June 5, 1923. 1,457,663

S. M. FORD

SHINGLE MAKING MACHINE

Filed Nov. 19, 1919 4 Sheets-Sheet 1

FIG. 1

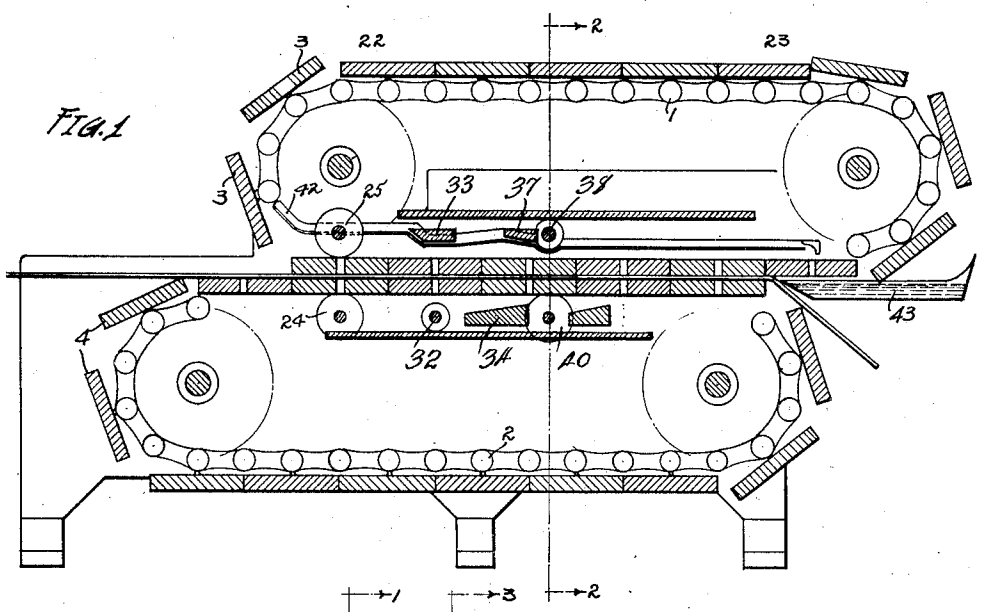
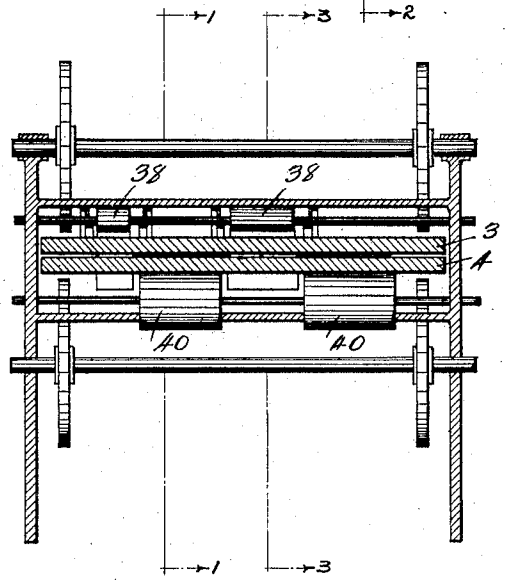


