H. A. CUMFER & O. D. McFARLAND.

SHINGLE STRIP MAKING MACHINE.

APPLICATION FILED JAN. 2, 1915.

1,257,321.

Patented Feb. 26, 1918.

6 SHEETS—SHEET 1.

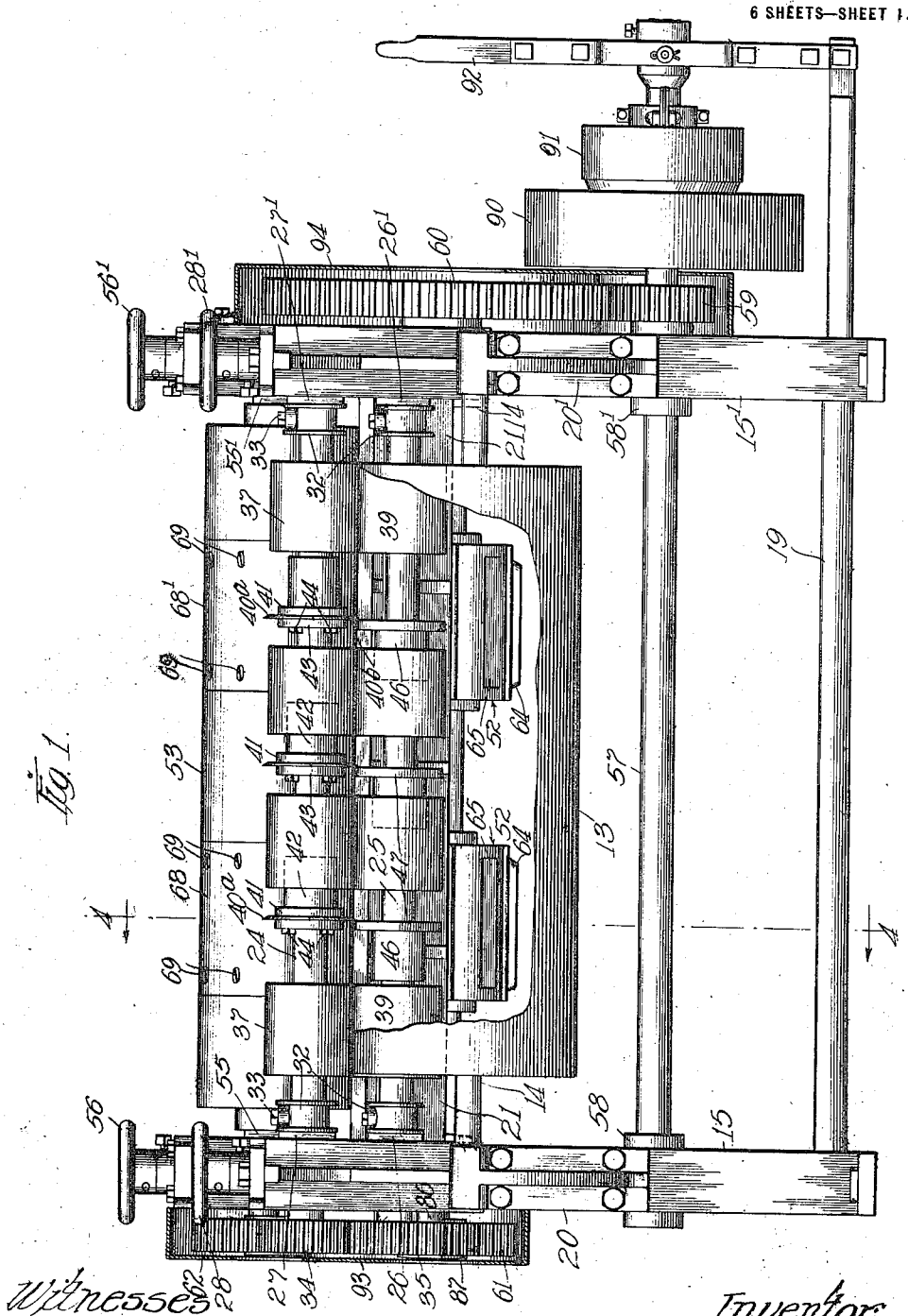


Fig. 1.

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Inventor:
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6 SHEETS—SHEET 2.

