(No Model.)

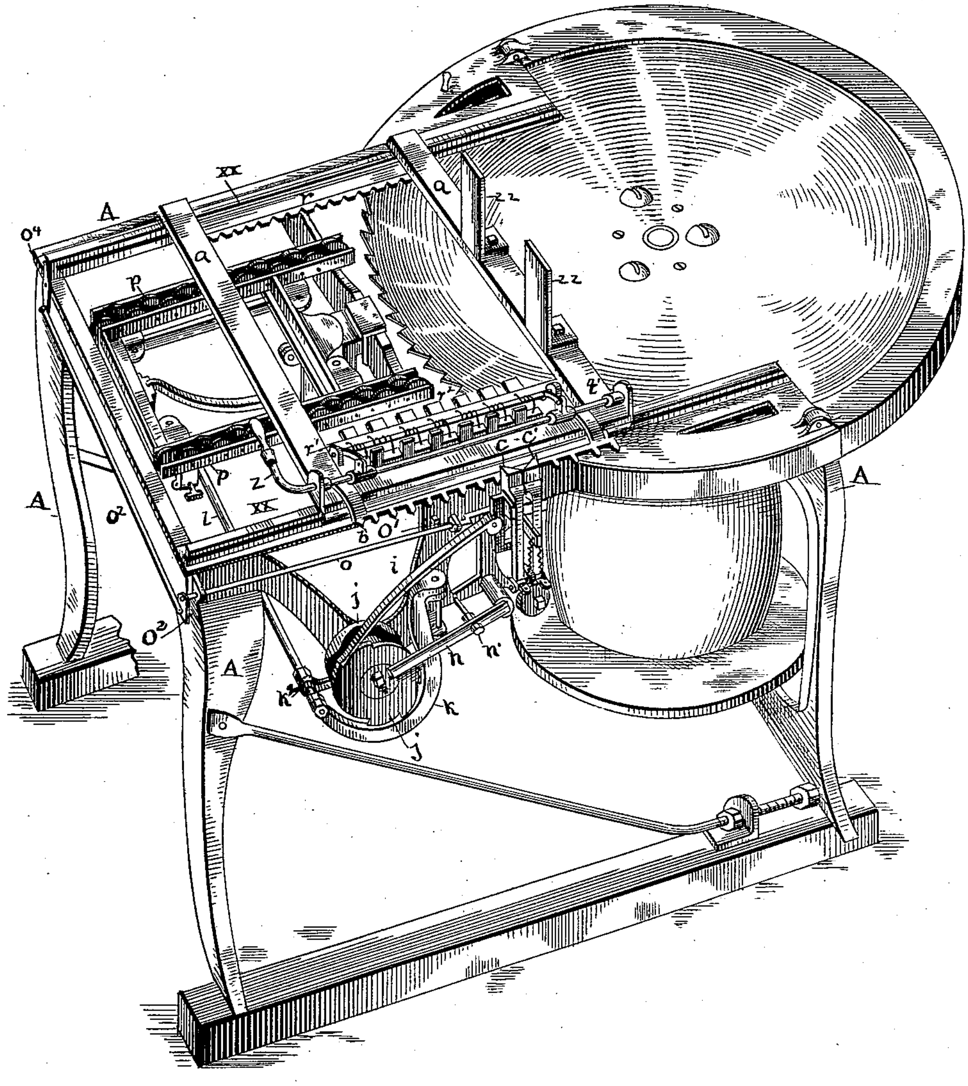
4 Sheets—Sheet 1.

W. J. PERKINS.

SHINGLE MACHINE.

No. 469,976. Patented Mar. 1, 1892.

FIG. 1.



WITNESSES.

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L. M. Bartlett.

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atty.

