Feb. 18, 1930. L. S. ROSENER 1,747,182

MACHINE FOR CUTTING FORMS

Filed March 24, 1923 5 Sheets-Sheet 1

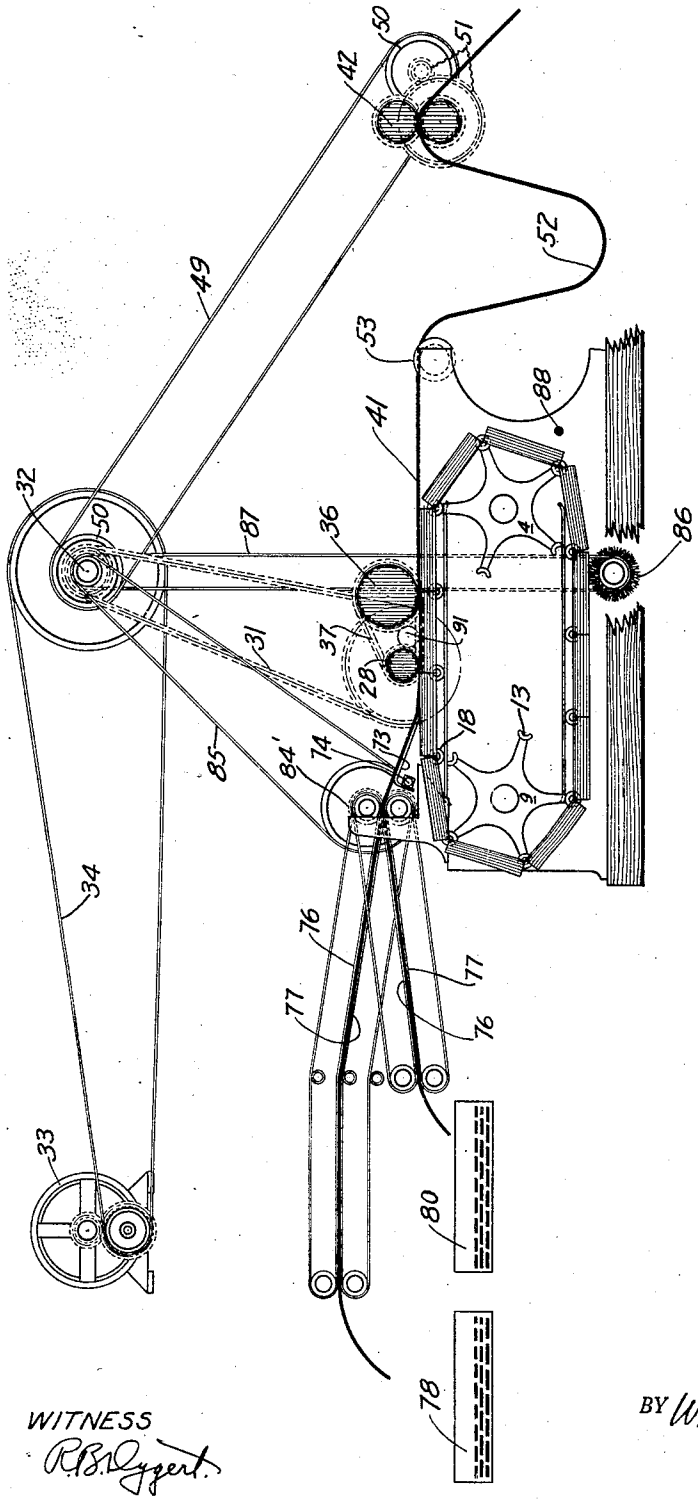


Fig 1

WITNESS
R. B. Ogert.

INVENTOR.
LELAND S. ROSENER
BY White Post Evans
ATTORNEYS.

