(No Model.) 5 Sheets—Sheet 1.

W. J. PERKINS.

Shingle Sawing Machine.

No. 236,620. Patented Jan. 11, 1881.

Fig. 1.

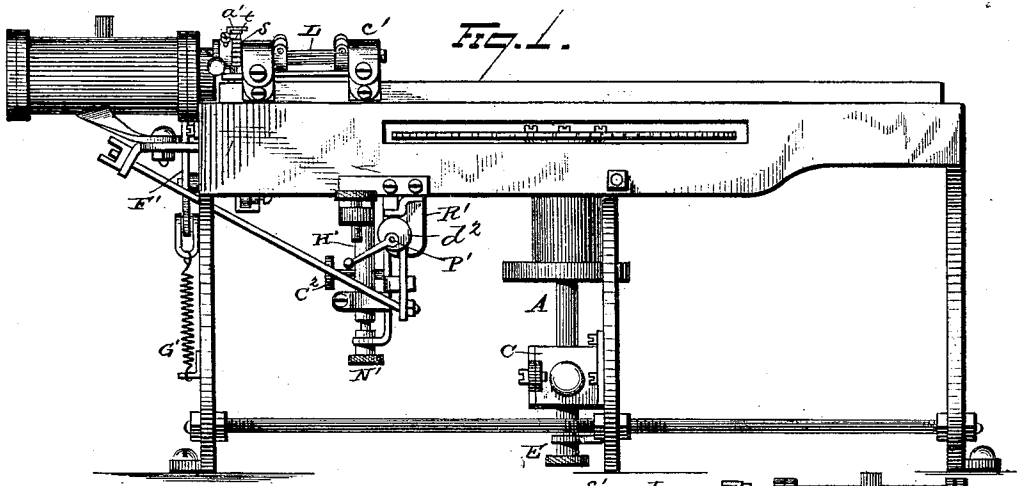


Fig. 2.

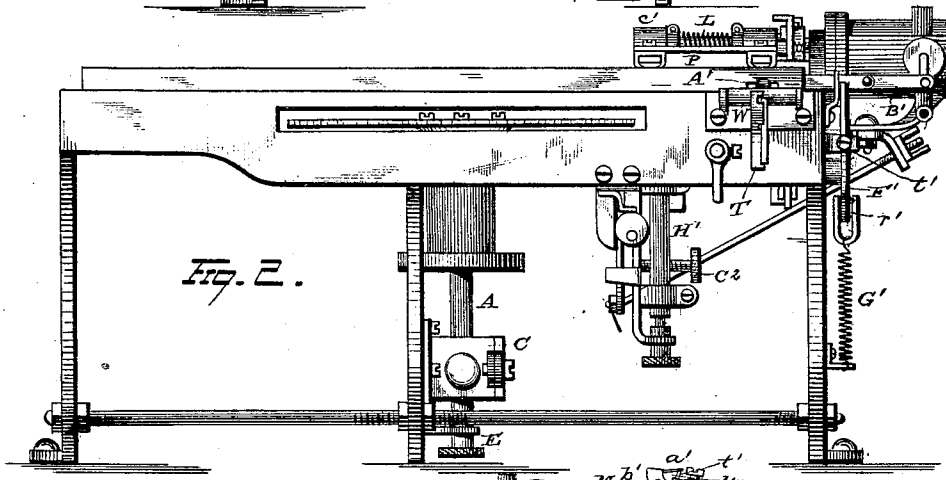
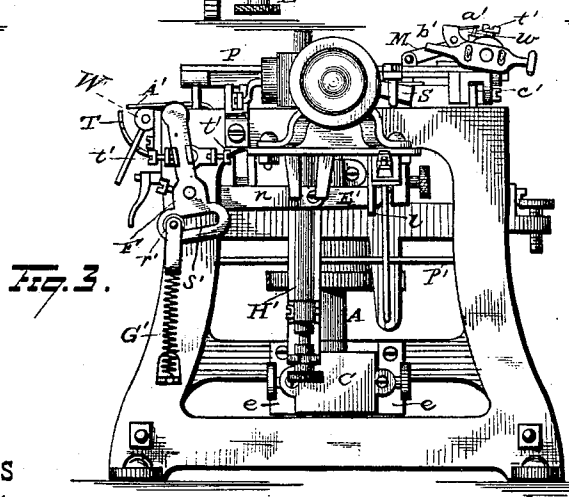


Fig. 3.



WITNESSES

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(No Model.) 5 Sheets—Sheet 2.

W. J. PERKINS.

Shingle Sawing Machine.