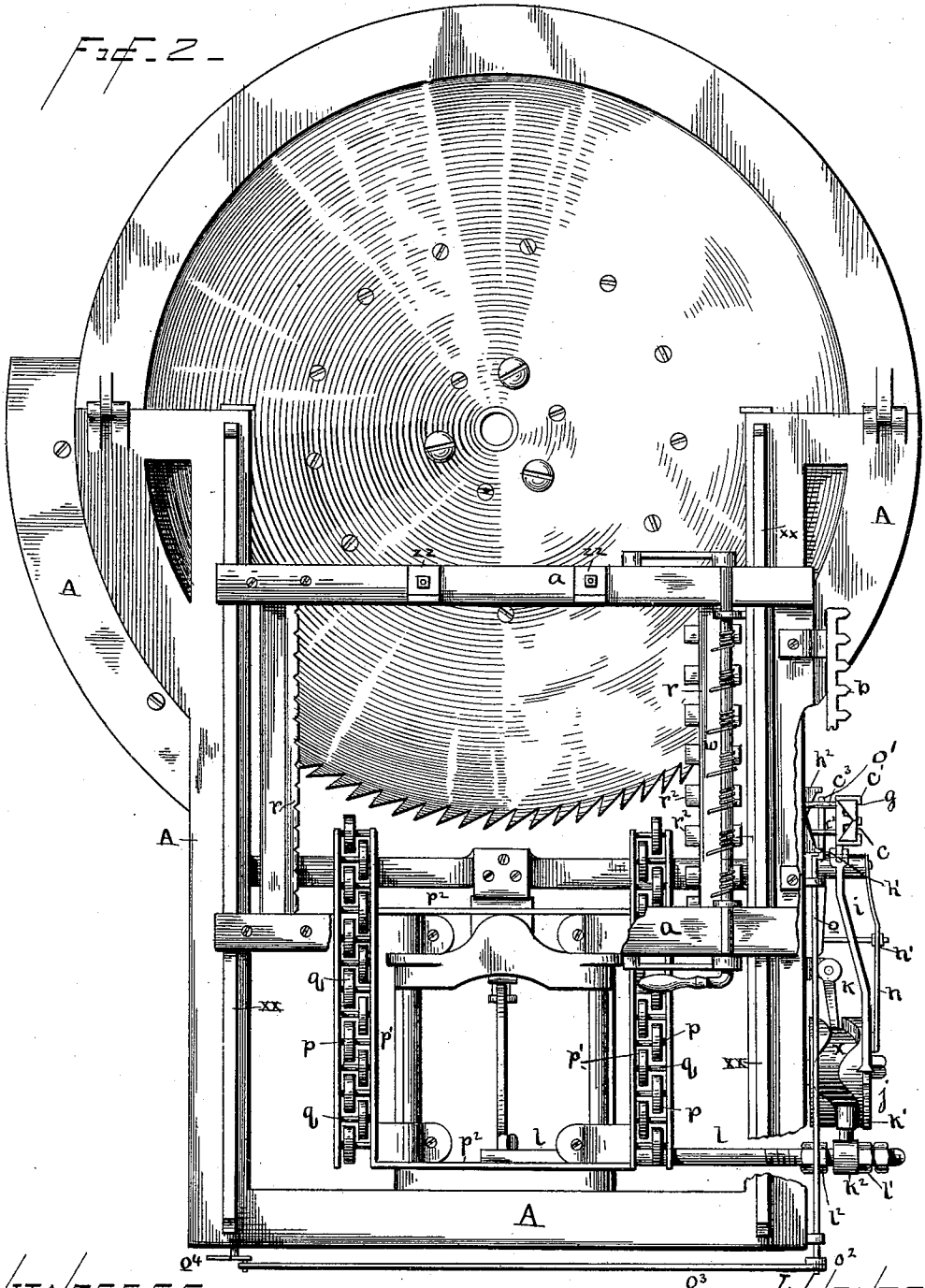
(No Model.) 4 Sheets—Sheet 2.

W. J. PERKINS.

SHINGLE MACHINE.

No. 469,976. Patented Mar. 1, 1892.

Fig. 2.



WITNESSES.
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(No Model.) 4 Sheets—Sheet 3.

W. J. PERKINS.

SHINGLE MACHINE.

No. 469,976. Patented Mar. 1, 1892.

Fig. 3.

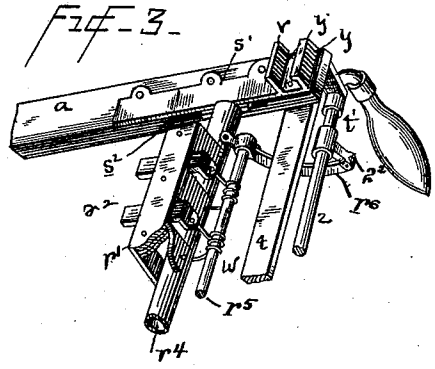


Fig. 10.