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MACHINE FOR CUTTING FORMS

Filed March 24, 1923 5 Sheets-Sheet 2

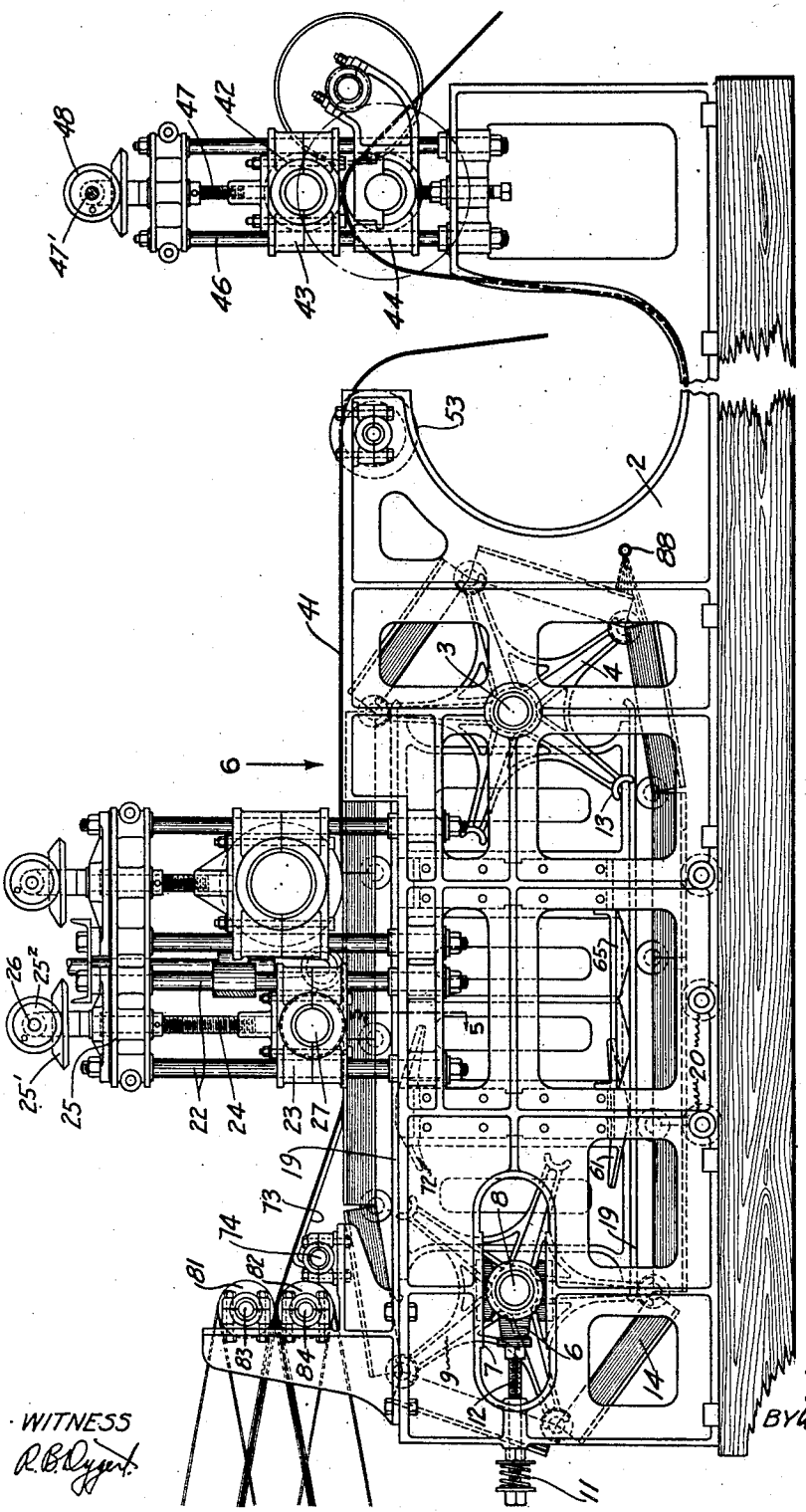


Fig 2

INVENTOR.
LELAND S. ROSENER
BY White Prout & Evans
ATTORNEYS.

