Aug. 4, 1925. 1,548,107

E. T. STREET

SHINGLE STRIP MACHINE

Filed March 17, 1921 2 Sheets-Sheet 1

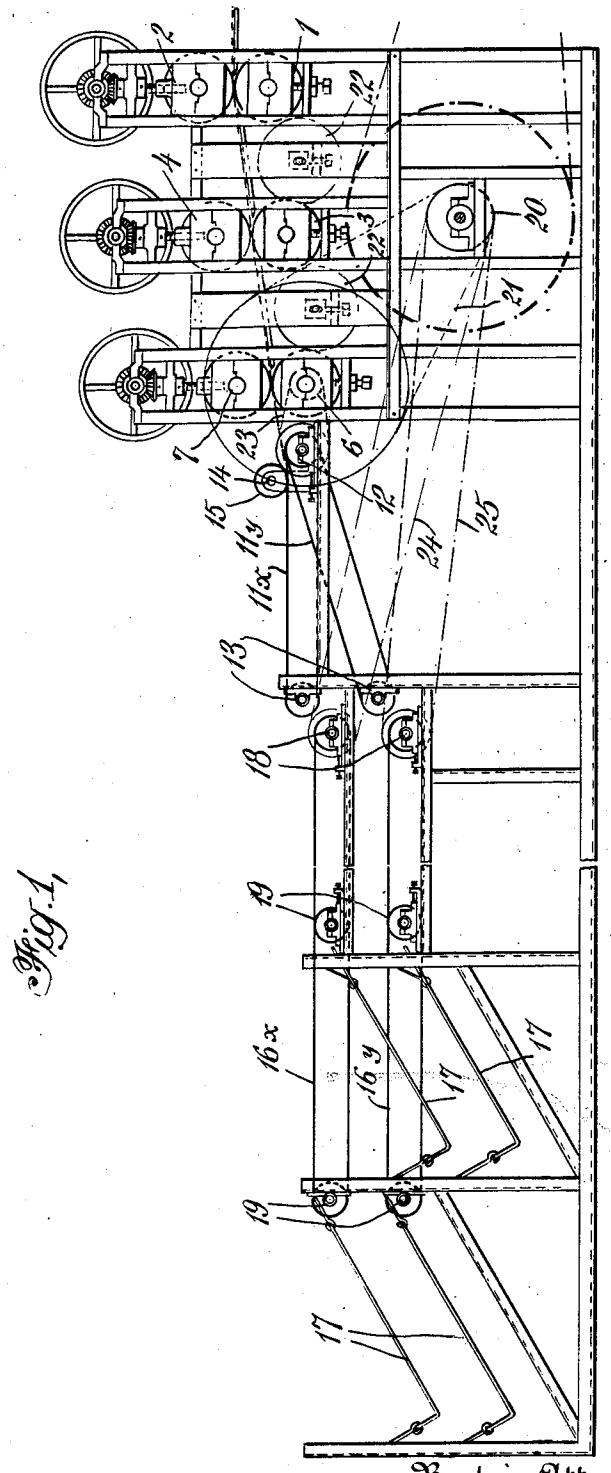


Fig. 1.

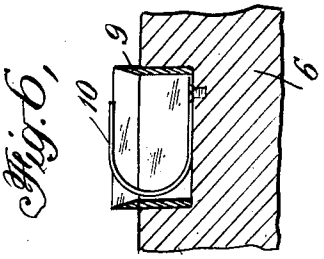


Fig. 6.

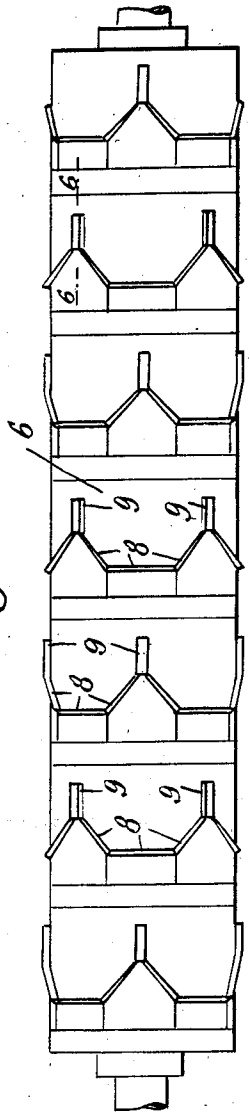


Fig. 5.