No. 236,620. **Patented Jan. 11, 1881.**

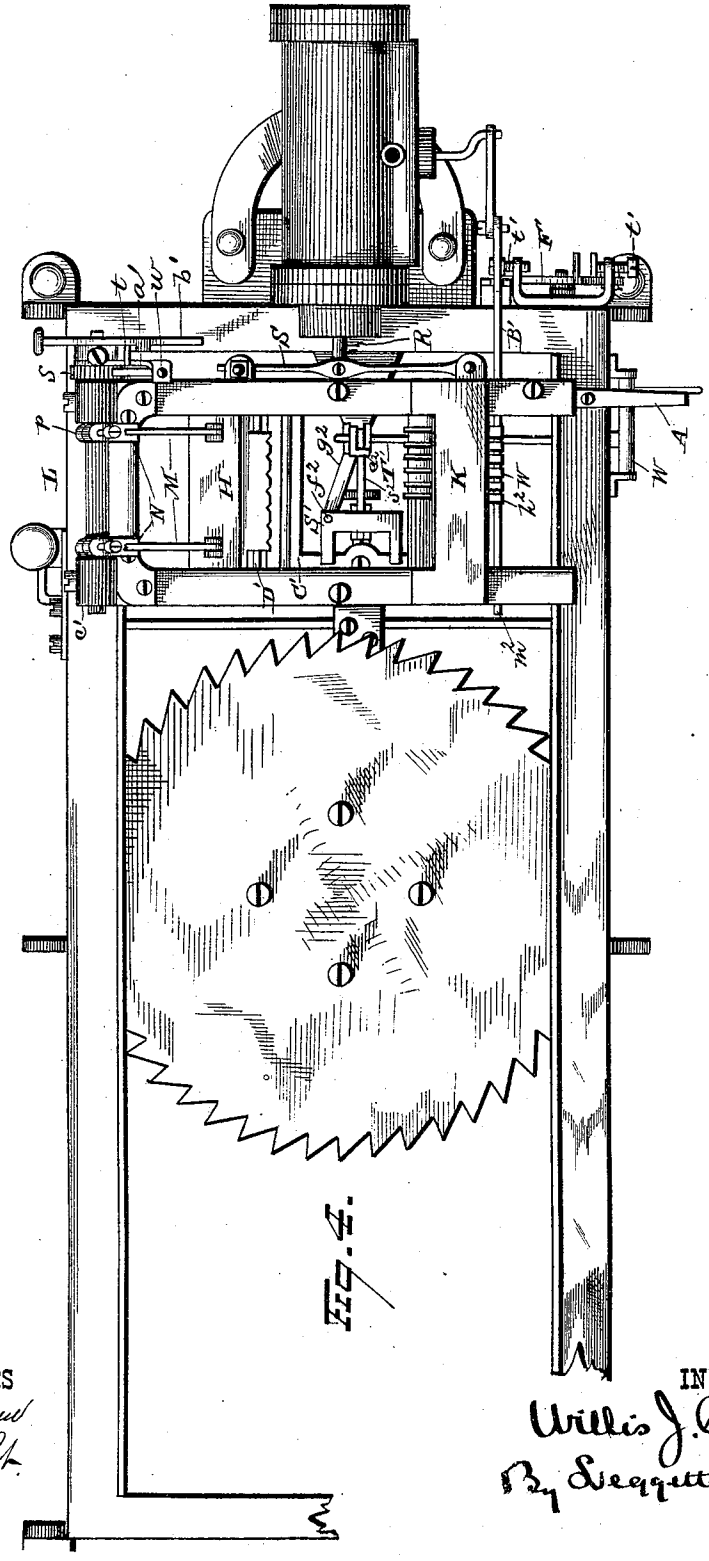

Fig. 2.

WITNESSES

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W. J. PERKINS.

Shingle Sawing Machine.

No. 236,620. Patented Jan. 11, 1881.

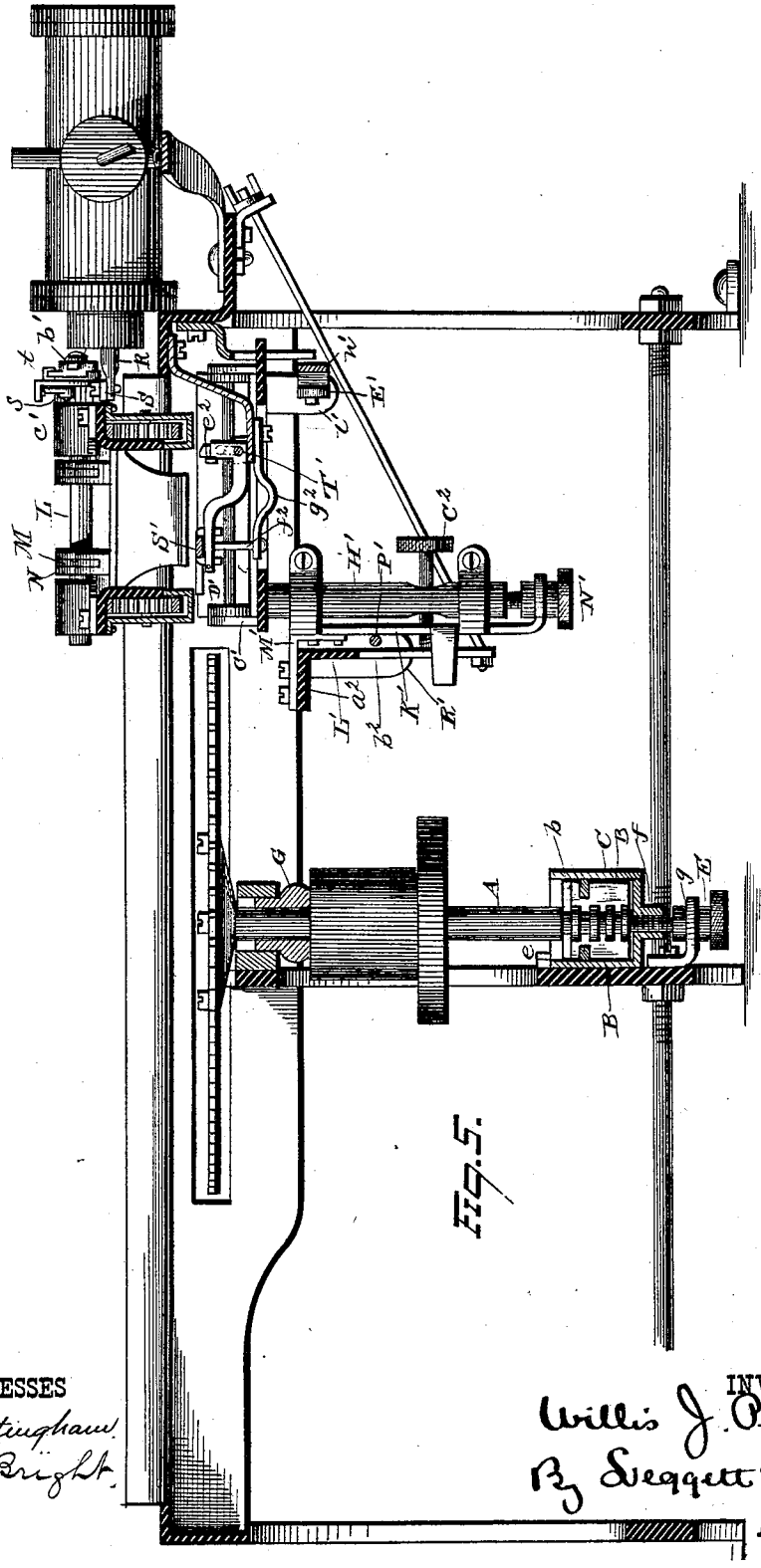

Fig. 5.