FIG. 2



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June 5, 1923. 1,457,663

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SHINGLE MAKING MACHINE

Filed Nov. 19, 1919 4 Sheets-Sheet 2

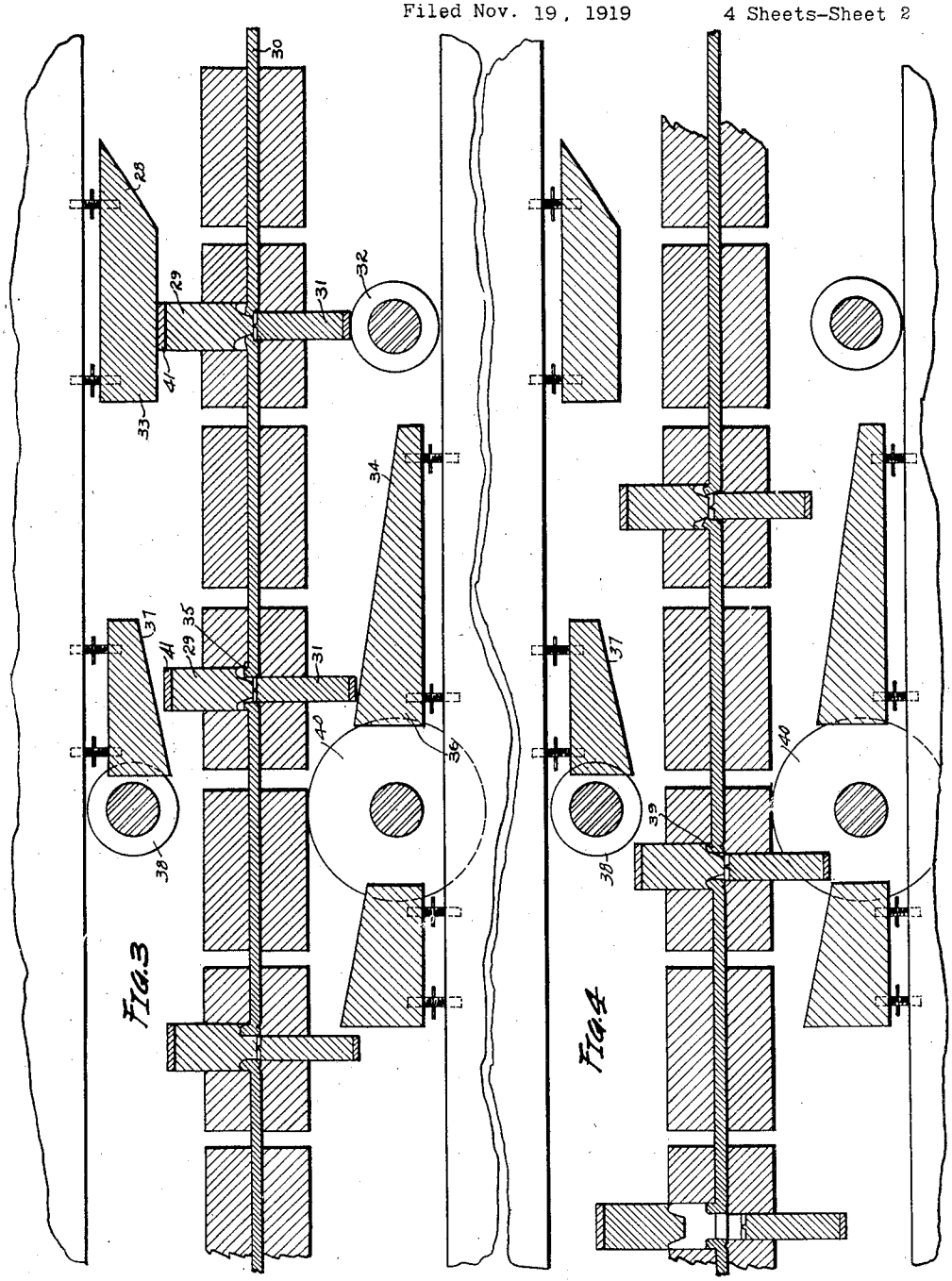


FIG. 3

FIG. 4

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SHINGLE MAKING MACHINE

Filed Nov. 19, 1919 4 Sheets-Sheet 3

FIG. 5

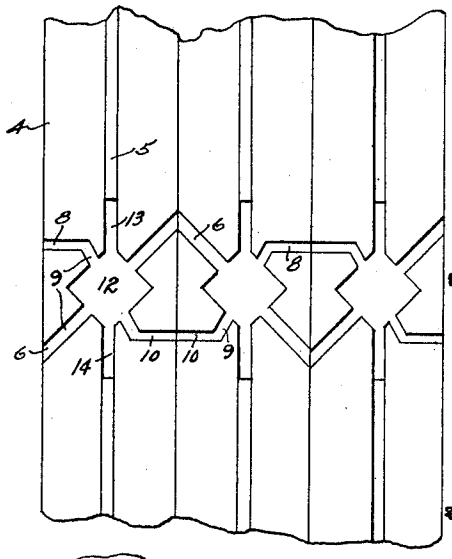


FIG. 10

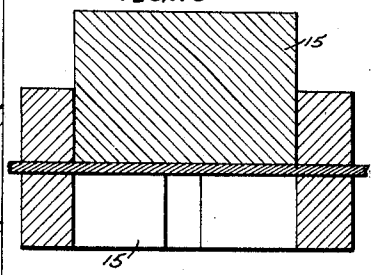


FIG. 11

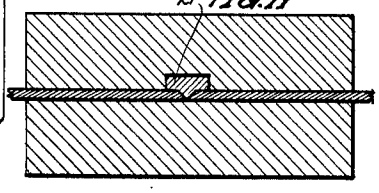


FIG. 6

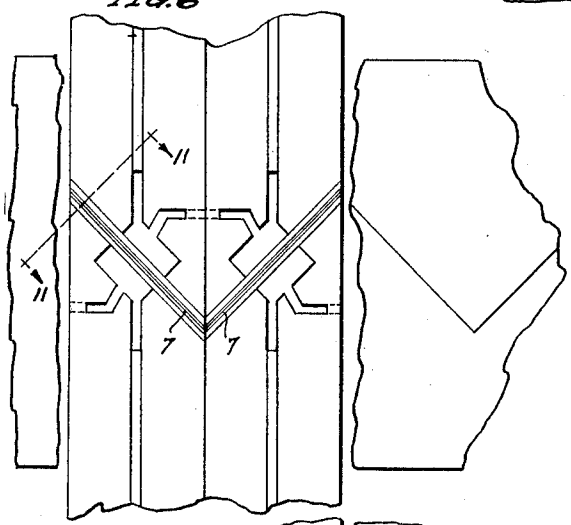


FIG. 8

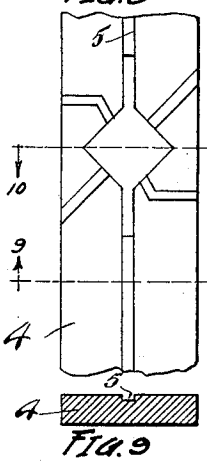


FIG. 9

FIG. 12

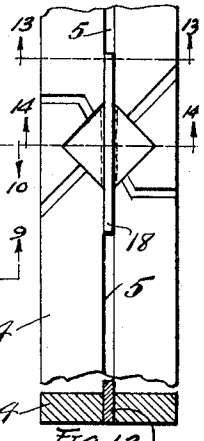


FIG. 13

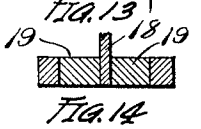


FIG. 14

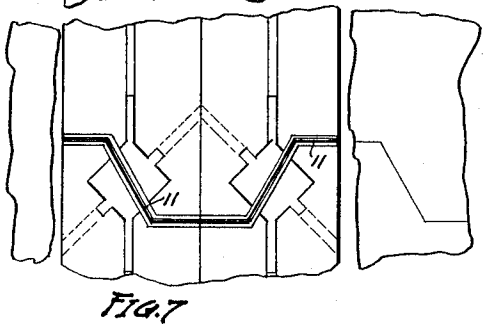


FIG. 7

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June 5, 1923. 1,457,663

S. M. FORD

SHINGLE MAKING MACHINE

Filed Nov. 19, 1919 4 Sheets-Sheet 4

FIG. 16

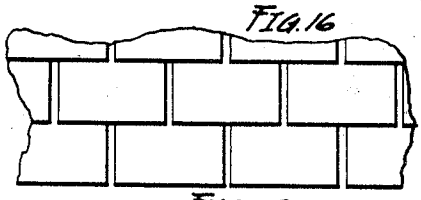


FIG. 18

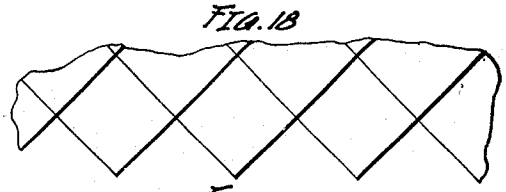


FIG. 15

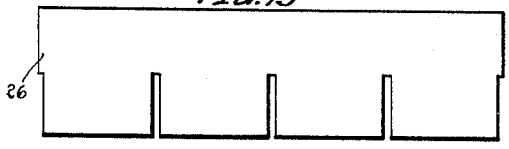


FIG. 17

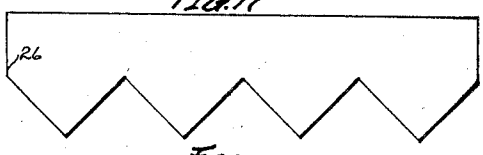


FIG. 20

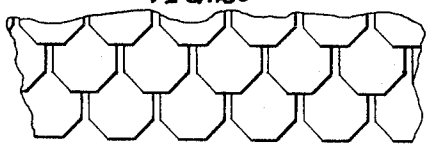


FIG. 22

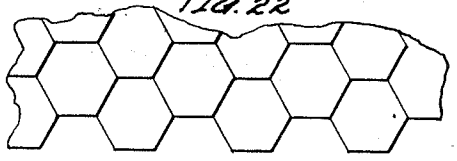


FIG. 19

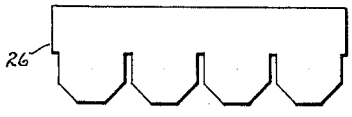


FIG. 21

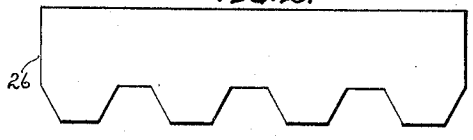


FIG. 23

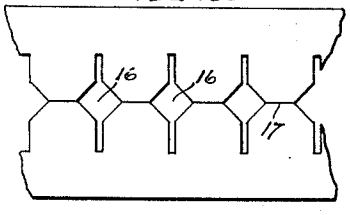


FIG. 24

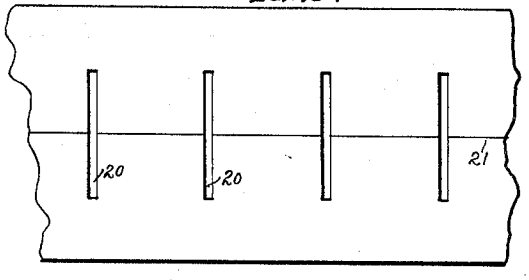


FIG. 25

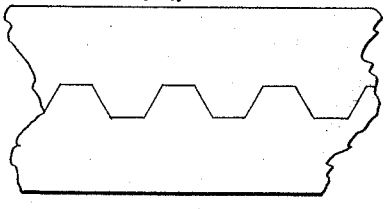
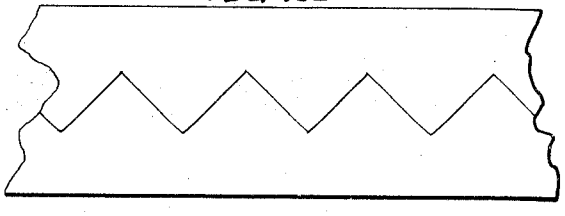


FIG. 26



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Patented June 5, 1923. 1,457,663