FIG. 2

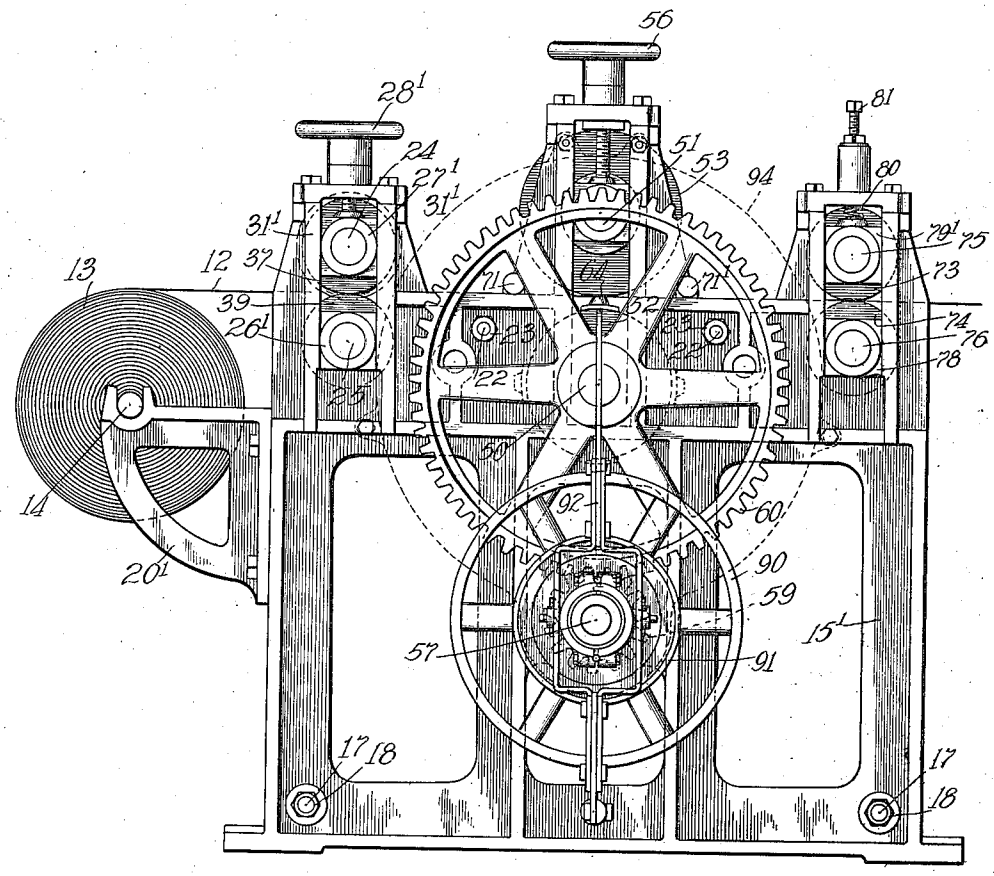


FIG. 10

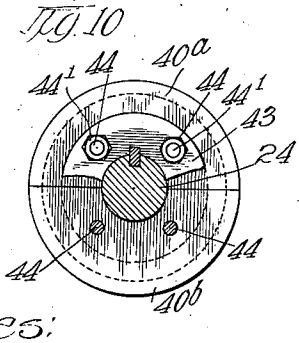
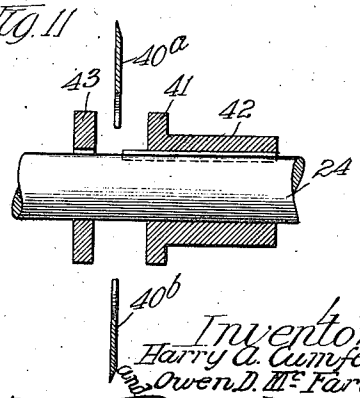


FIG. 11



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6 SHEETS—SHEET 3.