WITNESS
R. B. Wyatt

Feb. 18, 1930. L. S. ROSENER 1,747,182

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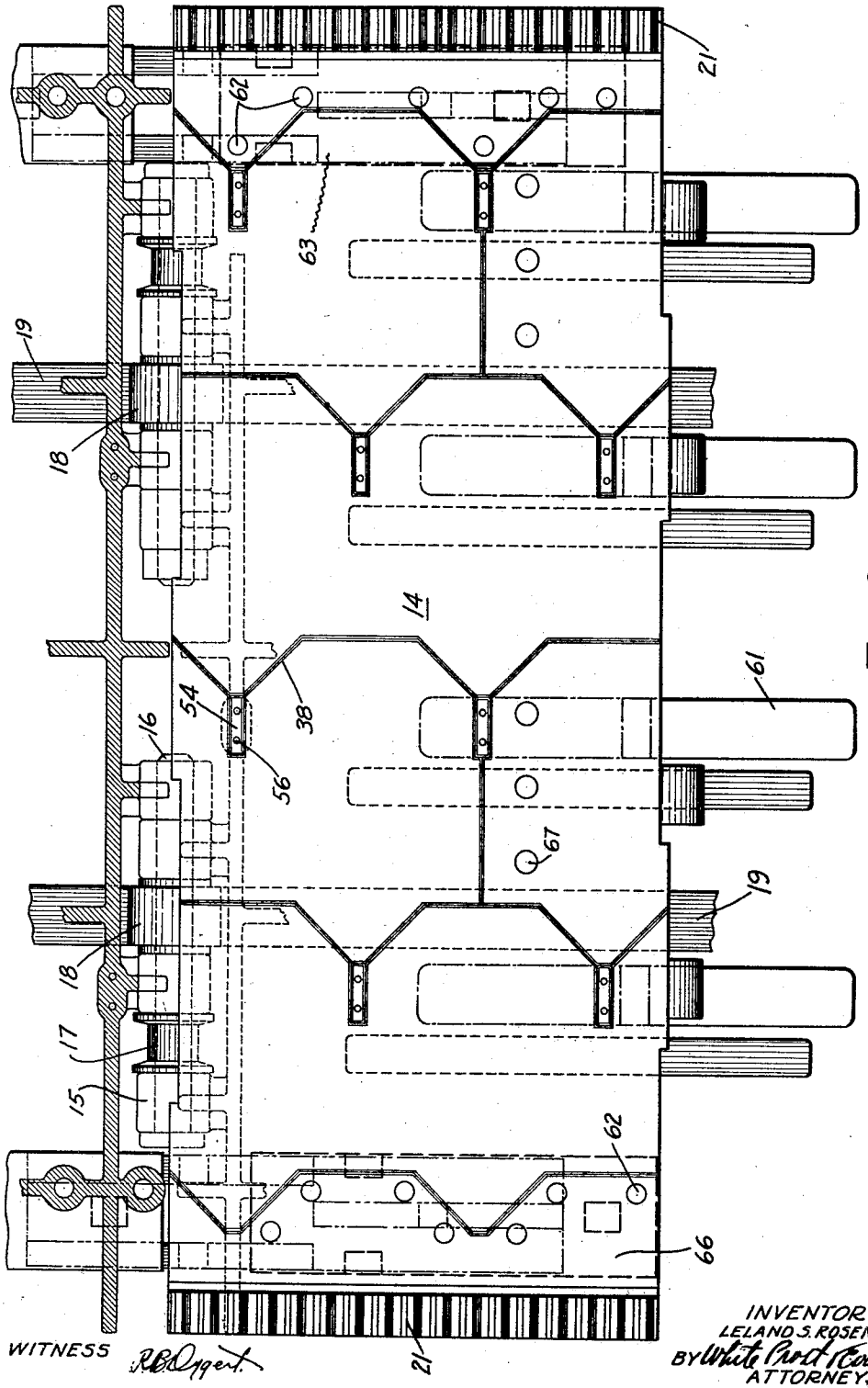


Fig 3

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MACHINE FOR CUTTING FORMS

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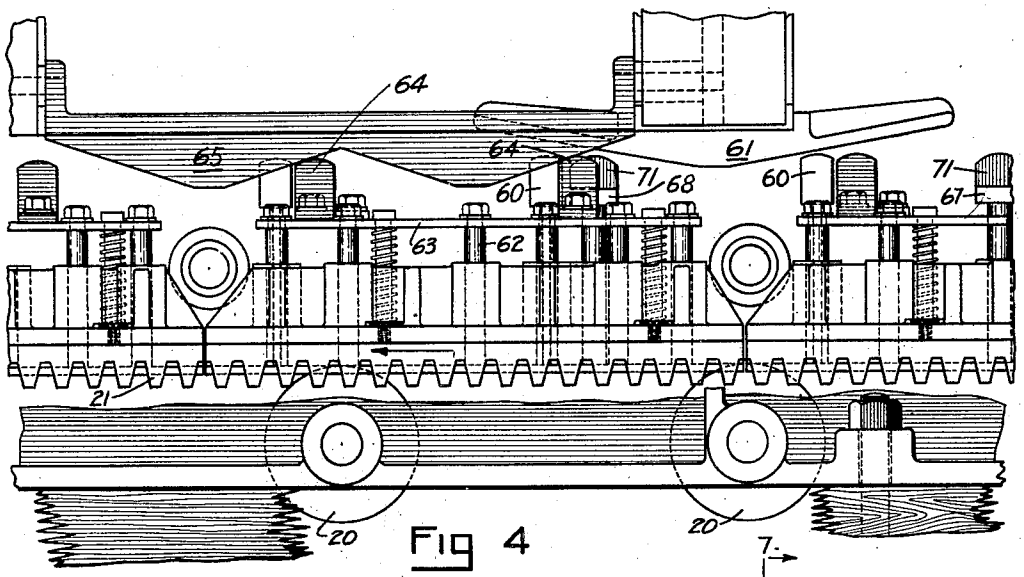