UNITED STATES PATENT OFFICE.

SILAS M. FORD, OF ST. PAUL, MINNESOTA.

SHINGLE-MAKING MACHINE.

Application filed November 19, 1919. Serial No. 339,175.

To all whom it may concern:

Be it known that I, SILAS M. FORD, a citizen of the United States, and a resident of St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in a Shingle-Making Machine, of which the following is a specification.

One object of my invention is to provide in a shingle making machine improved means for lubricating the cutting knives.

Another object is to provide in a machine of the class described an improved form of tool or die holder so that various tools or dies may be used in the machine to produce various types of shingles or shingle strips.

Another object is to provide improved means for holding the tools from spreading during the cutting or forming operations.

With these and incidental objects in view, the invention consists of certain novel features of construction and combination of parts, the essential elements of which are hereinafter described with reference to the drawings which accompany and form a part of this specification.

In the drawing, Figure 1 is a section taken on the line 1—1, Figure 2; Figure 2 is a section taken on the line 2—2, Figure 1 with the chains and part of the bars removed; Figures 3 and 4 are partial sectional details on the line 3—3, Figure 2, showing the cam operation of the machine; Figure 5 is a fragmentary view of some of the transverse bars of the machine showing slots and apertures for receiving dies and knives; Figure 6 is a similar view showing one type of knife inserted in the bars; Figure 