Fig. 3

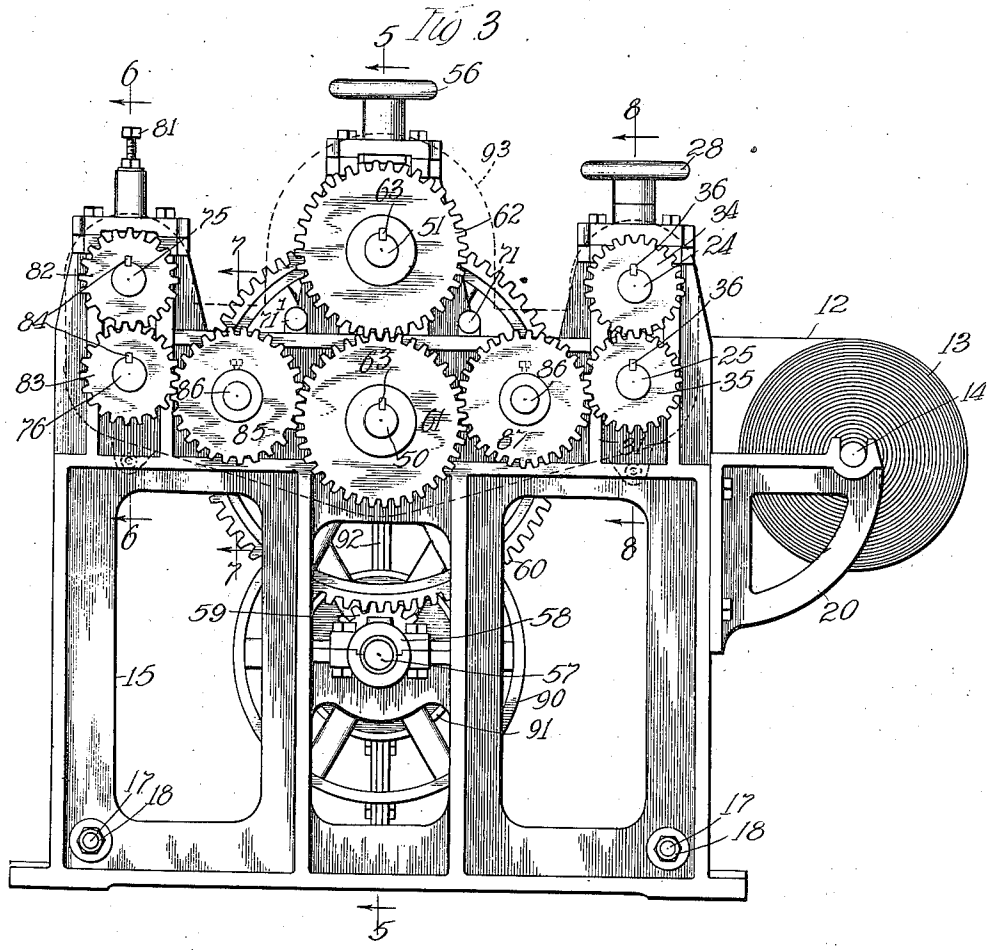


Fig. 6

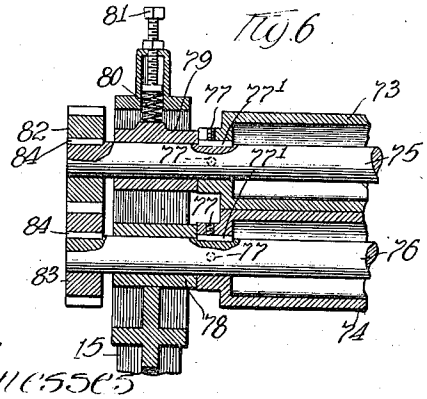
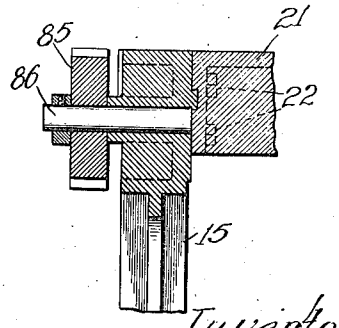


Fig. 7



Witnesses

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6 SHEETS—SHEET 4.

FIG. 4.

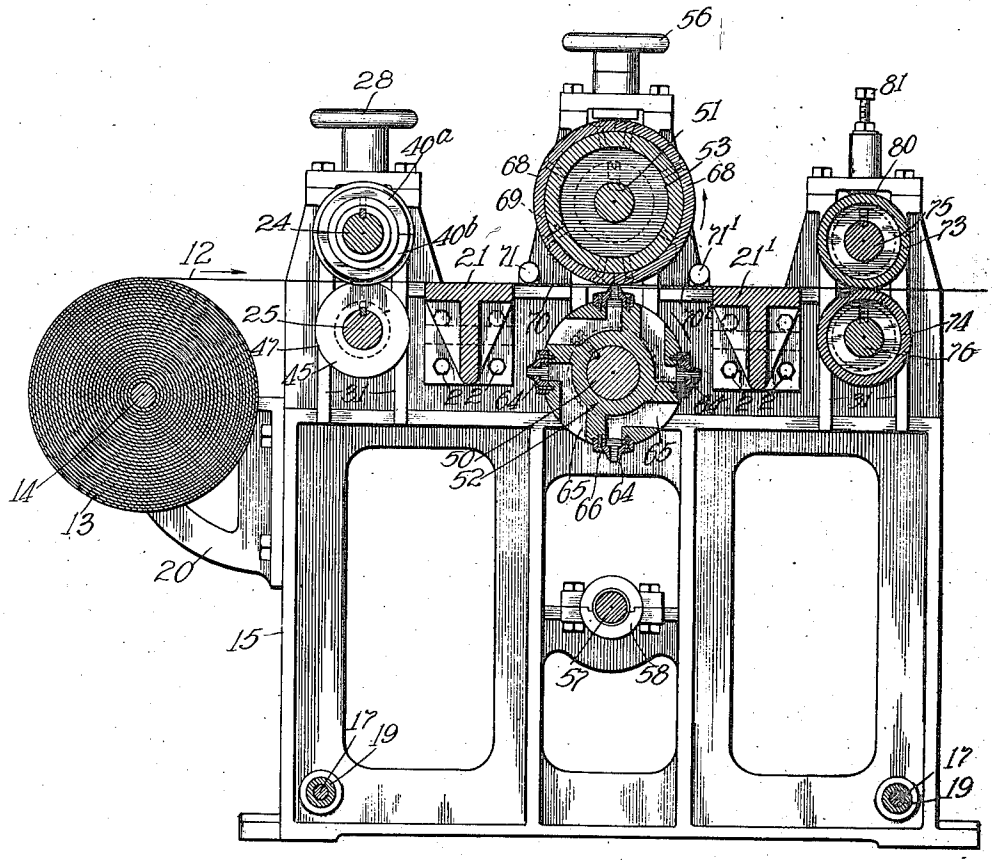
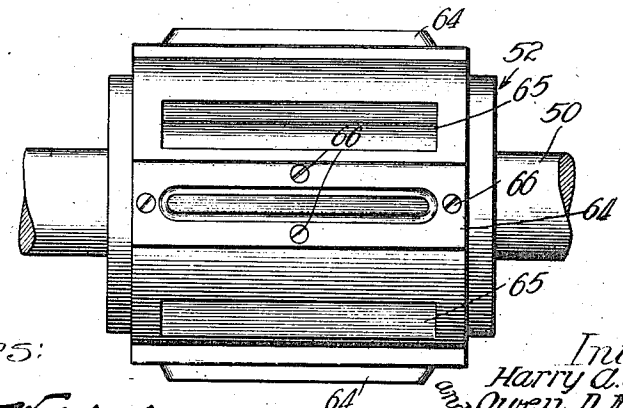