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SHINGLE STRIP MACHINE

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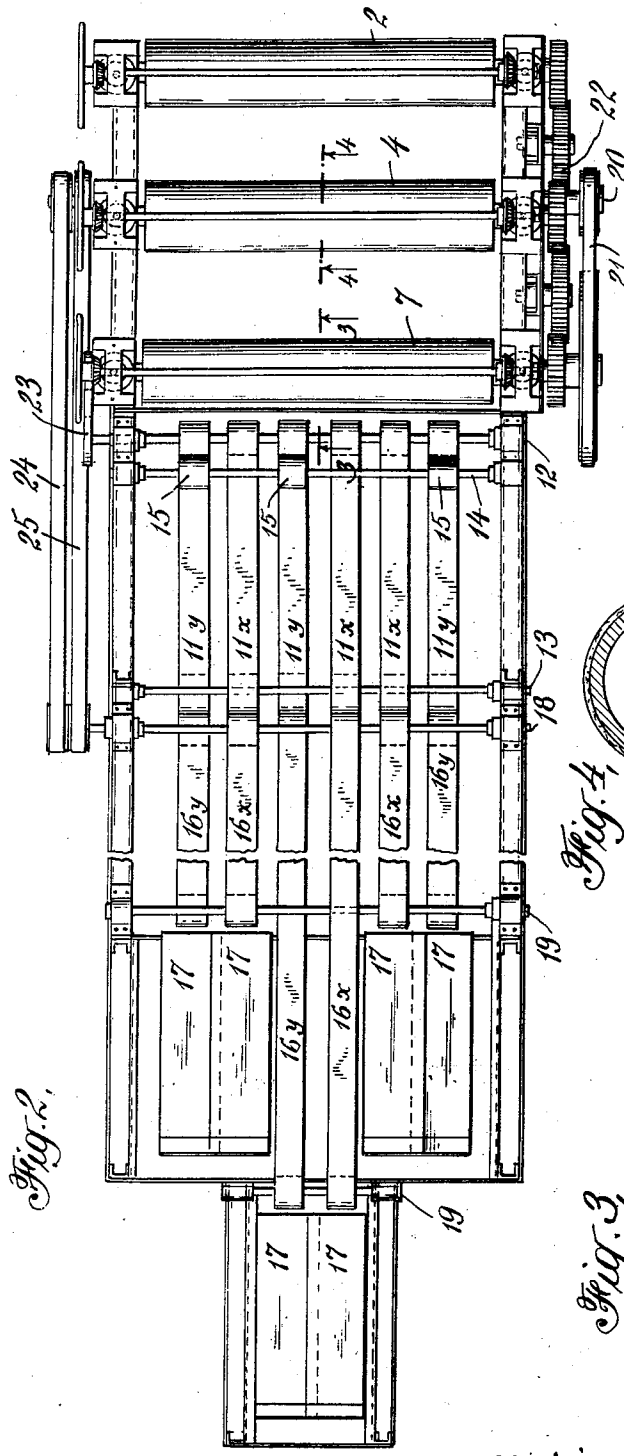


Fig. 2.

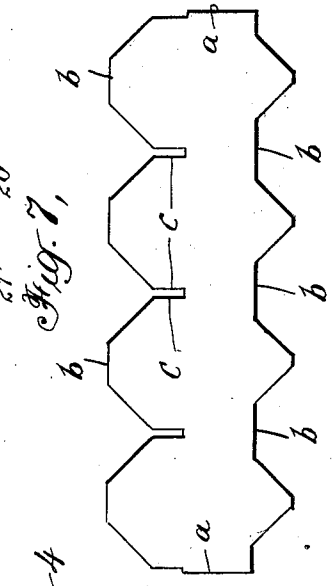


Fig. 7.

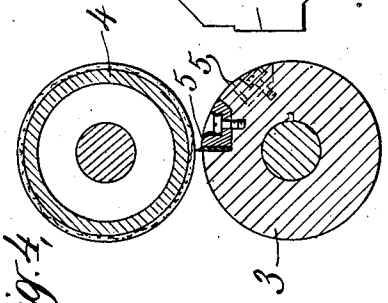


Fig. 4.

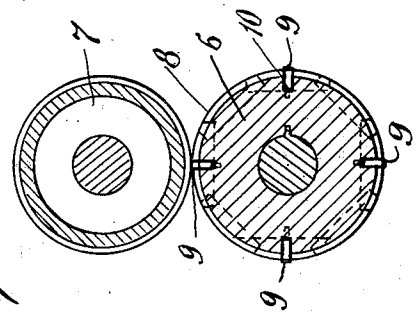


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWARD T. STREET, OF JOLIET, ILLINOIS, ASSIGNOR TO THE RUBEROID CO., A CORPORATION OF NEW JERSEY.

SHINGLE-STRIP MACHINE.

Application filed March 17, 1921. Serial No. 453,036.

To all whom it may concern:

Be it known that I, EDWARD T. STREET, a citizen of the United States, residing at the city of Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Shingle-Strip Machines, of which the following is a specification.

This invention relates to a shingle strip machine and more particularly to a machine for cutting a web of prepared roofing material into shingle strips having projections or tabs which when laid in overlapping courses simulate the appearance of individual shingles.