7 is a similar view showing a second type of knife inserted in the bars; Figure 8 is a similar view showing one type of punch carried by one of the bars; Figure 9 is a section taken on the line 9—9, Figure 8; Figure 10 is a section taken on the line 10—10, Figure 8; Figure 11 is a section taken on the line 11—11, Figure 6; Figure 12 is a plan view of one of the bars of a second type of die; Figure 13 is a section taken on the line 13—13, Figure 12; Figure 14 is a section taken on the line 14—14, Figure 12; Figure 15 is a plan view of a shingle strip made by the dies shown in Figure 12; Figure 16 is a fragmentary plan view of a roof laid with the shingles of this type; Figure 17 is a plan view of a shingle strip made by the knife shown in Figure 6; Figure 18 is a fragmentary plan view of a roof laid with shingles of this type; Figure 19 is a plan view of a shingle strip made from dies shown in Figure 8; Figure 20 is a fragmentary plan view of a roof laid with shingle strips of this style; Figure 21 is a plan view of a shingle strip made from the knives shown in Figure 7; Figure 22 is a fragmentary plan view of a roof laid with shingle strips of this type; Figure 23 is a plan view of a strip showing how two shingle strips of the type shown in Figure 19 are formed with one punching operation; Figure 24 is a similar view of a strip from which the shingle strips of the type shown in Figure 15 are made; Figure 25 is a similar view showing the strip from which the shingle strips shown in Figure 21 are obtained; and Figure 26 is a similar view of a strip showing the manner in which the shingle strip shown in Figure 17 is cut out.