FIG. 9.



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6 SHEETS—SHEET 5.

Fig. 5.

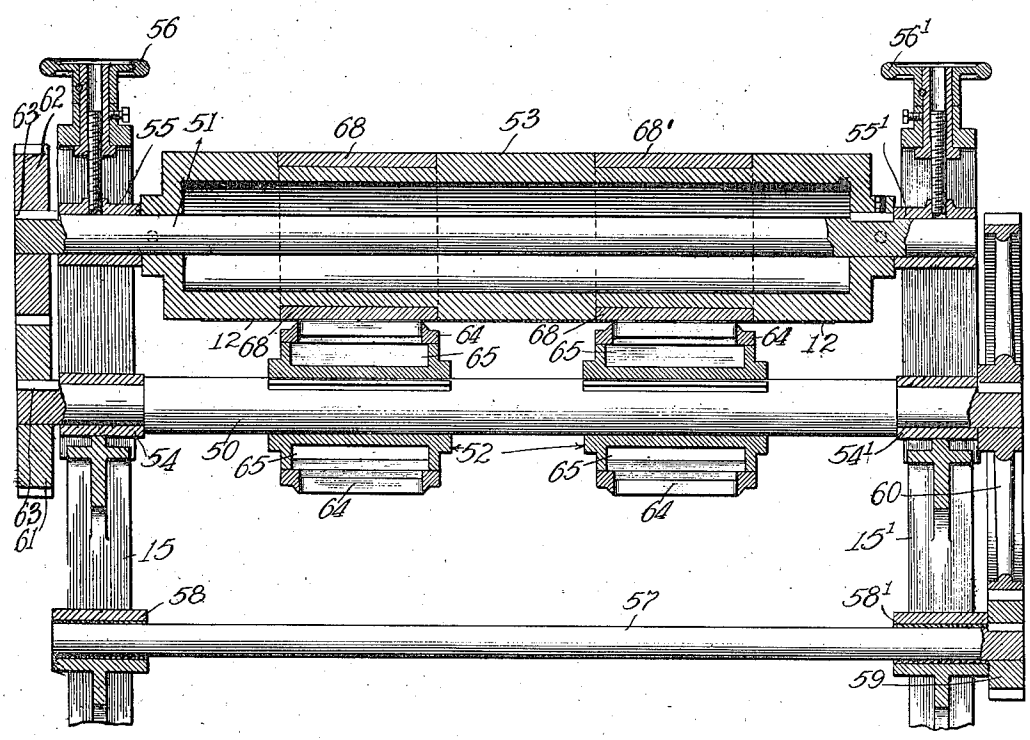
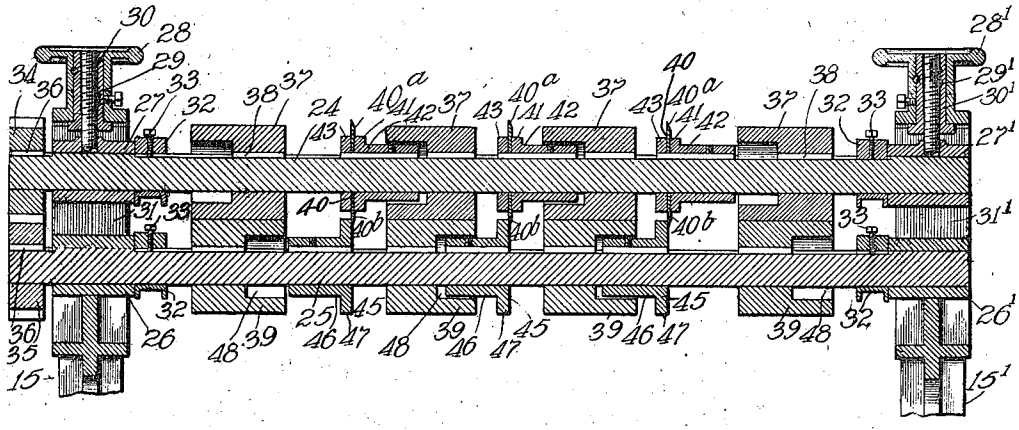


Fig. 8.



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SHINGLE STRIP MAKING MACHINE.

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6 SHEETS—SHEET 6.

Fig. 12.