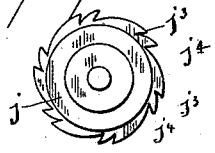


Fig. 11.

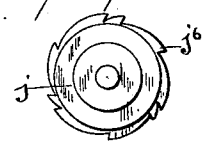
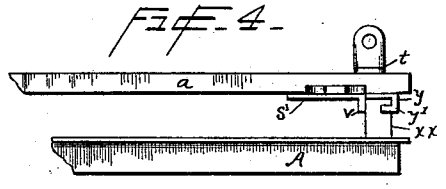


Fig. 4.



WITNESSES.
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(No Model.) 4 Sheets—Sheet 4.

W. J. PERKINS.

SHINGLE MACHINE.

No. 469,976. Patented Mar. 1, 1892.

Fig 5.

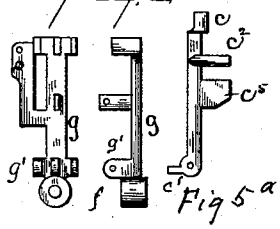


Fig 5ª

Fig 6.

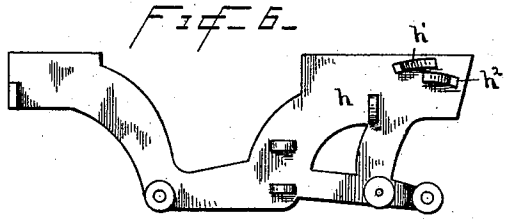


Fig 7.

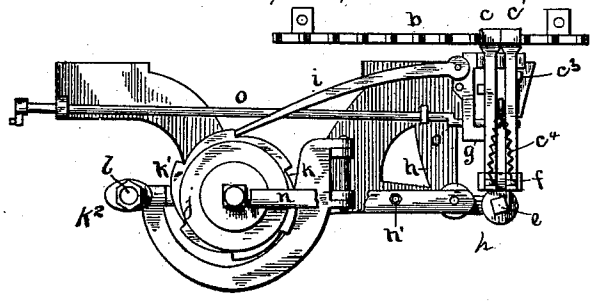


Fig 8.

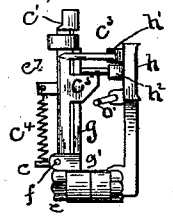
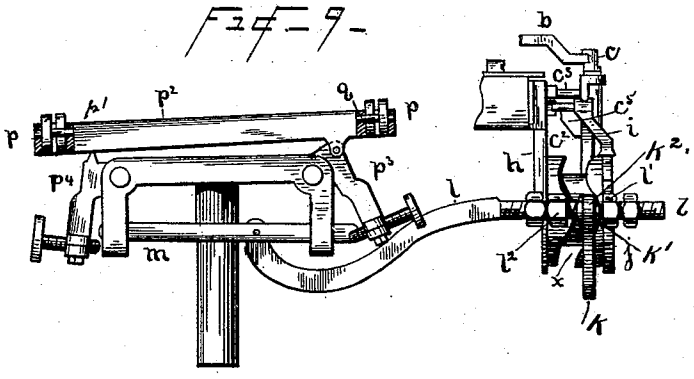


Fig 9.



WITNESSES.

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Willis J. Perkins

By Wm A Barlett

atty.

UNITED STATES PATENT OFFICE.

WILLIS J. PERKINS, OF GRAND RAPIDS, MICHIGAN.

SHINGLE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 469,976, dated March 1, 1892.

Application filed November 5, 1888. Renewed June 20, 1891. Serial No. 396,895. (No model.)

To all whom it may concern:

Be it known that I, WILLIS J. PERKINS, residing at Grand Rapids, in the State of Michigan, have invented certain new and useful Improvements in Shingle-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to shingle-sawing machines; and the object of the invention is to improve the various parts of the machine.

The invention most particularly relates to improvements on hand-feed shingle-machines in the mechanism for operating the tilt-table of a shingle-machine and also the bolt-supporting surface of the tilt-table, also the bolt-carrying carriage and the dogging mechanism of a shingle-machine.