WITNESSES

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W. J. PERKINS.

Shingle Sawing Machine.

No. 236,620. **Patented Jan. 11, 1881.**

Fig. 6.

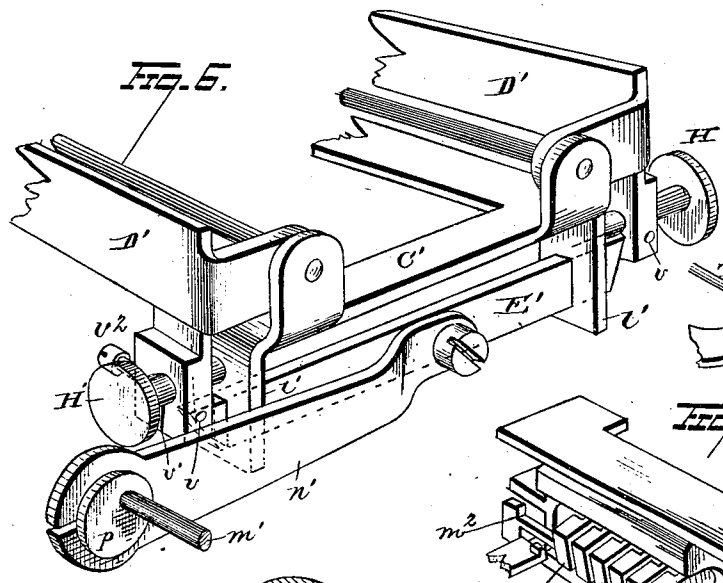


Fig. 11.

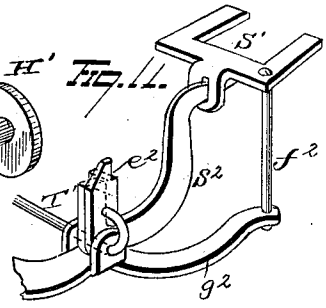


Fig. 7.

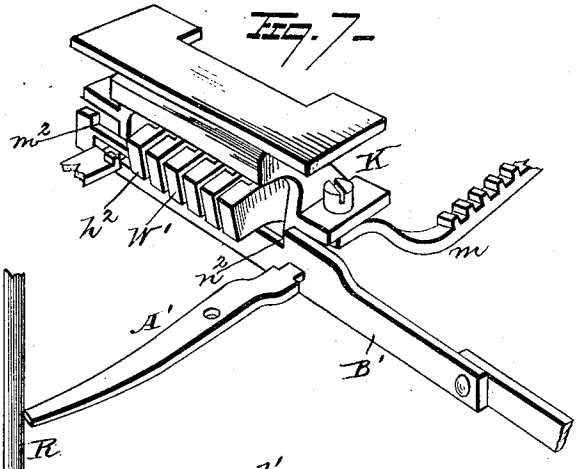
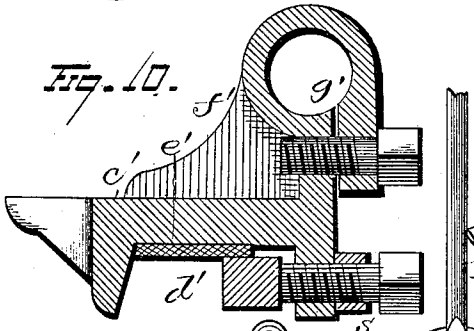


Fig. 10.



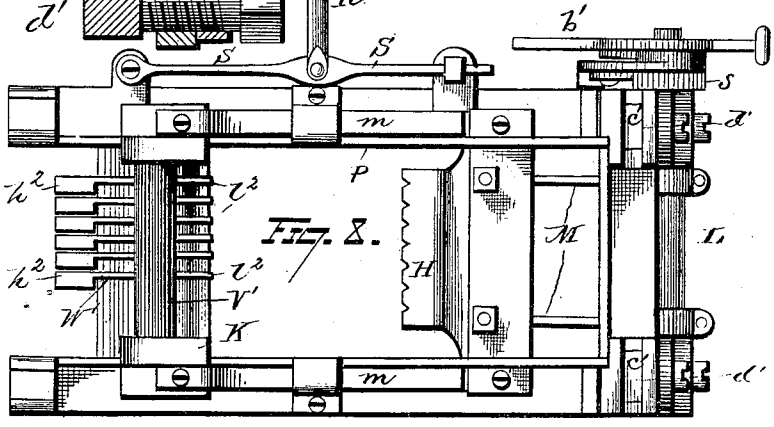
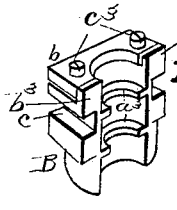


Fig. 8.

Fig. 18.



WITNESSES

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W. J. PERKINS.

Shingle Sawing Machine.

No. 236,620. **Patented Jan. 11, 1881.**

Fig. 9.