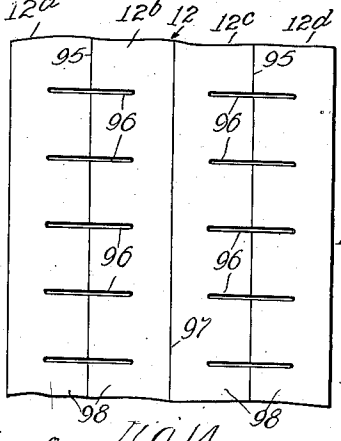


Fig. 13.

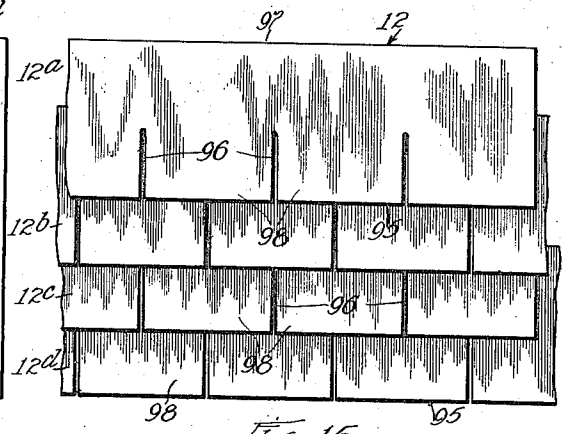


Fig. 14.

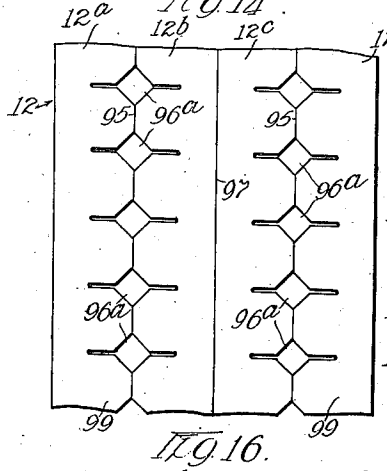


Fig. 15.

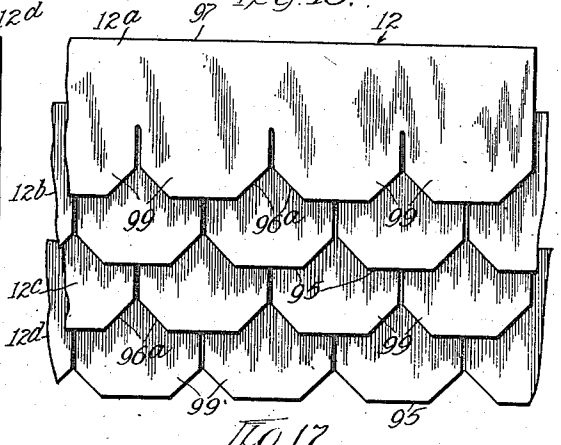


Fig. 16.

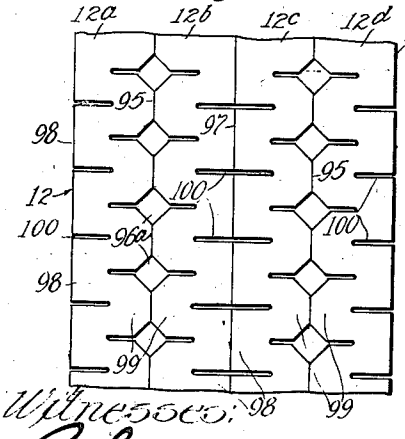
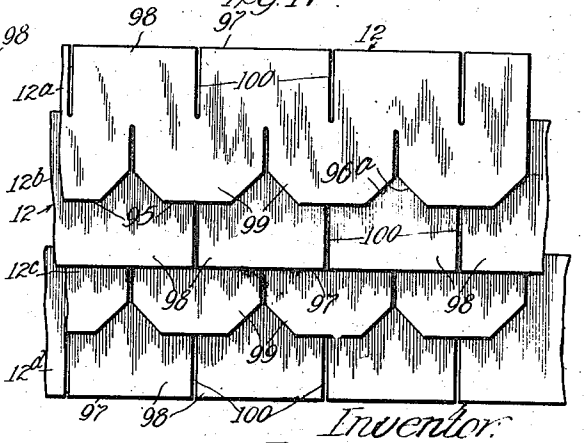


Fig. 17.



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UNITED STATES PATENT OFFICE.

HARRY A. CUMFER AND OWEN D. McFARLAND, OF CHICAGO, ILLINOIS, ASSIGNORS TO GUYTON & CUMFER MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHINGLE-STRIP-MAKING MACHINE.

1,257,321. Specification of Letters Patent. Patented Feb. 26, 1918.

Application filed January 2, 1915. Serial No. 249.

To all whom it may concern:

Be it known that we, HARRY A. CUMFER and OWEN D. McFARLAND, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Shingle-Strip-Making Machines, of which the following is a specification.

Our invention relates to machines for making shingle simulating strips.