Figure 1 is a perspective of the shingle-sawing machine. Fig. 2 is a top plan of the machine with parts broken away, so as to better illustrate certain details. Fig. 3 is an under side perspective of one corner of the carriage. Fig. 4 is an end view of carriage-supporting track. Fig. 5 shows a face and side view of the rocking arm, and Fig. 5^a a side view of one of the fingers which engage rack on the carriage. Fig. 6 is an elevation of part of the frame. Fig. 7 is an elevation of details hereinafter referred to. Fig. 8 is an end elevation of parts of the machine. Fig. 9 is an end elevation, with parts omitted, of the tilt-actuating mechanism. Figs. 10 and 11 are detail elevations of ratchet-wheels, which may be used in connection with the tilt.

This shingle-machine is of the same general type of hand-feed machines as described in Letters Patent to Willis J. Perkins, dated March 31, 1885, No. 314,603.

The tilt-table used on this machine is fully described in patent to Willis J. Perkins, No. 236,620, dated January 11, 1881, excepting the roller-bolt bearing-surface and method of operating hereinafter described. Tilting mechanism has heretofore been applied to hand-feed machines; but in all such devices with which I am familiar the carriage has to be brought back to a fixed point before the tilting motion was completed, thereby requiring extra exertion of the operator and consequent loss of time. In the following-described movement for operating the tilt the above objection is overcome.

In the device herein illustrated, the letter A indicates the frame of the machine, which supports the saw, tilt-table, and other working parts. A side bar h on this frame is hereinafter referred to. The carriage a a has a rack-bar b attached to one side. Two rocking fingers c c' are supported on the frame in a manner which will now be described. An arm g is pivoted to the part h of the frame and can rock on the pivot e in the direction of the movement of the carriage. Lugs g' on this arm support the pivot f, which carries the fingers c c'. These fingers or catches c' c are drawn toward the bar g by springs c^4, attached to lugs or projections c^6 and c^7 on the fingers and on the arm, so that the fingers c c' will be drawn by the springs into engagement with the rack-bar b. The ends of the teeth of the rack-bar should be inclined, as shown, and the adjacent sides of the spring-fingers are also beveled or inclined, (see Fig. 2,) while the outer faces of these fingers are at a right angle to the line of movement of the carriage. Consequently one of the fingers will oppose a resistance to the movement of the carriage in one direction and the other in the other direction when in engagement, but both may rock out of engagement with the teeth of the carriage. The fingers c c' have inwardly-projecting pins c^2 c^3. Frame h has two inclines or cam-bearings h' h^2, on which the pins c^2 c^3 impinge. Now, referring to Fig. 2, when the carriage is moved toward the saw the first tooth of rack b will engage finger c and swing said finger and its arm g in the direction of movement of the carriage. The pin c^2, bearing on the incline h^2, will gradually lift the finger c out of engagement with the rack-teeth, and the carriage will then complete its movement without further rocking the arm g, finger c' sliding along the rack-teeth. On a reverse movement of carriage and rack b the finger c' will be engaged by the rack-teeth until its pin c^3, bearing on the incline h', is lifted free of the rack-teeth. Thus the reciprocation of the carriage through a long path will swing the arm g but a short distance, determined by the cam-surfaces h' h^2. The arm g has a pawl i pivoted thereto, the free end of the pawl engaging the teeth of a ratchet-cam j, which is journaled to a stud or bar h of the frame.

The pawl i should be adjustable on arm g, so as to have a different throw when desired. The ratchet-cam j is held from too easy rotation by friction-bar n, bearing on the outer or disk face of said ratchet, the friction being regulated by nut n'. The ratchet-cam j has a race cam or groove x, in which a roller k' has bearing. This roller k' is mounted on a swinging frame k, which is pivotally supported on part h of the machine-frame. The free end k^2 of frame k has a hole through it, and rod l passes through this hole. The rod l may thus have a play in its seat in frame k, which play will be regulated by set-nuts l' l^2. The swing of frame k is more than enough to move the rod l longitudinally to the greatest distance needed to actuate the tilt-table, and thus the tilt movement may be regulated by the lost motion between nuts l' l^2 and frame k. (See my patent, No. 236,620, of January 11, 1881.) As the movement of end k^2 of frame k is uniform, if it is desired to diminish the thickness of the right-hand shingle-point, turn the nut l^2 so as to make quicker engagement with end k^2 of frame k, and vice versa. (See Fig. 9.)