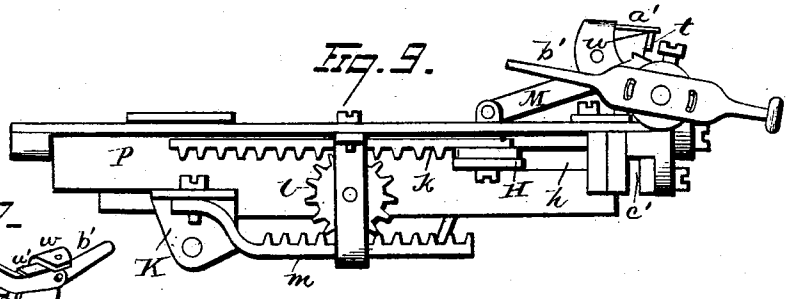


Fig. 17.

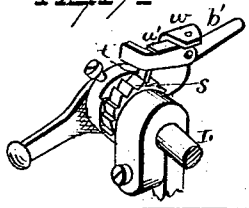


Fig. 12.

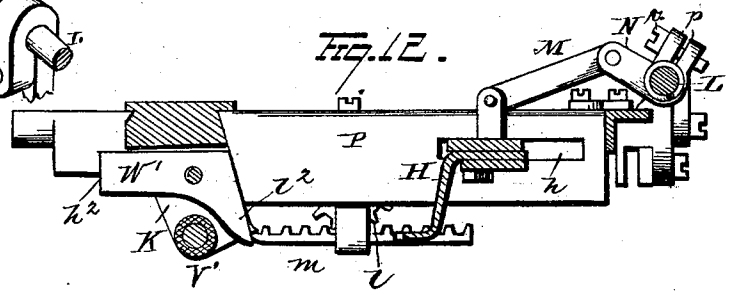


Fig. 13.

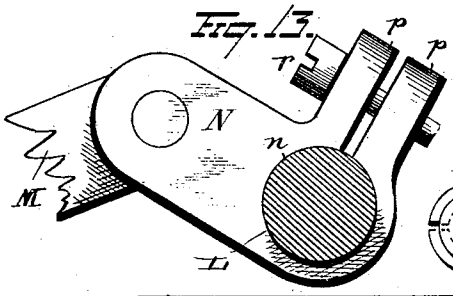


Fig. 14.

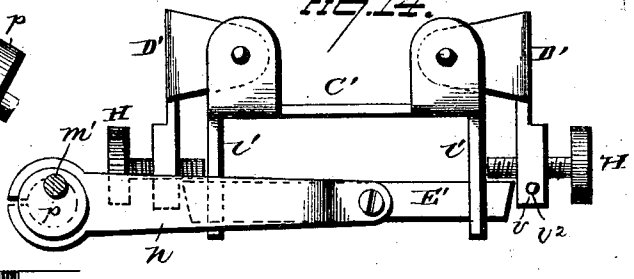


Fig. 15.

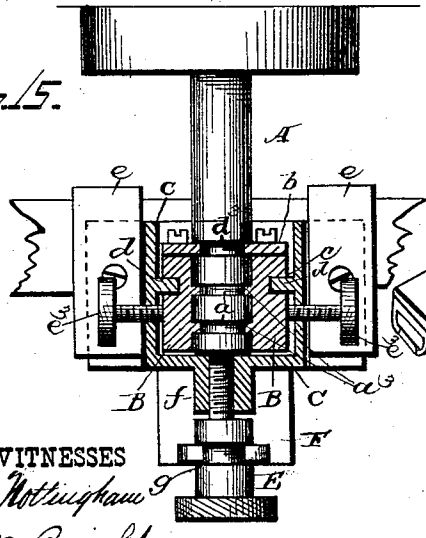
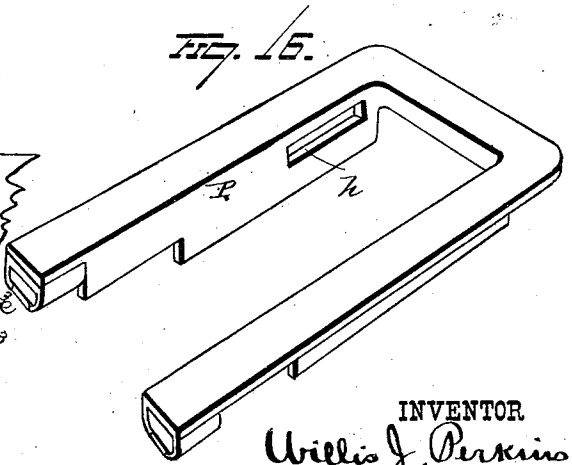


Fig. 16.



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UNITED STATES PATENT OFFICE.

WILLIS J. PERKINS, OF GRAND RAPIDS, MICHIGAN.

SHINGLE-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 236,620, dated January 11, 1881.

Application filed April 1, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIS J. PERKINS, of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Shingle-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is a view, in elevation, of one side of the machine. Fig. 2 is a similar view of the opposite side. Fig. 3 is a front end elevation. Fig. 4 is a plan view. Fig. 5 is a longitudinal vertical section. Fig. 6 is a detail view of the means for shifting the tiltways. Fig. 7 is a detail view of the mechanism for automatically reversing the travel of the carriage. Fig. 8 is a detail view of the carriage, representing it in reverse plan. Fig. 9 is a detail view of the carriage, representing it in front elevation. Fig. 10 is a detail view, representing one of the bearings of the carriage in vertical transverse section. Fig. 11 is a detail plan view of the spalt-cleaner. Fig. 12 is a vertical transverse section through the carriage. Fig. 13 is a detail view, representing the manner of connecting the knuckles of the dog-links to the rock-shaft. Fig. 14 is a detail end view, representing the manner in which the tiltways are connected to their table. Fig. 15 is a detail vertical transverse section through the bridge-pot. Fig. 16 is a detail view of the carriage-frame free from all attachments. Fig. 17 is a detail view, illustrating the rack *s* and its connecting parts. Fig. 18 is a detail view of one of the journal-boxes for the saw-arbor.