One of the objects of our invention is to provide a machine for making shingle simulating strips of flexible material for roof covering and the like.

Other, further and more specific objects of our invention will become readily apparent, to persons skilled in the art, from a consideration of the following description when taken in conjunction with the drawings wherein—

Figure 1 is an end elevation of the machine showing a roll of material of which the strips are made, broken away, to expose portions of the machine.

Fig. 2 is an end view, showing the end upon which the power wheel and the connecting and disconnecting clutch is mounted.

Fig. 3 is an elevation of the opposite side of the machine showing the train of gearing for connecting the various rolls and shafts together.

Fig. 4 is a transverse section taken on line 4—4 of Fig. 1.

Fig. 5 is a longitudinal section taken on line 5—5 of Fig. 3. Fig. 6 is a fragmentary section taken on line 6—6 of Fig. 3.

Fig. 7 is a similar section taken on line 7—7 of Fig. 3.

Fig. 8 is a longitudinal section taken on line 8—8 of Fig. 3 showing the slitting knives and the feed rolls.

Fig. 9 is an enlarged view of the hollow cylinder carrying the hollow punches.

Fig. 10 is an end view of a slitting knife.

Fig. 11 is a section of the knife and the means of fastening it to the shaft, showing the relative position of the parts.

Fig. 12 shows a sheet that has been cut into four shingle simulating strips and a transversely extending punched hole that bridges the slits, located at uniform intervals longitudinally of the strips.

Fig. 13 shows a series of these shingle simulating strips as they will appear when applied to a roof.

Fig. 14 is a view, similar to Fig. 12, with slight modifications.

Fig. 15 is a modification of the structure shown in Fig. 13, made with the strips 14.

Fig. 16 is a sheet cut into four strips from which a roof resembling that shown in Figs. 13 and 15 may be constructed by alternately reversing the edges of the strips, as shown in Fig. 17.

Fig. 17 shows said strips assembled.

In all the views the same reference characters are employed to indicate similar parts.

The material of which our shingle simulating strips are preferably made consist of a felt fabric 12 treated with asphaltum or the like, and preferably covered on at least one side with flaky slate, or similar material and wound upon rolls 13 upon a shaft 14.

The machine consists of two side frames 15—15′, which are substantial duplicates. The side frames are held together by a suitable number of bolts 17 secured in place by the nuts 18. Spacing tubes, or pipes 19, are placed over the rods 17—17 as a convenient means for holding the side frames 15—15′ parallel. A pair of brackets 20—20′ are secured to one end of the frames 15—15′ for the support of the roll 13. Beams 21—21′ extend between the side frames 15—15′ and are preferably T shape in cross section, having their flat top surfaces uppermost, which serve as tables for the support of the fabric 12 as it passes between the various rolls and rotating punches and dies. The beams are secured to the side frames at each end by screws or bolts 22 and coöperating nuts 23.

Extending between the side frames 15—15′ are the parallel shafts 24 and 25. The shaft 25 is supported in relatively stationary bearings 26—26′, one in each frame, the shaft 24 being supported at each end in vertically adjustable bearings 27—27′. The hand wheels 28—28′ serve as means for vertically adjusting the relative positions of the shafts 24 and 25 in an obvious manner. Each of the bearings 27—27′ carries a screw threaded stem 29—29′ which projects into a

sleeve 30—30′, which is screw threaded at its lower end and which is secured to the respective hand wheel 28—28′. The rotation of the hand wheels 28—28′ serves to raise or lower the respective ends of the shaft 24 in adjusting it in position with reference to the shaft 25. The bearings 27—27′ have outer squared surfaces adapted to be vertically moved in guideways 31 provided in the respective housings, or side frames. Each of the shafts, 24 and 25, is provided near its respective end, with a collar 32 that may be secured to the shaft in adjusted position, preferably against the respective boxes in which the shafts are supported by a screw 33, to prevent axial movement of the shaft. The shafts 24 and 25 are connected together for driving relation by the geared pinions 34 and 35, as by keys 36. These pinions are of the same diameter and contain the same number of teeth and therefore the shafts 24 and 25 preferably rotate at the same speed. Mounted on the shafts 24 and 25 are coöperating feed roller sections 37 and 39 rotatably held in place by feathers that are included in a spline which extends between the bearing ends of the respective shafts. On the shaft 24 is mounted a series of diametrically divided, rotary disk knives 40, of which there may be any desired number, each knife, for convenience of removal and replacement, is divided into two parts 40^a and 40^b, more clearly shown in Figs. 10 and 11. Each of the knife sections, 40^a and 40^b, is secured to a sleeve 42 and between the flange 41 of the sleeve and a separable flat ring 43, by means of bolts 44 and coöperating nuts 44′. This particular feature is disclosed in Patent No. 1,107,762 granted to Harry A. Cumfer on the 18th day of August, 1914, and therefore is not subject matter for claims in the present application. A series of knife members 45 coact with the knives 40 and are located on the parallel shaft 25. Each consists of a sleeve 46 having a radially extending flange 47 which abuts the side of the cutting edge of the knife 40. Each of the feed rolls 37 is adapted to feed the individual strips into which the sheet is cut and is counter bored, as at 48, to permit the sleeve 46 of the member 47 to enter the counter bore so as to bring the surface of the feed roll 37 into closer approximation with the respective knife. The fabric 12 of the roll 13 is fed directly to the knives 40 by means of the feed rolls 37 and 39 which knives slit the fabric into the desired number of strips, as shown in Figs. 12 to 17, inclusive, as desired and depending upon the number of knives mounted upon the shafts 24 and 25. The strips so slitted are then passed over the table 21 to the rotary punches which punch transversely extending slots or apertures that bridge the adjoining edges provided by the slitting knives and which may also punch slots into the moving fabric inwardly of the outer boundary thereof, as shown in Fig. 16.