As it is not always desirable to tilt the tilt-table after sawing a shingle, the following mechanism is shown for throwing the tilt-actuating fingers out of operation, so that when tilted in either direction the tilt-table will remain undisturbed. A rock-shaft o at the side of the machine bears a crank or eccentric o', located inside of the fingers c c'. A lever o^2 on the rock-shaft o is connected by draw-rod o^3 with operating lever or handle o^4, which is located on the main frame within reach of the hand of the operator. When the rock-shaft o is turned by moving the handle o^4, the crank or eccentric o' is turned against projections c^5 c^5 from both the fingers c c', thus rocking both fingers out of position to engage the rack b. The tilt-table will then remain unmoved during the reciprocation of the carriage. It will be understood that other equivalent mechanism may be employed for some of the mechanical parts set forth, the same being within the knowledge of the mechanic.

While as a rule butts and points alternately in opposite directions are preferable, exceptions to this rule must be made where machines are crowded to their utmost capacity, so as to assist the "jointer." (The jointer is a technical name applied to the man who trims the shingle-edges.) To accommodate the jointer, it is desired to make two butts and two points each way before reversing, thereby saving the jointer the time required to turn each shingle. The above purpose I accomplish wholly by the form of cams and ratchet-wheel as follows: Cam j^2, Fig. 10, is made with a raceway similar to one on cam j, except the dwell is longer, the variation otherwise being confined to the spacing of the ratchet-teeth. The long distance from tooth j^4 to tooth j^3 is the same as travel given to pawl I. (The cam j^2 is substituted for cam j when desired.) The short distance from j^4 to j^3 is preferably less than the dwell in the raceway. (See Fig. 7.) As carriage moves forward from left to right, pawl I drops over tooth j^3. In reverse motion of the carriage pawl I rotates cam j^2 the long distance from tooth j^4 to tooth j^3. The forward movement of carriage-pawl I traverses the long distance, but falls short of dropping over tooth j^3 a distance equal to distance from point of tooth j^3 to tooth j^4. On reverse movement pawl I rides over back of tooth j^3 until it engages with tooth j^4, when it partially rotates cam-wheel a distance equal to distance between tooth j^3 and tooth j^4, thereby requiring two movements of carriage to effect one change of tilt.

Still another form of cam is required on shingle-machines of this character when provided with the attachment patented by myself August 24, 1886, No. 348,050, (see Fig. 14, therein,) for cutting thin stock into shingles. A machine so adapted is called a "stealer" machine. In the stealer machines, used more particularly in cutting inch lumber into shingles, it is desirable to start sawing on the board with point of first shingle at the left. An inch board is the multiple of three shingles. The first cut is with point at the left; second cut with butt at the left; third cut with point at left. The next board must start with point at left to come out right. Therefore the cam-wheel must make two points at left, then one butt, and so on. Cam-wheel j^6, Fig. 11, accomplishes this peculiar motion, the ratchet being spaced so that by means of alternate long teeth it takes two movements of carriage to rotate a lift of raceway, as described heretofore on cam j^2.

Many other forms may be necessary, but the above are all trade requirements have developed at present.

The tilt-table bearing-surface p p is an improvement on patent to Gordon Earl, No. 298,737, May 20, 1884, said device as therein shown not being applicable to the peculiar form of tilt used by me and the method of attaching rollers therein described being unsatisfactory in practice.

p p p' r is a rectangular frame having double sides and a series of rollers q q, mounted on suitable shafts and having journal-bearings in each of the sides p p' to diminish the space between the bolt-bearing surface on the periphery of the rollers, thereby lessening liability of the narrow bolts tipping. I double up the line of rollers by alternating the rollers on the journals, the wearing-surface is doubled, and tendency to get out of alignment is lessened.

p^2 p^2 are cross-bars connecting the sides p p. The roller-supporting frame p p is pivotally attached to the independent tilt side p^3 while it rests loosely on tilt side p^4, thereby allowing it to slide thereon to compensate for draw of circular movement of tilt side p^3. The tilt sides p^3 and p^4 are moved by draw-bar m,

which is connected to draw-bar l, and the lowermost position of either end of the tilt may be determined by set-screws, as in my patent referred.