The vertical saw-arbor A has its lower extremity provided with one or more annular grooves, *a*, which receive corresponding horizontal projections a^3, formed on the interior side of the journal-boxes B. These horizontal projections take a portion of the weight of the arbor from off its end bearing upon the bottom of the bridge-pot C, and thus relieves the end thrust of said arbor. The meeting-edges of the journal-boxes are provided with upper extensions, b^3, which provide lateral bearing for the extremities of the gibs *b*, said gibs being secured to the top of the journal by adjusting-screws c^3, which maintain them at a greater or less vertical distance from the journal-boxes. These gibs have their central portions fitted in an annular groove, d^3, formed in the arbor above the horizontal line of the journal-boxes, said central portions of the gibs projecting inwardly beyond the vertical line of the bearing-surface of the journal-boxes. The object of the gibs and their vertical adjustment is to take up the wear of grooves *a* and projections a^3. As the latter wear away the gibs are adjusted to a lower position, so as to secure the saw-arbor against upward movement when the saw strikes a knot. The exterior side of each journal-box is formed with a horizontal groove, *c*, extending lengthwise with the machine. These grooves receive projections *d*, formed on the interior sides of the bridge-pot, and upon said projections the journal-boxes are adapted to be moved, so as to adjust the lower extremity of the arbor forward or rearward. Horizontal screws e^3 are threaded in holes formed in the two longitudinal sides of the bridge-pot and have end bearing against the journal-boxes. These screws serve to maintain the journal-boxes in position, so as to secure the lower extremity of the saw-arbor at any point forward or rearward in the bridge-pot. The bridge-pot is adapted to have sliding movement in a vertical guideway, *e*, secured to a cross-girt, and a socket, *f*, depending from the center of the bottom of the bridge-pot, provides engagement for set-screw E. The latter is provided with an annular groove, *g*, in which fit the arms of a bracket, F. This maintains the set-screw against vertical displacement and permits it to adjust the bridge-pot up and down, as desired.

The foregoing construction of parts is possessed of considerable merit, for in a two-block machine, when the saws are changed, if there is no provision for completely raising the saw-arbor, it is necessary to adjust the tilt mechanism at each end of the machine.

The upper portion of the saw-arbor has bearing in journal-boxes G, which have convex outer sides adapted to permit said upper portion of the arbor to accommodate itself to the horizontal adjustment of the lower portion of

the arbor. The dog H has sliding movement in slots *h* of the carriage, and its projecting extremities are respectively provided with rack-bars *k*. The latter mesh with the upper portion of vertical pinions *l*, journaled on the sides of the carriage. The lower portion of the pinions mesh with rack-bars *m*, secured to the head-block K, thus adapting the dog and head-block to be simultaneously moved in opposite directions. This joint movement of the dog and head-block of the carriage is of great advantage in centering the shingle-bolt, inasmuch as if the head-block were stationary, whatever variation there might be in the length of the shingle-bolt would have to be compensated for by the dog. By moving the head-block equally with the dog the difference in length between the shingle-bolt is compensated for in like measure by both said dog and head-block.

Rock-shaft L, mounted transversely on the carriage, is connected with the dog by links M and knuckles N. The latter are respectively provided with a recess, *n*, and spring-arms *p*. The arms are sprung apart, so as to permit the rock-shaft to be fitted in the recesses of the knuckles, and fastening devices *r* clamp the two arms of each knuckle about the rock-shaft. One of the bearings of the rock-shaft is provided with a convex rack, *s*, with which pawl *t* meshes, said pawl being pivoted to an arm, *w*, rigidly secured to the rock-shaft, and a spring, *a'*, also secured to said arm, maintains the pawl in engagement with said rack. Rod *b'*, mounted on the rock-shaft, is adapted to engage with the pawl and detach it from the rack with the same movement by which the rock-shaft is turned, so as to move the dog away from the head-block. Rod *b'* is moved by hand-power applied thereto, said parts being adapted to permit the rock-shaft to be turned so as to move the dog toward the head-block without engaging the pawl with the convex rack. The dog and head-block are thus locked against displacement, and are maintained in position against the shingle-bolt during the operation of cutting the shingles. This is important in view of the tendency of the saw cutting to force the head-block back and thereby release the shingle-bolt. The advantage of this provision is prominent in a machine operated by hand. The automatic unlocking of the dog and head-block by the shifting-rod as the latter is moved so as to separate said dog and head-block is very desirable. This shifting-rod has to be operated for every movement of the carriage, and it is apparent that by the above construction only a slight extra throw is added to the ordinary movement of the handle of the shifting-rod.

The sliding bearings *c'* of the carriage have glass bearing-surfaces *d'*, and inlaid between the two are yielding beds *e'*, formed of any suitable material adapted to prevent the glass from breaking. The sliding bearings at one end of the carriage are formed with uprights *f'*, having horizontal journal-boxes *g'* for the rock-shaft, the carriage-bearing and the rock-shaft bearing being formed in the same piece in each instance. It is not necessary to have guide-bearings at both ends of the carriage, and hence the grooved bearings *c'* are preferably formed only on one end of the carriage, as shown.

The carriage-frame P is formed with two sides and one end, the same being made of a single piece of angle iron or steel, thereby causing the carriage to be very light in its weight, this peculiar shape of the carriage-frame, in connection with the construction of the dog and head-block, combining to make the complete carriage very light, a result which is very desirable in all shingle-machines. The piston-rod R connects with the carriage by a horizontal transverse spring, S, thus preventing vibrations of the saw when the latter strikes a hard knot in the shingle-bolt.