According to my invention I provide a machine which is organized to cut a web of roofing material longitudinally into a plurality of strips of desired configuration and to deliver and stack the severed strips in such manner that adjacent stacks are formed on different levels so as to be readily accessible and conveniently handled.

The machine comprises a frame carrying a plurality of sets of rolls, wherein the first set consists of a pair of feed rolls, and the second and third sets each consist of a cutting roll and a platen or smooth bed roll. The web of prepared roofing material passes from the feed rolls to the second and third sets of rolls successively and is thereby cut into a plurality of shingle strips of the desired configuration.

A stacking mechanism is arranged adjacent to the last pair of rolls. This mechanism consists of series of endless belts which operate to carry the strip from the cutting rolls and to deliver them in stacking receptacles located at different levels at the delivery end of the machine. The belts are driven to travel at a higher rate of speed than the peripheral speed of the cutting rolls so as to tend to exert a pulling or drawing action on the strips whereby to separate such strips as may not be completely severed in the cutting operation.

The various rolls and other parts are connected by suitable driving mechanism in such manner that the parts are timed to perform the desired functions in the proper relation. Preferably the knives carried on the cutting rolls are arranged to cut from below through the back of the web of roofing material, in view of the fact that the front or top surface is generally covered with particles of slate or crushed mineral matter, and by cutting from the back there is a tendency to cause the mineral particles to separate above the cutting edge, and thereby tending to increase the useful life of the cutting edges, over methods or constructions which cut from above or through the mineral surface of the web.

In the accompanying drawings, which illustrate a preferred embodiment of the invention, and wherein similar characters of reference indicate corresponding parts in all of the views—

Figure 1 is a conventional side view of the machine,

Fig. 2 is a plan view,

Fig. 3 is a vertical section, on enlarged scale, through the third set of rolls taken on the line 3—3 of Fig. 2,

Fig. 4 is a section through the second set of rolls taken on the line 4—4 of Fig. 2,

Fig. 5 is a front view of the lower, or cutting roll, shown in Fig. 3,

Fig. 6 is a detail sectional view, on the line 6—6 of Fig. 5, of one of the slotting dies carried on said cutting roll, and,

Fig. 7 is a view of one of the completed strips as formed by the machine.

Referring to the drawings, the machine as shown comprises a frame consisting of a series of standards for supporting the various rolls, belt-carrying pulleys, and shafts, suitably connected together and braced, and of any desired construction.

At one end of the frame are mounted a pair of feed rolls 1 and 2 between which the web of the roofing material, with the mineral surfacing upwards, is fed. These rolls, as well as the cutting rolls hereinafter described, are vertically adjustable, as usual in such constructions, to permit of regulating the pressure on the web.

The web passes from the feed rolls to a second set of rolls, of which the lower one 3 is preferably a cutting roll, and the upper one 4 a smooth bed or platen roll. The cutting roll is provided with longitudinally extending knives 5 each of which is of the length required to form the ends or sides *a—a* of the completed shingle strip shown in Fig. 7, and they are alternately positioned in off-set relation, substantially as seen in Fig. 4, so that at each revolution of said rolls a series of staggered slits are formed transversely across the webs, which

slits, after the web has been cut longitudinally into strips by the cutting rolls next described, constitute the transverse lines of severance of the completed shingle strips.

The web then passes to a third set of rolls consisting of a cutting roll 6 and a bed or platen roll 7. The cutting roll is preferably disposed below the bed roll and is provided with knives 8 set circumferentially around the roll in such manner or design as to cut the web longitudinally into a plurality of strips each having a succession of uniform tabs and projections on opposite edges of the configuration of the desired completed product. This cutting roll is also provided, as seen in Figs. 5 and 6, with dies 9 of suitable construction to cut or die-out the slots or kerfs *c* on the shingle strips at the same time that the longitudinal edges *b*—*b* are being formed. The slotting dies are provided with suitable means, such as the springs 10, for ejecting the waste. If desired receptacles may be provided to catch the ejected waste material.

The knives 5 and 8, as well as the slotting-dies 9, are detachably secured to their respective cutting rolls in any suitable manner, as by means of wedge blocks, so that they can be easily removed for replacement or sharpening.

As shown in the drawings, the machine is designed to cut six strips across the width of the web and to form said strips into a succession of completed shingle strips each consisting of four connected shingle units. By changing the arrangement of the knives 8 the outline of the units may be varied as desired, and by changing the relationship of the transverse knives 5 with respect to the correlated longitudinal knives 8 individual strips of any desired lengths may be formed. Furthermore, it is to be understood, that the machine may be designed to divide the material, lengthwise, into more or less strips than six, depending upon the width of the web to be operated upon.