In hand-feed machines the operator has to propel the carriage back and forth by sheer force of muscle, therefore by lightening it the labor of handling is proportionately decreased. The carriage therefore has two side pieces a a, preferably made of wood. Stationary dog r^4 is bolted to them. The movable dog r' has sliding bearings on metal pieces or binding-strips s', Fig. 3, a recess s^3 being cut in the carriage side a, forming the seat for slide bearing the dog r'. The tie t connects the two ends of sides a a, and is bolted solid to sides a a. Tie t is turned up on the ends, sleeve-bearings t', fastened thereto, forming journal-seats for dogging-rod z. Sliding bearing v is formed partially out of the dog-seat s', the piece s' being turned down to present a bearing-face for slide-rail x x and completed by right-angle bearing y. Part of bearing y has an inwardly-extending projection y', which fits into groove x' on slide-rail x x. The carriage a a is thereby locked on the slide-rail x x and cannot be thrown off the rail onto the saw.

A further object of my improved carriage is to meet the wants of manufacturers that are making dimension shingles—that is, shingles of uniform widths. The standards of shingles now adopted and manufactured extensively in certain sections of the United States are respectively four inches, five inches, and six and one-half inches. It is with present methods employed very difficult to crosscut shingle-bolts from the log of exact length. It is also a waste of time to saw shingles with one narrow bolt in the shingle-machine carriage at a time; therefore I have adapted this carriage to hold from one to three shingle-bolts of varying lengths, as now about to be described. It must be understood that where a shingle-bolt having an irregular dogging-surface or a number of shingle-bolts of uneven length or dogging-surface are to be held in one carrier, carriage, or compartment the grasp of the dog or dogs on the bolts must be very firm and solid. The dogs must be able to support or carry the bolt or bolts or spalts thereof over an open space—such as the space between the end of the tilt-table and the edge of the saw or other space where there is no supporting way for the bolt to ride on—and the weight of the bolt or the jar of the machine or other accidental cause must not loosen the hold of the dogs. The dogs must only loosen the bolts when they are expected to do so, if good results are desired.

The principle of the auxiliary dogging mechanism is applicable to shingle-sawing machines and block-sawing machines of different construction, either reciprocating or rotary, and hence I do not limit myself to the application of this part of my invention to this particular form of shingle-machine or for the special mechanism for operating the dogs, whether by hand or mechanically. Moreover, the compound dog or dog with movable teeth may be used to grasp one end of the block, and any known or usual holding device may be used at the other end of the block without departing from my invention.

Referring to Fig. 2, and especially to the detail, Fig. 3, one dog r is of usual or any approved construction, as with a series of holding-teeth arranged side by side and shown in line with each other and near one end of the carriage. The other dog r' has a series of holders or biting-teeth r^2, which in some measure partake of the movement of the main dog r', but have also an independent movement. Fig. 3 shows the dog-teeth or holders r^2 as movable in bearings in the main dog r'. A spring w, connected to some part of the main dog, acts on each tooth or holder r^2 to press said tooth or holder forward, the dog r^2 sliding in ways in the body of the main dog r'. The movable dog r' is moved forward or back by any suitable train of mechanism common for the purpose. As shown, this general movement of the dog is effected by the following train of mechanism. The dog r' is mounted on or carried by the support r^4, and the springs w are mounted on the support r^5, which supports partake of the movement of and are preferably part of the main dog. A link r^6 connects the dog r' to the lever z^2 on the shaft. Consequently the rocking of the shaft z throws the entire dog r' forward or back, with a tendency to engage with the bolt or bolts, which may be between the dogs r r'; but as dog-teeth or holders r^2 have a movement independent of the dog r' they will adjust themselves to the ends of the bolt or bolts in the carriage, as many teeth or holders r^2 engaging the end of a bolt or bolts as the width of the bolt or bolts will warrant, and even if the bolts are irregular in length or of irregular dogging-surface (within usual limits) the compound dog will adjust itself to engage and hold firmly the bolt or bolts in the carriage. The springs w have one bearing against the dogs or teeth r^2 and the other against a piece which partakes of the movement of and virtually forms part of the main dog r'.