Fig 4

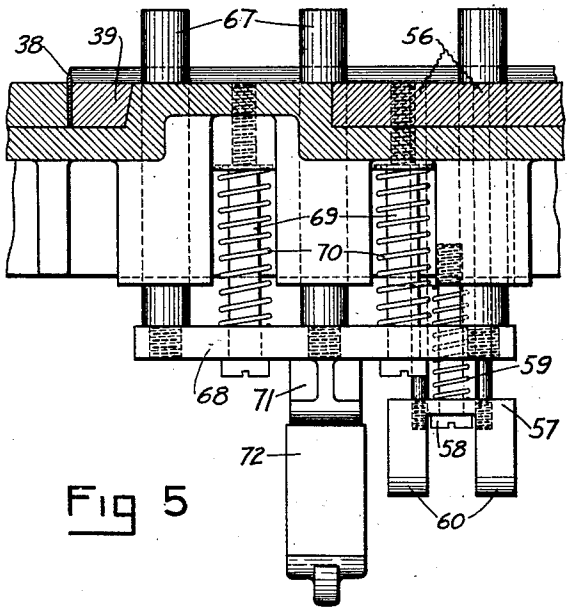


Fig 5

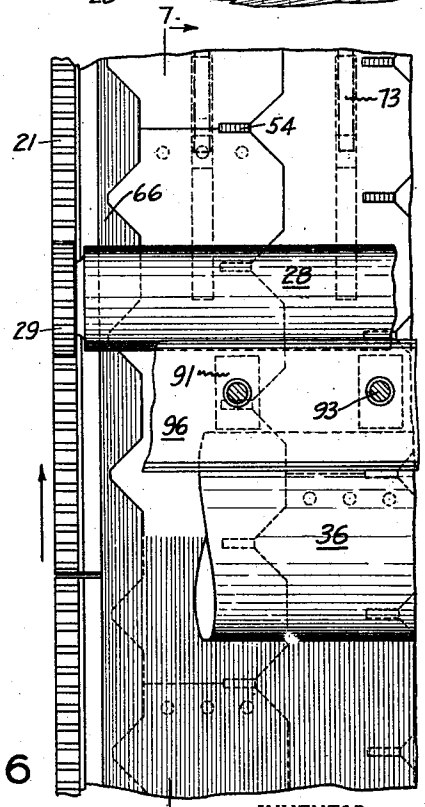


Fig 6

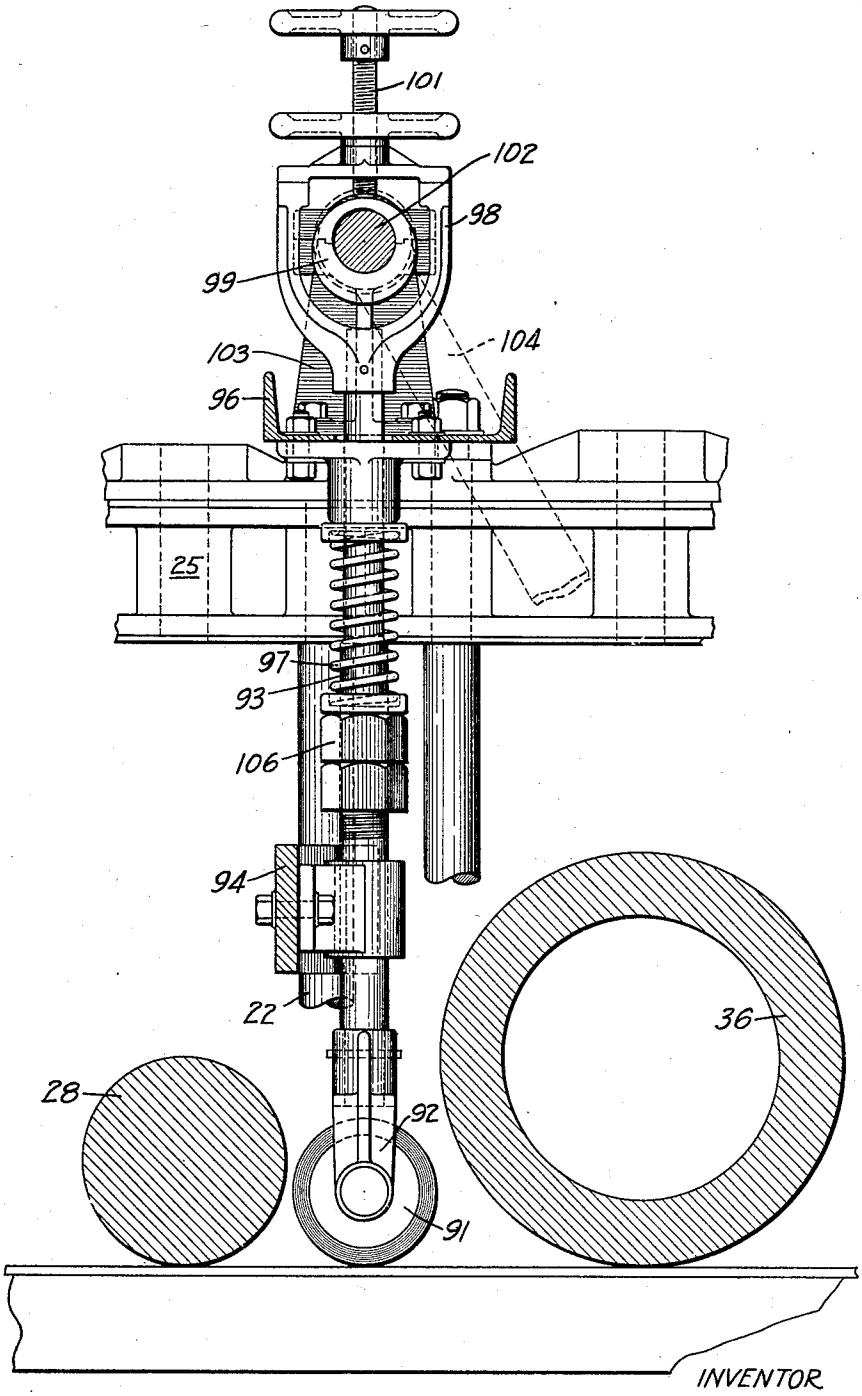
INVENTOR.
LELAND S. ROSENER
BY White Prout & Evans
ATTORNEYS.