In machines employing a power feed, when the saw strikes a hard knot its duty is instantly increased. If the driving power continues to force the carriage ahead at the usual rate of feed the saw will be thrown into vibrations, and as a result the next few shingles will be marked accordingly. It is my object to obviate this disadvantage by interposing an elastic connection between the carriage and the actuating means, so that when the saw strikes a hard knot this elastic connection permits the carriage to yield and prevents its being forced forward at the ordinary rate.

A catch, T, projecting from the machine-frame is provided with a series of notches. A horizontal cam-roller, W, has a depending rod adapted to engage with said notches. The cam-roller bears against the under side of the outer extremity of pivotal lever A', and thus locks the latter against movement, the inner extremity of the lever being connected to valve-shifting rod B'.

Table C' is provided on opposite sides with tiltways D', which are respectively mounted on independent bearings. Stop-screws H, connected to the lower portions of the tiltways, are adapted to have end bearing against arms depending from the table, and thus provide rigid support for the tiltways when the latter are free from engagement with shifting-bar E'. By adjusting these set-screws, the thickness of the butt of the shingles may be determined. The shifting-bar E' operates to raise one of the tiltways to the extent permitted by set-screws *t' t'*. (Well shown in Fig. 3.) At the same time the other tiltway drops down against its corresponding set-screw H, while the shifting-bar moves clear of it. This construction permits one side of the shingle-bolt to be raised or lowered without raising or lowering the opposite side thereof. Hence the thickness of the tip of the shingle can be varied without changing the thickness of the butt.

The dog H is formed of a single piece of steel whose extremities fit in the guideways *h* of the carriages. The forward portion of the piece depends from the main horizontal por-

tion, and has its cutting-edge projecting angularly therefrom. This dog is very light in weight, and hence its importance, in that the movement of the carriage is correspondingly rendered easier.

It will be observed that the openings v of the tiltways are provided with open slits v', and that the screws are clamped in said openings by fastening devices v^2. Shifting-bar E′ has sliding movement in slots formed in depending arms l', and it is connected to rock-shaft m' by link n', an eccentric, p, formed on said rock-shaft, working in a suitable slot in the link. Said rock-shaft has tilting-handle F′, rigidly secured to its extremity opposite to the eccentric. A roller, r', fitting in slot s' of the handle, is acted upon in downward line by a spring, G′. As the handle is tilted in either direction it carries with it the rock-shaft, and the latter, by means of the eccentric and link, moves the shifting-bar correspondingly. Said shifting-bar is thus adapted to simultaneously raise one tiltway and lower the other tiltway. Spring G′ tends to maintain the roller in the lower end of its slot as the handle is tilted in either direction, thus locking the handle against accidental displacement and preventing any movement of the shifting-bar. Set-screws t' are adapted to have end bearing against opposite sides of the handle, and limit the tilting movement of the latter.

The table to which the tiltways are connected is provided with a depending standard, H′, rigidly secured thereto and sliding in bearings formed on bar K′, the latter depending from cross-girt L′ and connected thereto by an angular spring, M′. Said cross-girt is provided with a horizontal lug, a^2, to which the horizontal portion of the spring is secured. It is also provided with a depending arm, b^2, which provides end bearing for set-screw c^2. The latter passes freely through a vertical slot in standard H′, and has screw-thread engagement with bar K′, so that by turning the set-screw said bar may be forced in inclination away from arm b^2, or it may permit spring M′ to maintain bar K′ in vertical position. This operation of set-screw c^2 results in vertically adjusting the rear portion of the table provided with the tiltways. When the screw is turned inward the tilt mechanism has its rear portion raised, and when the screw is turned outward the rear portion of the tiltways is lowered. This adjustment of the table in horizontal inclination lengthwise with the machine serves to insure uniformity in the width of the shingle. The spring M′ is especially adapted to accomplish the purpose required of a joint at point of connecting bar K′ to the cross-girt. An ordinary form of joint would soon have lost-motion, thereby destroying the accuracy of the entire machine. Hence the advantage of the heavy angular spring used by me.

The lower extremity of bar K′ is bifurcated and fits in an annular groove formed in set-screw N′. The latter has screw-thread engagement with a socket formed in the lower portion of standard H′, thus permitting said standard to be vertically adjusted. This set-screw N′ determines the thickness of the shingles. When it is turned so as to bodily raise the table provided with the tiltways the shingles are cut of less thickness than when the screw is turned so as to bodily lower said tilt mechanism.

A rotary transverse shaft, P′, journaled in hangers R′, depending from the machine-frame, is provided with cams d^2, which latter engage with the extremities of the cross-girt L′. Said girt extremities fit in vertical slots formed in the hangers, and by turning the rotary shaft the cross-girt is raised or lowered.

A spalt-clearer, S′, is mounted on a vertically-curved arm, S^2, which latter is pivoted on a transverse rock-shaft, T′. This shaft is adapted to be moved by the operator, whereby to cause catch e^2, formed rigid with said shaft, to be raised so as to be engaged by the carriage on the latter's return movement. The carriage striking against this catch raises the spalt-clearer up, and the spalt is thrown out of the machine. When the spalt-clearer is raised up by the action of the carriage it is suddenly arrested on one side by link f^2, connected to arm g^2, which latter is rigidly secured to the machine-frame.