After the shingle strips leave the last set of rolls, whereby they have been completely formed, they are received on a series of endless belts 11, which carry the strips to different levels as seen in Fig. 1. In other words, certain of these belts, as belts 11^x, carry the shingle strips in a substantially horizontal plane while others, as the belts 11^y, carry theirs in an inclined plane. The belts 11 are supported on transverse pulley shafts 12 and 13 which are mounted on uprights of the machine frame and are suitably driven to rotate the belts at a somewhat faster rate of speed than the peripheral speed of the cutting and feed rolls. The frictional engagement of the belts with the underside of the shingle strips, inasmuch as the belts are traveling faster than the cutting rolls, tends to exert a slight longitudinal tension or pulling action on the strips, as they leave the cutting rolls, whereby to completely separate such of the longitudinally adjacent strips as may not have been completely severed in the cutting operation, while at the same time permitting of sufficient slippage so as not to distort the shape of the completed shingle strips through undue tension. In view of the fact that the machine is designed to operate on prepared roofing material consisting of fibrous fabric saturated or impregnated with bituminous compositions, this feature of my invention is of considerable practical importance as in dealing with such materials, which are of somewhat sticky nature, it is difficult to so completely sever the material with cutting knives that the adjacent portions will not have a tendency to stick together along the lines of severance.

A transverse shaft 14 is mounted above the belts 11 near their forward ends and carries a series of idler pulleys 15 which are so positioned thereon in relation to the belts 11^y, as to depress the alternate strips as they leave the cutting rolls, whereby to completely separate the lateral edges of adjacent shingle strips and to guide the alternate strips on to the inclined belts 11^y.

The belts 11^x and 11^y deposit their loads on endless belt conveyors 16^x and 16^y, respectively, which conveyors travel in substantially parallel horizontal paths, at different levels, and serve to carry the shingle strips to the receptacles or inclined pans 17 wherein the strips are stacked. The conveyors 16 are mounted on transverse shafts 18 and 19, and they are suitably driven to rotate at substantially the same speed as the belts 11.

For convenience in handling the stacks I prefer to arrange the receptacles 17 in the manner shown in Figs. 1 and 2, that is, with one pair in front of the others and with the outermost two at a lower level than the intermediate pair. By this arrangement of the receptacles, operators standing at the sides of the machine can easily reach the stacks of shingle strips formed therein so as to remove the same.

Suitable means are provided for driving all of the rotating parts in correct time relation. In the present embodiment these means consist of a main driving shaft 20, a driving belt 21, and gearing 22 for operating the feed and cutting rolls; a belt 23 for driving the carrying-belts 11; and belts 24 and 25 for driving the conveyors 16^x and 16^y.

It is to be noted that in the machine shown in the accompanying drawings both the longitudinal and the tranverse cuts

required to form the completed shingle strips are made by rotary knives which operate from below the continuously moving web and cut through the material from the back or under surface. Now as the prepared roofing materials usually employed in the manufacture of such shingles or strips are generally coated on the top surface with fine sand, crushed slate, or particles of mineral matter, it will be apparent that the knife edges will cut cleaner and last longer in my improved machine than in the present types of shingle machines which cut from the top directly through the mineral coating.

Various changes and modifications in the specific details of construction and arrangement of the parts may be made without departing from the spirit or scope of my invention as herein described and claimed.

What I claim is:—

1. A shingle strip machine comprising means for feeding a web, a rotary cutting mechanism for forming staggered transverse cuts in a web, a second rotary cutting mechanism for cutting the web longitudinally, said mechanisms co-operating to form rows of uniform strip shingles, receptacles arranged at different levels for stacking the strips of each row, and endless belts for separating the strips and delivering those of each row in separated condition to the proper receptacle.

2. A shingle strip machine comprising means for feeding a web, a rotary cutting mechanism for forming staggered transverse cuts in a web, a second rotary cutting mechanism for cutting the web longitudinally, said mechanisms co-operating to form rows of uniform strip shingles, receptacles arranged at different levels for stacking the strips of each row, and endless belts traveling at higher speed than the web and arranged to engage the strips as they leave the second cutting mechanism and to deliver the strips in separated condition to the proper receptacles.

3. In a shingle strip machine, web feeding means, means for cutting the web into strips having interfitting portions, and conveyors traveling at a higher speed than the feed of the web and having their receiving ends disposed adjacent the cutting means and substantially in the plane of travel of the web, said conveyors being arranged to carry and discharge the strips at different levels so as to completely separate each strip from the following strip and the laterally adjacent ones.

4. In a machine of the character described, web feeding means, rotary means for cutting the web into rows of strips, and conveyors traveling at higher speed than the web and arranged to engage the strips as they leave the cutting means whereby to separate the successive strips of each row, certain of said conveyors traveling in substantially horizontal paths and others in inclined paths so as to separate the strips of each row from those of the laterally adjacent rows and to deliver the separated strips at different levels.

EDWARD T. STREET.