WITNESS
R. B. Dyer

Feb. 18, 1930. L. S. ROSENER 1,747,182

MACHINE FOR CUTTING FORMS

Filed March 24, 1923 5 Sheets-Sheet 5



WITNESS
R. B. Ogden

Fig 7

INVENTOR
LELAND S. ROSENER
BY White Prout & Evans
ATTORNEYS

Patented Feb. 18, 1930 1,747,182

UNITED STATES PATENT OFFICE

LELAND S. ROSENER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE PARAFFINE COMPANIES, INC., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF DELAWARE

MACHINE FOR CUTTING FORMS

Application filed March 24, 1923. Serial No. 627,496.

The invention relates to means for cutting, from sheets or a web, blanks or forms and particularly to machines for cutting shingles from a continuous web of roofing material.

One of the objects of the invention is the provision of a machine adapted to receive a continuous web of prepared roofing and capable of cutting the web into desired forms which are then delivered from the machine. Another object of the invention is the provision of a machine of the character described embodying improved cutting means capable of functioning continuously at high speed or at the speed of delivery of the web of roofing from the roofing machine where it is desirable to operate the two together.

Another object of the invention is the provision of improvd ejector means for releasing the product forms and the waste forms from the dies. Another object of the invention is the provision of an improved means for mounting the dies so that a continuous operation without reciprocation of the dies is accomplished.

The invention possess other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to the showing made by the said description as I may adopt variant forms of the invention within the scope of the claims.

Referring to the drawings: Fig. 1 is a side elevation of the complete machine, shown largely in diagram. Fig. 2 is a side elevation of the main portion of the machine, a part being broken away to shorten the figure. Fig. 3 is a plan view of the platen chain and certain adjacent parts, the direction of the view being indicated by the arrow 3, Fig. 2. Fig. 4 is a side elevation of the lower reach of the platen chain, the direction of the view being opposite to that of Fig. 2. Fig. 5 is a vertical sectional view showing the ejector mechanism the plane of section being indicated by the line 5—5 of Fig. 2. Fig. 6 is a plan view of a portion of the platen chain and pressure rollers, the direction of the view being indicated by the arrow 6, of Fig. 2. Fig. 7 is an elevation and vertical section, the plane of section being indicated by the line 7—7 of Fig. 6, the pressure rolls being shown in one of the relative positions which they may assume.

In terms of broad inclusion the invention comprises a series of platens pivotally connected to form an endless belt or chain and suitably mounted on sprockets, together with means for feeding a web, from which the product forms are to be cut, upon the platens. Suitable cutting dies are arranegd on each platen and the platen chain is driven under pressure rollers which forces the web down against the cutting dies. Means are provided for maintaining planar alinement of the active platens adjacent the pressure roller and ejector mechanism is provided, part of which is operative to clear the waste forms from the dies on the lower reach of the platen chain, and part of which is operative to raise the leading end of the product forms over a stripper bar, which then guides the product forms to a conveyor mechanism which removes the product forms from the machine as fast as they are formed and deposits them in a suitable receptacle. Means are also provided for driving the platen chain from one of the pressure rollers which receives power from any suitable source, also for brushing the die elements, and for spraying them with a cooling and lubricating stream on each turn of the platen chain.

