cutting action.

10. In an apparatus for cutting a traveling sheet of material into a predetermined length the combination of a traversing means provided with a shoe curved upwardly at one end and curved downwardly at its other end; a cutter carried by said

traversing means; an electric motor and connections comprising an electrically controlled clutch for moving said traversing means and cutter across the path of travel of said sheet and back to its starting point; an electric motor for operating said cutting means; a pivoted adjustable means provided with a slot in which a portion of said cutter travels; and circuit making and breaking switches adapted to be controlled respectively by said traveling sheet and by said traversing means to effect the starting and stopping of said last named means and said cutter and to cause said traversing means to dwell for a predetermined interval of time before each cutting action.

11. In an apparatus for cutting a traveling sheet of material into a predetermined length the combination of a traversing means provided with a shoe curved upwardly at one end and curved downwardly at its other end; a cutter carried by said traversing means; a track on which said traversing means travels; an electric motor and connections comprising an electrically controlled clutch for moving said traversing means on said track and cutter across the path of travel of said sheet and back to its starting point; a pivoted adjustable means provided with a slot in which a portion of said cutter travels; means for adjusting said slot to an angle to the path of travel of said sheet proportional to the relative speeds of said sheet and traversing means; means to so adjust said cutter as to cause the latter to move in a path approximating the center of said slot; and circuit making and breaking switches adapted to be controlled respectively by said traveling sheet and by said traversing means to effect the starting and stopping of said last named means and said cutter and to cause said traversing means to dwell for a predetermined interval of time before each cutting action.

12. In an apparatus for cutting a traveling sheet into predetermined lengths the combination of a cutting means comprising a carriage carrying a cutter; a pivoted member on which said cutter is supported; means comprising a motor for reciprocating said carriage and cutter across the path of travel of said sheet and back to its starting point; a pivoted means provided with a slot in which a portion of said cutter travels and adapted to be placed at an angle to the path of travel of said sheet proportional to the relative speeds of said carriage and sheet; a second electric motor for rotating said cutter; an electric switch adapted to start the movement of said carriage controlled by said traveling sheet; and an automatic cut-out switch adapted to be operated by said carriage to stop the motion of the latter and said cutter.

13. In an apparatus for cutting a traveling sheet into predetermined lengths the combination of a cutting means comprising a carriage carrying a cutter; a pivoted member on which said cutter is supported; means comprising a motor and a magnetic clutch for reciprocating said carriage and cutter across the path of travel of said sheet and back to its starting point; a pivoted means provided with a slot in which a portion of said cutter travels and adapted to be placed at an angle to the path of travel of said sheet proportional to the relative speeds of said carriage and sheet; a second electric motor for rotating said cutter; an electric switch adapted to start the movement of said carriage controlled by said traveling sheet; an automatic cut-out switch adapted to be operated by said carriage to stop the motion of the latter and said cutter; an electric motor and connections for rotating said cutter mounted on said carriage. means for so adjusting said pivoted member as to cause said cutter to travel in the central vertical plane of said slot; and a circuit for said motor controlled by said cut-out switch.

14. In an apparatus for cutting a traveling sheet into a predetermined length the combination of a cutter; means constituting a support for said cutter; means to move said cutter and support across the line of travel of said sheet and back to its starting point; means providing a slot along which said cutter travels; means to adjust the angle said slot makes with the line of travel of said sheet; means to adjust the plane of said cutter with respect to the axis of said slot; and means to cause a dwell of said cutter and support after reaching said starting point.

15. In an apparatus for cutting a traveling sheet into a predetermined length the combination of a cutter; means constituting a support for said cutter; pivoted means for supporting said cutter and first named means; automatic means to move said cutter and support across the line of travel of said sheet and back to its starting point; means providing a slot along which said cutter travels; means to adjust the angle said slot makes with the line of travel of said sheet; means to adjust the plane of said cutter with respect to the axis of said slot. and automatic means comprising a circuit controlling switch to cause a dwell of said cutter and support after reaching said starting point.

16. In an apparatus for cutting a traveling sheet into a predetermined length the combination of a rotating cutter; an electric motor for rotating said cutter; means constituting a support for said cutter; means comprising a second motor and connections to move said cutter and support across the

line of travel of said sheet and back to its starting point; means providing a slot along which said cutter travels; means to adjust the angle said slot makes with the line of travel of said sheet; means to adjust the plane of said cutter with respect to the axis of said slot; and means comprising a pair of switches controlled by said sheet and first named means to cause a dwell of said cutter and support after reaching said starting point. 10

In testimony whereof I affix my signature.

TREADWAY B. MUNROE.