The machine shown and described herein is something of the general type of that shown in my co-pending application Serial Number 329,874, filed October 10, 1919, but important improvements are incorporated herein and only the novel features and improvements will be claimed.

The chains 1 and 2, Figure 1, carry transverse bars 3 and 4, respectively, which I prefer to make wider than of the type shown in my co-pending application aforesaid, so each one of the bars carries a tool.

In my present machine I have so designed these bars and the cams for actuating them that with a single set of bars, I can, by changing the tools in the bars, make shingle strips of various styles, including several types wherein the edges of the formed shingles are cut by knives and in such fashion that two adjacent shingle strips will nest, one with the other, and can also form several styles of shingle strips wherein the tabs are formed by punching material from the sheet instead of merely cutting the material.

Looking at the bars 4, as shown in Figure 5, it will be seen that each of the bars has a longitudinal groove 5 therein in which may be inserted a cutting off knife to cut the sheet of material at the end of each successive shingle strip.

In the bar 4 is also a diagonal groove 6 which in the succeeding bar is positioned in

a diagonally opposite direction. These grooves are to carry knives such as 7, Figure 6, and to cut a strip of material as shown in Figure 26, so as to form two shingle strips of the style shown in Figure 17, which, when superimposed shingle fashion upon a roof, presents the appearance of the style shown in Figure 18.

The bar 4 also has connecting grooves 8, 9, and 10, which are reversed in the succeeding bar and which carry knives 11, Figure 7, so formed as to cut a strip of material of the style shown in Figure 25, forming thereby two shingle strips of the style shown in Figure 21, which when placed shingle fashion upon a roof present the appearance shown in Figure 22.

The bars have a squared aperture 12 with extensions 13 and 14 therefrom adapted to carry a punch 15, Figure 10 slidable therein, co-operating with the similar aperture of the bar 3, above, forming a punch and die, such that portions will be blanked out at 16, Figure 23, and a sheet of material so punched will, when slit along the line 17, form two shingle strips of the style shown in Figure 19, which, when superimposed upon a roof shingle fashion present the appearance shown in Figure 20.

The punch 18, Figures 12 to 14, inclusive, may also be slidably mounted in the slots 13 and 14, and the spaces 19 in the co-operating bar 3 filled up as shown on the dotted line, so a punch and die will be formed that will punch material as shown at 20, Figure 24, in such a fashion that when material so punched is slit along the line 21 two shingle strips of the style shown in Figure 15 will be formed, which, when superimposed upon a roof, present the appearance shown in Figure 16.

Although the cutting operations performed by the knives described may be accomplished any place between vertical planes passing through the points 22 and 23, Figure 1, I prefer to perform this cutting operation at the point 22, as indicated in Figure 1.

Inasmuch as the knives cut from below through the material up to and substantially against the co-operating bar 3 above, means must be provided for creating a considerable pressure at this point, and in such a manner that the knives will always penetrate the material to be cut.

For this purpose I prefer to use rollers 24 and 25, Figure 1, between which the bars are squeezed during the cutting operation, it being understood that the apertures in the upper bars provided as female members of the dies are plugged in the bars during the cutting operation.

The severing of the strips along the ends 26, Figures 15, 17, 19, and 21, is accomplished by a knife inserted in the groove 5 and extending the length of one or more of the bars and all of the cutting knives have a cross-section as shown at 27, Figure 11.