In detail, the invention comprises a pair of parallel frames 2 provided with fixed bearings for the shaft 3 upon which the sprocket wheel 4 is mounted. Spaced from the shaft 3 and near the end of the frame are adjustable bearing blocks 6 slidably mounted in the frame on guide-ways 7, and in which the shaft 8 supporting the sprocket wheel 9 is journaled. On each side a spring 11 is interposed between the frame and a stud 12 secured to the bearing blocks, so that in the operation of the machine a certain amount of motion of the bearing blocks against the resistance of the springs 11 is possible. Each of the sprocket wheels comprises a twin series of arms fixed to the supporting shaft and terminating in a half bearing 13, in which complementary elements on the platen chain are

adapted to seat. Forming an endless chain about the sprockets are the platens 14, each formed with suitable lugs 15 which in adjacent platens are pivotally connected by a pivot pin 16. As shown in Fig. 3, there are preferably two sets of these lugs and two pivot pins connecting each two platens. Rotatably mounted on the pivot pin near each side of the platen chain and between the lugs are two rollers, one, a grooved roller 17 adapted to seat in the bearing ends 13 of the sprocket arms, and the other a straight faced roller 18, adapted to run on the horizontal rail 19. These rails underlie the upper reach and overlie the lower reach of the platen chain on each side, and together with the rollers 20, which are journaled in the lower portion of the frame to support the platens in the lower reach of the chain, they maintain the planar alinement of the platens in both reaches.

As shown in Fig. 3, each of the platens is provided on the opposite outer edges with rack teeth 21 and these teeth in successive platens form a continuous rack when the platens are in planar alinement.

Mounted in suitable bearings in the upper portion of the frame on each side are guide rods 22, on which bearing blocks 23 are slidable. A stud 24 threaded in each bearing, and journaled in a head 25, fixed on the top of the slide, provides means for the vertical adjustment of the bearing blocks 23. Both studs 24 are turned together by a shaft 26 connected thereto by gears 25^1 and controlled by a hand wheel 25^2. Mounted in the bearing blocks is a shaft 27, carrying the primary pressure roll 28, and also carrying gears 29, Fig. 6, adapted to mesh with the rack teeth 21. The shaft 27 is driven by a chain 31, Fig. 1, from a power shaft 32, turned by any suitable prime mover such as the motor 33, thru connections including the belt 34. Thus it will be seen that rotation of the shaft 27 drives the platen chain. A secondary pressure roller 36, preferably larger than the roller 28 is similarly mounted above the platen chain and may be driven from the shaft 27 by means of a chain 37, or it may be allowed to float or idle.

Disposed on each platen are the cutting knives or die elements 38 so arranged as to give the desired configuration to the forms which are to be cut. Fig. 3 shows the arrangement of the dies or cutting knives suitable for cutting a stripped shingle from roofing felt. These knives comprise thin blades of steel sharpened at one edge and held on the platen by wedge blocks 39, suitably formed and proportioned and secured to the platen by means of screws or other suitable devices. The exposed cutting edges of all of the knives on a single platen lie in a plane and the proportion of parts is such that the primary pressure roll 28 is supported so nearly in contact with the cutting edges that the web 41 of material which is to be cut up is forced upon the knives to completely sever the desired forms without actually cutting into the pressure roll. The secondary pressure roll 36, under which the web first passes, may be adjusted vertically a trifle further away from the knives to effect a partial severance of the web as shown in Figure 2, the amount varying with the material being cut. Since the drive chain 37 from the primary roll is nearly horizontal, such vertical adjustment is well within that permitted by the slack of the chain.

It is desired to feed the roofing felt directly from the roofing machine to the shingle cutting machine, and means are therefore provided for taking the felt as it is delivered from the roofing machine and feeding it to the shingle cutting machine. Such means comprise a pair of pull rolls 42 geared together and mounted in the bearing blocks 43 and 44 arranged on the slides 46 on each side of the machine. The upper bearing blocks 43 are vertically adjustable together by means of threaded studs 47, geared to a shaft 47^1 controlled by the hand wheel 48 so that the pressure between the pull rolls may be regulated. The pull rolls are driven at the desired speed by a belt 49 from the shaft 32 and running over cone or taper pulleys 50 in the usual way so that close regulation of the speed of the pull rolls may be secured. The lower pulley 50 is operatively connected to the lower pull roll by suitable gear connections 51. In order to provide for minor fluctuations in the feeding of the web, eliminate wrinkles therein, and permit the web to pass evenly and without danger of tearing over the guide roll 53, a loop 52 is left between the pull rolls and the flanged guide roll 53, which centers the web and directs it upon the platen chain.