Mounted upon the shafts 50 and 51 are the rotary punches 52 and a coacting drum 53, respectively. The shaft 50 is supported in relatively stationary bearings 54 and 54′ and the shaft 51 is supported in relatively adjustable bearings 55 and 55′, adjustable in the same manner and for substantially the same purpose as the shaft 24 by similar wheels 56—56′. The punch carrying shaft 50 is driven from the power shaft 57, which is supported in bearings 58 and 58′ of the side frames, by means of a geared pinion 59 which meshes into a gear wheel 60 carried by the shaft 50. The shaft 51 is driven by geared pinions 61 and 62, of the same diameter, and having an equal number of teeth, so that the shafts 50 and 51 will be rotated at the same speed; the pinions being secured to the respective shafts by keys 63. The rotatable drums 52 which carry the separable hollow punches 64, are hollow, or carry interior recesses. Each of the drums, in the exemplification is provided with four hollow punches 64, and associated with each punch is a recess 65 in the drum structure to receive the parts punched from the fabric and to permit the same to fall away from the punch, as clearly shown in Figs. 4, 5 and 9. Each of the punches 64, is secured to the drum by screws 66 so that the punches may be removed, sharpened and replaced or new punches provided. The shape of the punch and the arrangement shown in the machine, with the number of knives and punches indicated, will produce the fabric shown in Fig. 12. To produce the particular strips shown in Figs. 14 and 16, and other varieties it is only necessary to change the shape of the punch and vary the positions and number of knives and punches required. The drum 53 is provided with removable wearing plates 68 and 68′, of which there may be a suitable number and which are preferably made of a better metal than the body portion of the drum, and may be removed and replaced by means of screws 69. These plates form the abutments for the fabric when the punches 64 are brought into contact therewith and by this means coöperate with the punch to produce the aperture in the fabric as it passes between the punch and drum. The punches engage the under side of the fabric which is not covered with the slate or the like, and push the covered side into contact with the superposed drum.

Pieces of relatively thin sheet metal, 70, 70′ are placed on either side of the axis of the shafts 50 and 51 to support the fabric as it passes in between and out from the punches and cylinder die. Each of these pieces is provided with a vertically extending part 71—71′ and is adjustable trans-

versely of the fabric so that the parts 71—71′ will support the fabric and prevent the strips that have been separated from the sheet by the slitting knives from separating from each other as they pass between the punch and die. The plates 70—70′ are so arranged that the vertical portions 71—71′ may be brought into contact with the outer selvage edges of sheets of fabric of various widths.

Just about the time the fabric is being properly longitudinally severed, by the slitting knives and punched at proper intervals by the punches and dies it passes between the guides 71′ and over the table 21′ into and between the feed rolls 73 and 74, which are mounted upon the shafts 75 and 76, respectively. These feed rolls, 73 and 74, may be hollow drums, as shown in Fig. 6, secured to the respective shafts by means of set screws 77, or the like, at their respective ends. The shaft 76 is supported in a stationary bearing 78 and the shaft 75 is supported in vertically adjustable bearings 79—79′. Springs 80, immediately above the bearings 79—79′ are adjustable by the set screw 81—81′ so that the feed drums 73 and 74 are thereby yieldingly held in contact. The shafts 75 and 76 are connected together by means of geared pinions 82 and 83, of substantially the same diameter and containing the same number of teeth, which are held on their respective shafts by a key 84. The shafts, 75 and 76, are driven by these pinions and an intermediate gear wheel 85, supported on a stud 86 that projects from the frame 15. The intermediate gear 85 is driven by the gear wheel 61. A similar intermediate gear wheel 87 is mounted upon a stud 86 and serves to drive the gear wheel or pinion 35, itself being driven by the gear wheel 61.

Rotatable upon the power shaft 57 is a power wheel or pulley 90 which is adapted to be secured to the power shaft to drive the machine by means of a clutch 91, operable by the handle 92.

A housing 93 covers the train of gearing on one side of the machine and a similar housing 94 covers the train of gearing on the other side of the machine. These housings protect the operator from danger of the intermeshing gear wheels.