High bolts are apt to tip when being sawed. To prevent this, I have placed the guides or gages z z z z on front side of carriage, against which the bolt may be held by the operator while sawing, he employing one hand, as a rule, to handle the carriage with.

It will be understood that the spring-fingers constitute a clutch-trip, which makes engagement between the carriage and the tilt-operating train of mechanism, and that said trip has this peculiarity of movement, that it is operative with the first movement of the carriage in either direction, and after it has been in operation long enough to actuate the tilt it becomes automatically inoperative, no matter what the movement of the carriage may be.

It will thus appear that the trip has a variable relation to the carriage and operates automatically, whether the carriage be reciprocated a long or short distance. This I find a very important feature of the machine. Thus, suppose the operator desires to saw shingles from a narrow bolt—say four inches wide—the edge of the shingle-bolt is near the saw before the movement of the carriage begins. The operator presses the carriage and bolt toward the saw, and, as soon as the shingle is sawed from the bolt, reverses the carriage. The clutch will be actuated to move the tilt precisely as if the carriage had made a long travel—as for an eight or twelve inch shingle-bolt or a number of narrow bolts. Thus the operator is not compelled to make a full reciprocation of the carriage in order to actuate the tilt, as in all other machines with which I am familiar.

It is within the spirit of my invention to substitute mechanical equivalents for the parts shown. The clutch or trips referred to will operate with other trains of tilt-actuating mechanism—such as the trains shown in my patents referred to and in other United States patents on shingle-sawing machines.

I desire to cover the novel features of my invention whether used as a whole or in parts.

What I claim is—

1. In a shingle-sawing machine, the combination, with a reciprocating carriage, of a movable arm, a finger on said arm in position to engage the carriage, and a pawl extending from said arm and engaging with the tilt-operating ratchet, all in combination, substantially as described.

2. In a shingle-machine, a reciprocating carriage having a rack thereon, a swinging arm in the frame having spring-fingers in position to engage said rack, a pawl connected to the arm, and a tilt-operating ratchet engaged by said pawl, all in combination, substantially as set forth.

3. In a shingle-machine, a reciprocating carriage, a rack on said carriage, a swinging arm on the frame having fingers engaging said rack and having a pawl engaging the tilt-operating ratchet, and bearing-surfaces by which these fingers may be separately thrown out of engagement with the rack by the carriage movement, substantially as described.

4. In a shingle-machine, a reciprocating carriage, a rack thereon, a pivoted arm on the carriage having a pawl operating on the tilt-actuating ratchet, and a pair of spring-fingers, each finger having one inclined surface and one straight surface in position to engage with the rack, all the recited elements being combined substantially as described.

5. In a shingle-sawing machine, the combination of a reciprocating carriage having projection thereon, a movable catch outside the carriage in position to engage the said projection at the beginning of the carriage movement, and a tilt-actuating train connected to the catch, in combination, substantially as described.

6. In a shingle-machine, a reciprocating carriage moving on ways, a pair of catches outside the carriages and at the side of the ways in position to engage the carriage at the beginning of its movement in either direction, and a tilt-actuating train leading from said catches, the combination being and operating substantially as described.

7. In a shingle-machine, a moving carriage, a catch outside the carriage connected to the tilt-actuating train in position to engage said carriage at the beginning of its movement in either direction, and detaching-surfaces to disengage said catch after it has moved a limited distance with the carriage, all combined substantially as stated.

8. In a shingle-machine, the combination of a reciprocating carriage having projections thereon, movable fingers supported by the frame in position to engage said projections, inclines connected to the frame in position to disengage said fingers from the carriage during the carriage movement, a pawl connected to said fingers so as to partake of the carriage movement during the engagement of the fingers therewith, and a tilt-actuating pawl engaged by said ratchet, all substantially as described.

9. In a shingle-machine, the combination of a reciprocating carriage having projections thereon, a finger in position to engage said carriage and actuate the tilt through a train of adjunctive connections, substantially as described, and a rod under control of the operator in position to hold said finger out of engagement, and thus render the tilt inoperative, substantially as described.

10. In a shingle-sawing machine, the combination of the reciprocating carriage, an arm pivoted to the frame and having two fingers in position to engage said carriage, bearings connected to the frame in position to disengage said fingers alternately after the carriage has made a part of its movement, a pawl leading from said fingers, and a tilt-actuating cam engaged by said pawl, all combined substantially as described.