Means are provided for ejecting from the dies the waste forms, and for lifting the leading end of the product forms into engagement with a stripper mechanism which effects the complete detachment of the product forms from the dies as the platen chain advances.

Slidably arranged in each platen at suitable points under the area 54 occupied by the waste forms which are removed from the shingles, are two ejector pins 56 connected on the under side of the platen by the plate 57. A screw 58 secures the plate to the platen, and a spring 59 resiliently retains the plate and attached ejector pins in their inactive position, while permitting the plate and ejector pins to be thrust downwardly in the lower reach of the chain to release the waste forms from the knives, when the shoes 60 on the plate 57 engage the cams 61, fixed on the frame of the machine. In the same way the ejector pins 62, fixed to the plate 63, Fig. 4, are operated by the shoes 64, engaging the cams 65. On account of the length of the

plate 63, two cams and shoes are used to evenly depress the plate. The last named ejector pins release the waste edge strip on one side of the platen, occupying the area 66, Fig. 3, and similar ejector pins similarly operated, are arranged on the opposite side of the platen to insure the disengagement of the waste strip on that side.

Slidably arranged in the platen in a position to engage the under side of the leading edge of the shingles are ejector pins 67 preferably arranged in groups of three and secured to a plate 68 on the under side of the platen. Screws 69 retain the plate and connected pins in the platen and springs 70 resiliently hold the ejector pins in their retracted position. Plate 68 is provided with a shoe 71, which engages a cam 72, arranged on the frame of the machine below the upper reach of the platen chain. The position of the cam and the action of the pins are such that the leading edge of the shingle is detached from the knives and raised so as to pass above a stripper bar 73, a number of which, depending on the number of strips being cut from the web, are fixed to a shaft 74 fixedly held on the upper portion of the frame work of the machine. With the forward movement of the platen chain the shingle rides up on the stripper bar out of the die and is caught between the adjacent belts 76 and 77 which carry them away from the machine. In the machine shown four strips are being cut simultaneously from the width of the web and there are therefore four stripper bars and four conveyors receiving the cut shingles. Two of these extend upwardly and deliver shingles into a suitable receptacle 78. The alternate ones extend downwardly and deliver their shingles to a receptacle 80 between the machine and the receptacle 78. The purpose of this angular separation of the strips of shingles is to effect their complete disunion. Although severed by the knives on the platen, some slight connection may be left, and furthermore the severed edges may tend to stick together due to the nature of the material impregnating the base material of the web. The pieces are forcibly separated by taking them off at different angles.

The belts 76 and 77 of each of the conveyors run over pulleys 81 and 82 respectively fixed on the shafts 83 and 84 respectively journaled in the frame of the machine and connected by suitable gears 84^1 for rotation at the same speed. One of the shafts is driven by suitable belt connection 85 with the driving shaft 32 as shown in Fig. 1.

Means are provided for brushing the knives of the die in order to remove any adhering pieces or material, and for cooling and lubricating the die knives with each revolution of the platen chain, so as to minimize sticking of the knives and web. A brush 86 of cylindrical type is rotatably mounted below the lower reach of the platen chain in such position that the dies are engaged by the bristles of the brush. The brush is driven by a belt 87 from the shaft 32. A suitable spray pipe 88 is also disposed across the end of the machine adjacent the sprocket wheel 4, and water under suitable pressure is sprayed from this pipe upon the knives as they turn upwardly to again engage the web. The water not only serves as a cooling agent for the knives which become heated in use but also provides lubrication, and facilitates the cutting of the web without objectionable sticking.

It is found that a localized pressure is usually desirable immediately above the areas 54, Fig. 3, in order to insure cutting thru the web at these points. This is secured in the present case by means of four small fiber faced pressure rolls 91, each of which is journaled in the yoke end 92 of a bar 93, non-rotatably but slidably mounted in suitable upper and lower bearings supported at intervals across the machine on the cross bars 94 and 96. A spring 97 interposed between the bar and the upper bearing presses the bar downwardly. The upper end of the bar is formed with an eye 98 enclosing an eccentric disk 99, and an adjusting screw 101, threaded thru the head of the eye, provides means for adjusting the relative positions of the bar and eccentric and determining the lowest point to which the spring 97 can press the roller.

The four eccentrics for the four bars are fixed on a shaft 102 journaled in bearings 103 carried on the cross bar 96, and rotation of the shaft by the handle 104 operates all the eccentrices together, to lift the pressure rollers 91 free of contact with the web or to seat them on the web. Adjustment of the tension of the spring 97 by the nuts 106 determines the resistance to lifting of the rollers 91 and adjustment of the screw 101 determines the lowest point to which the roller can be pressed in engagement with the web.