By the use and operation of our machine as illustrated the sheet 12 fed continuously from the roll 13, is divided into four strips 12^a, 12^b, 12^c and 12^d. The strips 12^a and 12^b are separated by a slit 95 and this slit, which extends longitudinally of the strip is bridged by transverse slots 96 which are made before the strip is completed and which may be of the form shown in Fig. 12 or 14, or of any other similar and suitable design. These slots are spaced at regular intervals or distances and when the strips are separated the lower portion of them, between the slots, simulate the appearance of shingles, as shown in Figs. 13, 15 and 17, one strip being laid and lapped upon another, just as the shingles are separately placed in position. The transverse slots 96 of the strips provide kerfs or spaces between adjacent shingles.

If it is desired that the projecting ends or shingles shall take the form shown in Fig. 15, then the punch for producing the slot 96^a should have a rectangular enlargement, as shown in Fig. 14. To divide adjacent strips they are cut apart, as at 97, this cleavage being through a continuous portion of the fabric and not across perforations, or transversely extending slots, that have been made therein. Another form of strip is shown in Figs. 16 and 17 wherein either edge, 98 or 99, may be turned down and exposed to the weather. In this structure transverse slots 100 are punched between adjacent strips and on the selvage edge of the sheet.

It will be observed that in the operation of our machine the sheet and strips are continuously in motion; that the sheet is first slitted longitudinally to subsequently provide as many strips as required and then simultaneously punched at intervals, the slots, or perforations thus provided breaking the otherwise longitudinally continuous edges of the strips and finally the strips are passed from the machine, in this condition, ready to be divided into suitable lengths.

Having described our invention, what we claim is:

1. In a machine for cutting openings in a strip of roofing material, the combination with a smooth faced drum, of a rotatable drum provided with a plurality of apertures opening to its periphery, certain of the apertures being connected within the drum, and removable hollow punches overlying certain of the apertures leaving open other apertures through which to discharge the punching.

2. In a machine of the class described, a rotatable structure provided with a plurality of apertures, both ends of which are open on the face thereof; a removable hollow punch overlying one of the openings, of each aperture, leaving the other end of the aperture open through which to discharge the punchings.

3. A machine of the character described comprising parallel shafts carrying a plurality of coöperating, rotatable knife-bearing members for slitting a fabric into strips; coöperating feed rolls on said shafts, between each pair of knives, to feed a fabric thereto; a plurality of pairs of rotatable punch members, arranged to punch slots across adjoining edges of the said strips, and means, between the knives and punches to

hold adjoining edges of the strips together while being punched.

4. A machine of the character described comprising parallel shafts carrying a plurality of coöperating, rotatable knife bearing members, for slitting a fabric into strips; coöperating feed rolls on said shafts, between each pair of knives, to feed the fabric to the knives; a plurality of pairs of rotatable punch members arranged to punch slots across adjoining edges of the said strips and means on each side of the rotatable punches to hold adjacent edges of the strips together while being punched.

5. A machine of the character described comprising parallel shafts carrying a plurality of coöperating, rotatable knife bearing members, for slitting a fabric into strips; coöperating feed rolls on said shafts, between each pair of knives to feed a fabric to the knives; a plurality of pairs of rotatable punch members, arranged to punch slots across adjoining edges of said strips; means on each side of the rotatable punches to hold adjoining edges of the strips together while being punched and feed rolls beyond the punches to draw the strips away from the punches.

6. A machine of the character described comprising parallel shafts carrying a plurality of coöperating, rotatable knife bearing members for slitting a fabric into strips; coöperating feed rolls on said shafts, between each pair of knives to feed the fabric to the knives; a plurality of pairs of rotatable punch members arranged to punch slots across adjoining edges of said strips; means on each side of said rotatable punches adjustable to compensate for varying widths of sheets, to hold adjacent severed edges of the strips together, while being punched; a flat, fabric support, on each side of the rotatable punches, substantially in the same horizontal plane as said punches and feed rolls beyond the punches to draw the strips away from the punches.

7. A machine of the character described comprising parallel shafts carrying a plurality of coöperating, rotatable bearing members, for slitting a fabric into strips; cooperating feed rolls on said shafts, between each pair of knives, to feed the fabric to the knives; a plurality of pairs of rotatable punch members arranged to punch slots across adjoining edges of the said strips; and means to hold adjacent edges of the strip together while being punched.

8. In a machine of the character described, comprising parallel shafts carrying rotatable slitting-knife members, to cut a sheet into longitudinal strips and fabric feeding members for feeding each said strip, near one end of the machine; a pair of yieldingly contacting feed rolls of uniform diameter for feeding all of said strips, at the other end of the machine; a pair of rotatable fabric-punching members between the two sets of feeding means, having its punches set to cut slots across adjacent longitudinal edges of said strips.

9. A machine of the character described comprising means for constantly moving a sheet of prepared roofing material; means for punching transversely elongated slots in said sheet at predetermined intervals, and slitting means to divide the sheet into a plurality of longitudinal strips, said slitting means being positioned in alinement with points midway between the slot punching means and points at the centers of the slot punching means.

In testimony whereof we hereunto set our hands.

HARRY A. CUMFER.
OWEN D. McFARLAND.

In the presence of—
FORÉE BAIN,
MARY F. ALLEN.