The head-block is provided with a glass roller, V′, mounted in bearings on the under side of the head-block and longitudinally therewith. This roller prevents injury to the saw in case the latter should tend to come in contact with the head-block. The head-block of the carriage is provided with a series of pawls, W′, pivoted in transverse line with its length. Said pawls have their outer arms, h^2, made heavier than their inner arms, l^2, and angular thereto. In normal position the inner arms of the pawls are thrown up and the outer arms hang down. The pawls are respectively fitted in transverse slots formed in the head-block, and they have free tilting movement on their pivotal bearings. The outer arms of the pawls are adapted normally to engage with a stop, m^2, formed on the forward extremity of the valve-shifting rod. By this engagement said valve-rod is moved so as to shift the valve and cause the carriage to be actuated in its return movement. The carriage then comes in contact with a stop, n^2, formed on the valve-shifting rod, thereby shifting the valve so as to cause the carriage to be actuated in its feed-movement. As the shingle-bolt rests in position on the head-block it is contiguous to the forward side of the carriage, and is next to the saw. The pawls which have their inner arms in contact with the shingle-bolt are thereby tilted so as to throw said inner arms down and to throw the outer arms of the pawls up. The pawls which do not have their inner arms in contact with the shingle-bolt have their outer

arms in normal lowered position, adapted to engage with stop m^2. It is evident that the first pawl nearest the saw, which is not in contact with the shingle-bolt, will therefore operate the valve-shifting rod, and cause the carriage to be started in its return stroke. Should all the pawls be in contact with the shingle-bolt the rear portion of the carriage itself may engage with stop m^2. In this manner the carriage may be automatically reversed, and the extent of travel is determined by the width of the shingle-bolt. If the shingle-bolt is wide the carriage will be moved a correspondingly-greater distance toward the saw than if it were a narrow bolt, thus causing the distance of travel of the carriage after the shingle-bolt first comes in contact with the saw to be equal to the width of said bolt.

The value and importance of the foregoing construction will be appreciated when it is remembered that all power-feed machines heretofore made have had no means whereby the extent of feed-travel of the carriage is automatically determined by the width of the shingle-bolt which is being cut. A shingle is from two to sixteen inches in width. Three-fourths of the quantity of shingles made will average six inches in width. If a power-feed machine is set to run a certain number of cuts per minute, usually fifty, as their stroke is regular, and extends sixteen inches each time, while for three-fourths of said strokes but little over six inches out of sixteen inches serve any cutting purpose, it is evident that an unnecessary travel of the carriage is thereby caused.

By my improvement the carriage is caused to travel in its feed-movement only a distance sufficient to pass completely through the shingle-bolt which is being cut, and thus all unnecessary travel of the carriage is saved.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a shingle-machine, the combination, with a horizontal saw and a vertical saw-arbor having its lower extremity provided with one or more annular grooves, of journal-boxes having their interior sides provided with corresponding horizontal projections which respectively fit in said annular grooves, substantially as set forth.

2. In a shingle-machine, the combination, with a horizontal saw, a vertical saw-arbor whose lower extremity is provided with one or more annular grooves, and journal-boxes having interior horizontal projections which respectively fit in said grooves, of gibs which fit in an annular groove of the saw-arbor above the journal-boxes, and screws which secure the gibs to the top of the journal-boxes in vertical adjustment, substantially as set forth.

3. In a shingle-machine, the combination, with a horizontal saw, a vertical saw-arbor, and journal-boxes having their exterior sides provided with horizontal grooves, of a bridge-pot having interior lateral projections extending lengthwise with the machine and which fit in said grooves, and set-screws which maintain the journal-boxes at the desired point of adjustment on said projections, substantially as set forth.

4. In a shingle-machine, the combination, with a horizontal saw, a vertical saw-arbor, and bridge-pot, of journal-boxes for the arbor fitted in said bridge-pot, and a screw which vertically adjusts the latter, substantially as set forth.

5. In a shingle-machine, the combination, with a saw-arbor and journal-boxes fitted in a bridge-pot, of a cross-girt provided with a vertical guideway in which the bridge-pot slides, and a screw which vertically adjusts the latter, substantially as set forth.

6. In a shingle-machine, the combination, with a horizontal saw, a vertical saw-arbor provided with an annular groove, and journal-boxes having their meeting edges provided with upper extensions, of gibs whose extremities have lateral bearing against said extensions, and adjusting-screws which secure said gibs to the top of the journal-boxes at different heights therefrom, substantially as set forth.

7. In a shingle-machine carriage, the combination, with a dog, a head-block, and rack-and-pinion mechanism connecting them, of arms which connect the dog with a rock-shaft, and a spring-pressed pawl which engages with a circular rack formed on the carriage, substantially as set forth.

8. In a shingle-machine carriage, the combination, with a carriage-frame provided with longitudinal slots in its opposite sides, a dog whose extremities project through the slots and are provided with racks formed lengthwise with the carriage, and mechanism which moves the dog, of a head-block whose extremities are provided with rack-bars extending lengthwise with the carriage, and two pinions located on opposite sides of the carriage and respectively connecting the rack-bars of the dog with the rack-bars of the head-block, substantially as set forth.

9. In a shingle-machine carriage, the combination, with a carriage-frame whose sides are provided with longitudinal slots, a dog having its extremities projecting through the latter and provided with bars extending lengthwise with the carriage, the lower sides of said bars being formed as racks, of a head-block whose extremities are provided with bars extending below the rack-bars of the dog and having their upper sides formed as racks, and two pinions located on the outer sides of the carriage-frame and respectively connecting the rack-bars of the dog with the rack-bars of the head-block, said dog being provided with actuating mechanism, substantially as set forth.

10. In a shingle-machine, the combination, with rock-shaft L, rod b', having a limited pivotal movement on said shaft, and stationary racks s, of arm u, rigidly secured to said

shaft, and spring-pressed pawl *t*, pivoted to the arm, said rod *b'* operating, by its limited pivotal movement, to disengage the pawl from the rack before turning the rock-shaft, substantially as set forth.

11. In a shingle-machine, the combination, with two independent tiltways, of a shifting device which moves said tiltways independently of each other, and supports which provide rigid lateral bearing for the tiltways when the latter are respectively released from engagement with said shifting device, substantially as set forth.

12. In a shingle-machine, the combination, with two independent tiltways and a shifting device, of set-screws which provide adjustable lateral bearing for the tiltways as the latter are respectively disengaged from said shifting device, substantially as set forth.