Preferably the pressure rollers 91 are disposed between the two large pressure rollers and by their localized action severance of the web by the dies over which they roll is insured.

I claim:

1. In a machine for cuting forms from a web, a series of platens comprising the links of an endless chain, a cutting die on each platen, a roller for pressing the web against the dies, means for driving the chain past the roller, means for feeding the web upon the dies, means for stripping the product forms from the dies, and means for detaching the waste forms from the dies.

2. In a machine for cutting forms from a web, a series of platens comprising the links of an endless chain, a cuting die on each platen, a roller for pressing the web against

the dies, means for driving the chain past the roller, means for feeding the web upon the dies, means for raising the leading end of the product forms from the dies, and a stripper bar along which the product forms travel away from the dies.

3. In a machine for cutting forms from a web, a series of platens comprising the links of an endless chain, a cutting die on each platen, rack teeth on the edge of each platen, a gear in mesh with said teeth, means for rotating the gear, and means for pressing the web against the dies.

4. In a machine for cutting forms from a web, a series of platens comprising the links of an endless chain, a cutting die on each platen, racks arranged on opposite outer edges of each platen, a shaft transverse to the line of movement of said platens, gears on said shaft in mesh with the racks, a roller for pressing the web against the dies, and means for rotating said shaft.

5. In a machine for cutting forms from a web, a series of platens comprising the links of an endless chain, a cutting die on each platen, racks arranged on opposite outer edges of each platen, a shaft transverse to the line of movement of said platens, gears on said shaft in mesh with the racks, a roller on said shaft for pressing the web against the dies, and means for rotating said shaft.

6. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, cutting blades arranged on said platens in the pattern of the form to be cut, and wedge blocks releasably secured to said platens for securing said blades in place.

7. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, means for pressing the web against the dies, ejector pins slidably mounted in said platens, and cams for operating said ejector pins to release the product forms and the waste forms from said dies.

8. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journaled roller arranged on one side of the chain to press the web against the dies, means for adjusting said roller relative to said dies, means for maintaining planar alinement of the active platens during the cutting of said forms, and means mounted for rotation with said roller for driving said platens therepast.

9. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journaled roller arranged on one side of the chain to press the web against the dies, means for adjusting said roller relative to said dies, means for maintaining planar alinement of the active platens during the cutting of said forms, rack teeth on each platen, a gear mounted with said roller and in mesh with said rack teeth and means for driving said roller.

10. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journaled primary roller for pressing the web against the dies, a rotatably journaled secondary roller for pressing the web against the dies, means for maintaining planar alinement of the active platens during the cutting of said forms, rack teeth on each platen, a gear mounted with said secondary roller and in mesh with said teeth, means for driving said secondary roller and means for driving said primary roller from said secondary roller.

11. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journalled roller arranged on one side of the chain to press the web against the dies, a conveyor mechanism for receiving the product forms, a stripper bar for guiding the product forms in to said conveyor mechanism, ejector means for raising the leading ends of the product forms from the dies over the end of the stripper bar, and means for driving the chain of platens past said roller.

12. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journaled roller arranged on one side of the chain to press the web against the dies, a conveyor mechanism for receiving the product forms, a stripper bar for guiding the product forms into said conveyor mechanism, ejector means for raising the leading ends of the product forms from the dies over the end of the stripper bar, ejector means for releasing the waste forms from the dies, cams adjacent one reach of the platen chain for operating the first named ejectors, cams adjacent the other reach of the platen chain for operating the last named ejectors, and means for driving said platen chain past said roller.

13. In a machine for cutting forms from a web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, racks arranged on opposite outer edges of each platen, a shaft transverse to the line of movement of said platens, gears on said shaft in mesh with the racks, rollers journaled on the axis of each pivotal connection of the platens, rails on which said rollers are adapted to run for maintaining said platens in planar alinement during the cutting of the forms, a roller for pressing the web against the dies and arranged for rotation with said shaft, and means for rotating said shaft.

14. In a machine for cutting forms from a

web, a series of platens pivotally connected to form an endless chain, a cutting die on each platen, a rotatably journaled roller arranged on one side of the chain to press the web against the dies, a conveyor mechanism for receiving the product forms, a stripper bar for guiding the product forms into said conveyor mechanism, ejector means for raising the leading ends of the product forms from the dies over the end of the stripper bar, cams adjacent the platen chain for operating said ejector means, and means for driving the chain of platens past said roller.

In testimony whereof, I have hereunto set my hand.

LELAND S. ROSENER.