11. In a shingle-machine, a reciprocating carriage, a movable arm having fingers in position to engage said carriage, a pawl connected to said arm, interchangeable ratchet-cams controlled by said pawl, and a tilt-rod actuated by one of said cams and connected to the tilt-table.

12. The combination, with the vibrating arm and its pawl, of a ratchet having unevenly-spaced teeth, a cam connected to said ratchet, and a rod whereby the tilt is actuated by said cam, substantially as stated.

13. In combination with the race-cam and its driving mechanism, a movable frame having a bearing-piece in said race, and a rod connected to the tilt, having adjustable engagement with said movable frame, whereby

a lost motion is permitted to the frame which actuates the tilt-rod.

14. The combination, with the race-cam and its driving mechanism, of a bearing-wheel in said cam-race, a rod passing loosely through the journal-piece of the bearing-wheel and connected to the tilt, and adjustable stops on the rod, whereby its movement in either direction may be governed by the bearing-wheels in the cam-race, substantially as described.

15. In a shingle-machine, the combination of the carriage-ways, a carriage moving thereon to a greater or less distance, as desired, and a tilt-actuating clutch engaging said carriage at the beginning of its movement in either direction.

16. In a shingle-machine, a reciprocating carriage having projections thereon, a series of fingers mounted in the path of movement of said projections and having a movement in the general direction of the carriage and transversely thereof, a train connecting said fingers to the tilt, and bearing-surfaces in the line of movement of said fingers serving to disengage the same.

17. In a shingle-sawing machine, the combination, with the reciprocating carriage, of a vertical block-supporting gage on the carriage and extending above the same at the side next the saw.

18. In a shingle-machine, the combination, with the carriage and block-supporting table, of a plural series of anti-friction wheels at one side of the table, said wheels overlapping each other, substantially as shown.

19. In a shingle-machine carriage, the combination of a stationary dog at one end of the carriage and a movable dog at the other end, one of said dogs having independent spring-pressed teeth, substantially as described.

20. In a shingle-machine carriage, the combination of a stationary dog at one end of the carriage and a movable dog at the other end, said movable dog having sliding teeth or auxiliary dogs, each independently acted on by a spring, substantially as stated.

21. In a shingle-machine carriage, the combination, with two non-metallic sides, a stationary dog forming end connections at one end between said sides, and a movable dog at opposite end, of a metallic tie forming end connection between side pieces, and having a journal-seat attached thereto for holding dog-operating rod.

22. In a shingle-machine carriage having two sides suitably connected and holding-dogs attached thereto, an upright guide, as 22, attached to side of carriage nearest the saw and adapted to form bearing for side of shingle-bolt to rest against.

23. The combination of the saw, a reciprocating carriage, a tilt-train, and a trip actuating said train and having a variable relation to the carriage, whereby the tilt may be actuated by a movement of the carriage less than a complete reciprocation.

24. The saw, a reciprocating carriage moving over the face thereof, a tilt-table and its operating-train, and a trip connected to said train in position to actuate the same at the beginning of the backward movement of the carriage from any part of its way, in combination, substantially as described.

25. In a shingle-machine, a bolt-carrier having a holding-dog and a movable dog, said movable dog having separate and independently-movable teeth, combined substantially as described.

26. In a shingle-machine, a bolt-carrier having a dog at one end of the bolt provided with a series of independently-movable teeth moving in bearings in the main dog and a retaining-dog at the other end of the shingle-bolt, in combination, substantially as described.

27. In a shingle-machine, the movable carriage having a movable dog and mechanism for moving the same, a plurality of independent teeth carried by said dog, each tooth pressed by a spring which has a bearing on the main dog and on the tooth, and a separate holding-dog at the other end of the shingle-bolt, in combination, substantially as described.

28. In a shingle-machine, a carriage having a main dog and means for moving the same and auxiliary teeth in said dog, each tooth pressed forward by a spring independently of all the other teeth, said springs attached to and moving with the main dog, and a retaining-dog at the opposite end of the bolt from said movable dog, the parts in combination, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS J. PERKINS.

Witnesses:
ARTHUR C. DENISON,
GEORGE CLAPPERTON.