13. In a shingle-machine, the combination, with two independent tiltways, of a shifting-bar disconnected from both the same and adapted to be longitudinally moved, the ends of said shifting-bar having free bearing respectively against the tiltways, substantially as set forth.

14. In a shingle-machine, the combination, with a shingle-bolt carriage, of a table located below the latter and provided with tiltways, a depending standard supporting the table, and a set-screw which vertically adjusts said standard to move the table to or from the carriage, substantially as set forth.

15. In a shingle-machine, the combination, with a shingle-bolt carriage and a table located below the latter and provided with tiltways, of mechanism, substantially as described, which adjusts the table in horizontal inclination lengthwise with the machine, and thereby moves the rear portion of said table to or from the carriage, substantially as set forth.

16. In a shingle-machine, the combination, with a shingle-bolt carriage and a table located below the latter and provided with tiltways, of mechanism, substantially as described, which adjusts the table in horizontal inclination with the carriage, and a spring which tends to maintain the table normally parallel with said carriage, substantially as set forth.

17. In a shingle-machine, the combination, with a standard depending from the table on which the tiltways are mounted, of a spring connected to the bearings in which the standard is supported, and a set-screw which adjusts the standard in vertical inclination lengthwise with the machine, substantially as set forth.

18. In a shingle-machine, the combination, with a standard depending from the table on which the tiltways are mounted, and a parallel bar provided with bearings in which the standard is fitted, of a spring which connects the upper extremity of said parallel bar to a support, substantially as set forth.

19. In a shingle-machine, the combination, with a standard depending from the saw end of the table on which the tiltways are mounted, a parallel bar provided with slide-bearings in which the standard is fitted, and a spring which connects the upper extremity of the parallel bar to a support, of a horizontal set-screw which adjusts said bar forward or rearward in vertical inclination, and a vertical set-screw which adjusts the standard up or down in its slide-bearings, substantially as set forth.

20. In a shingle-machine, the combination, with tiltways and a shifting-bar which moves them, of a tilting-handle provided with a slot, a movable device fitted in the latter, and a spring connected to the movable device, said handle and shifting-bar being connected by intermediate mechanism, substantially as set forth.

21. In a shingle-machine, the combination, with tiltways and intermediate connecting mechanism, of a tilting-handle and adjustable stops which limit the tilting movement of said handle, substantially as set forth.

22. In a shingle-machine, the combination, with a catch projecting from the machine-frame and provided with notches, and a horizontal cam-roller provided with a depending rod, of a pivotal lever whose inner extremity connects with the shifting-rod and whose outer extremity has frictional engagement with the cam-roller, said depending rod being adapted, by engagement with the catch-notches, to lock the shifting-bar against movement, substantially as set forth.

23. In a shingle-machine, the combination, with a saw, of a carriage whose head-block is provided with a glass roller mounted on its lower side and adapted to prevent injury to the saw in case the latter should tend to come in contact with the head-block, substantially as set forth.

24. The combination, with a shingle-machine carriage and actuating mechanism, of a shifting-rod provided with a handle pivoted to the machine-frame, and a cam-roller adapted to lock said handle by frictional engagement therewith, substantially as set forth.

25. In a shingle-machine, the combination, with a carriage provided with a series of tripping-dogs, of a shifting-rod or its equivalent connected with the carriage-driving mechanism and adapted to be engaged by the dogs, certain ones of said dogs, according to the width of the shingle-bolt, being engaged by said bolt and thereby operated so as to cause the shifting-rod or its equivalent to automatically determine the length of stroke of the carriage, substantially as set forth.

26. In a shingle-machine, the combination, with a carriage head-block provided with a series of tripping-dogs, of a shifting-rod or its equivalent connected with the carriage-driving mechanism and adapted to be engaged by the outer extremities of the dogs, certain ones of said dogs, according to the width of the shingle-bolt, being adapted to have their inner ex-

tremities engaged by the shingle-bolt, and thereby operating their outer extremities so as to cause the shifting-rod or its equivalent to determine the stroke of the carriage, substantially as set forth.

27. In a shingle-machine, the combination, with a carriage head-block provided with a series of transverse vertical slots, of dogs fitted in the latter, and a shifting-rod or its equivalent connected with the carriage-driving mechanism, substantially as set forth.

28. In a shingle-machine, the combination, with a shingle-bolt carriage, of a vertically-moving spalt-clearer and connecting mechanism, substantially as described, adapted to be operated by the carriage in its return movement and thereby actuate the spalt-clearer in an upward throw, substantially as set forth.

29. In a shingle-machine, the combination, with a spalt-clearer and an operating-rod, of a connecting device, substantially as described, adapted to be thrown by said rod into engagement with the shingle-bolt carriage as the latter is on its return movement, and thereby actuate the spalt-clearer in its upward throw, substantially as set forth.

30. In a shingle-machine, the combination, with a spalt-clearer, an operating-rod, and a connecting device adapted to be thrown by said rod into engagement with the shingle-bolt carriage as the latter is on its return movement, of a link connected to the spalt-clearer and adapted to limit it in its upward throw, substantially as set forth.

31. In a shingle-machine, the combination, with a vertically-vibrating spalt-clearer provided with an arm, of an operating-rod provided with an arm which connects with the spalt-clearer arm, said rod-arm being adapted to be engaged by the carriage on its return movement, and thereby actuate the spalt-clearer in its upward throw, substantially as set forth.

32. In a shingle-machine, a carriage-frame composed of a single piece of angular wrought metal having two sides and one end, said frame being formed with an outwardly-projecting flange having curved corners, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of March, 1880.

WILLIS J. PERKINS.

Witnesses:

E. M. WILLIAMS,

JOHN MILLER.