The machine can be used not only in punching out the material to form the shingle strips such as shown in Figures 14 and 19, but may also be used to form shingle strips of the kind shown in my Patent #1,207,523, issued December 5, 1916, and entitled Shingles with side gutter walls.

When used to form shingles of this type certain camming operations are required and these are illustrated in Figures 3 and 4 in which the material is supposed to be moving from right to left, the two figures being similar except that the dies are differently positioned in the two figures to more clearly show the cam operations.

In this style of operations the cam 28 moves the punch 29 down in contact with the material 30 and the cutting and scoring knife 31 is cammed upwardly by the roller 32.

When the punch 29 is freed from the end 33 of the cam 28 the knife 31 is lifted upwardly by the cam 34, forming the material as at 35, Figure 3, and carrying the punch 29 upwardly with it. As the knife 31 is freed from the end 36 of the cam 34, the punch 29 is brought downwardly against the material by the cam 37 and rides onto the roller 38, which gives it a heavy downward pressure to form the material as shown at 39, Figure 4, and the roller 40 is provided to support the lower transverse bar during this heavy squeezing operation, thus completing the style of shingles shown in my patent aforesaid.

The rollers 24 and 25 are the ones provided to support the pressure when the cutting off knives cut the shingle strips at their ends, and also when knives are used instead of dies to form the shingle strips heretofore described.

The dies are all provided with plates 41 forming ears at the ends of the dies to take control of the dies at the point 42, Figure 1, so the dies may be lowered into the pan 43, containing lubricating and cleaning compound, as heretofore described in my patent application aforesaid.

While I have described my invention and illustrated it in one particular design, I do not wish it understood that I limit myself to this construction, as it is evident that the application of the invention may be varied in many ways within the scope of the following claims:

Claims:

1. In a shingle making machine the combination with a plurality of travelling bars, of means for causing said bars to travel through a predetermined distance in a given plane, means for causing said bars to travel with a circular motion, a punch slidable in

one of said bars, a cam co-acting with said punch and taking control of said punch while its bar is travelling in a circular motion, said punch co-operating with said cam throughout the motion of said bar in said pre-determined plane.

2. In a shingle making machine the combination of a sprocket chain, a pair of sprocket wheels associated with said sprocket chain, a plurality of transverse bars carried by said chain, a punch slidably mounted in one of said bars, a receptacle for containing cleaning and lubricating compound associated with said sprocket chain, and a cam associated with said sprocket chain and said bars to receive said punch while it is travelling around one of said sprocket wheels and to lower said punch into compound carried in said receptacle, near the end of the travel of said punch between said sprocket wheels.

3. In a shingle making machine the combination of a plurality of travelling, transverse bars, a portion of said bars having slots in the face thereof to receive cutting knives, a second series of travelling, transverse bars co-operating with said first named bars to serve as pressure supports for knives carried by said first named bars, and rollers associated with said bars and positioned to maintain pressure between said bars when shingle material is passing therebetween and cut by said knives.

4. In a shingle making machine, including a plurality of transverse bars, the combination with a supporting, co-operating bar, of a tool bar having a longitudinal slot in the face thereof, a diagonally positioned slot across the face thereof so that a knife may be positioned in either of said slots.

5. In a shingle making machine, including a plurality of transverse bars, the combination with a co-operating pressure bar, of a tool carrying bar having an aperture therein for mounting a slidable punch, a groove across the face thereof and crossing said aperture so a punch may be mounted in said bar, or a knife may be mounted in said groove whereby shingle material may be punched from a sheet or may be cut by a knife carried in said groove.

6. A tool carrying bar for a shingle making machine having a flat face and having one slot longitudinally thereof, a second slot diagonally thereof and crossing said first named slot, and an aperture therein which is crossed by both of said slots so said bar may carry either a diagonally positioned knife, a longitudinally positioned knife, or a slidable punch.

7. In a shingle making machine the combination with a plurality of pressure bars, a second set of pressure bars co-operating with said first named bars, means for moving said two sets of bars with straight line motion, a die carried by one of said bars, a cam associated with said bars and adapted to actuate said die, a roller positioned near said cam and also adapted to further actuate said die.

8. In a shingle making machine the combination with two sets of co-operating pressure bars, of means for causing said bars to move in a straight line during a portion of their travel, a cutting knife carried by a bar of one set, and a pair of pressure rollers oppositely disposed and adapted to hold said bars in pre-determined relation with each other as they pass therebetween.

SILAS M. FORD.