April 9, 1963 L. B. DENNISON 3,084,726

MACHINE FOR FACING SHINGLES

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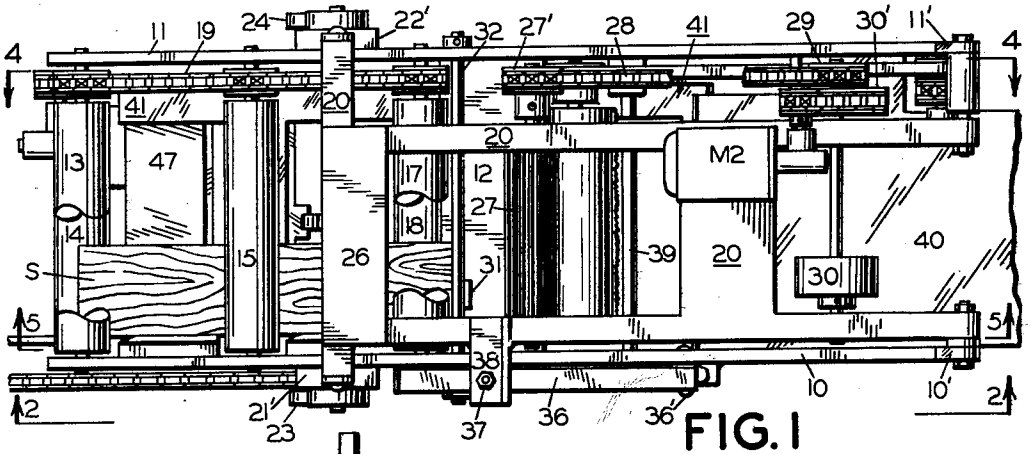


FIG. 1

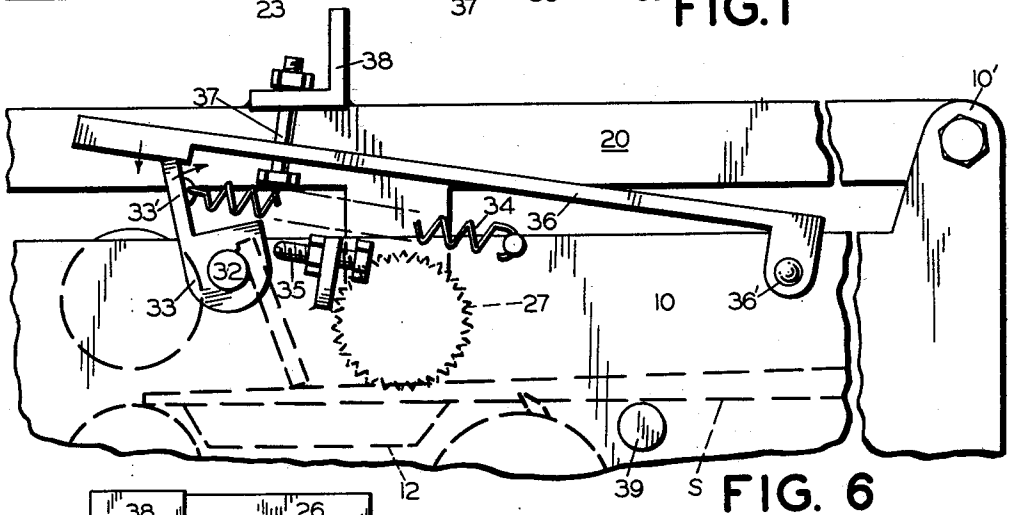


FIG. 6

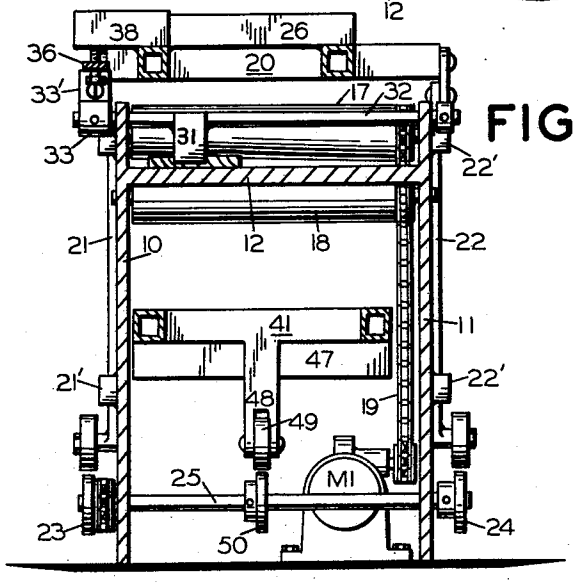


FIG. 3

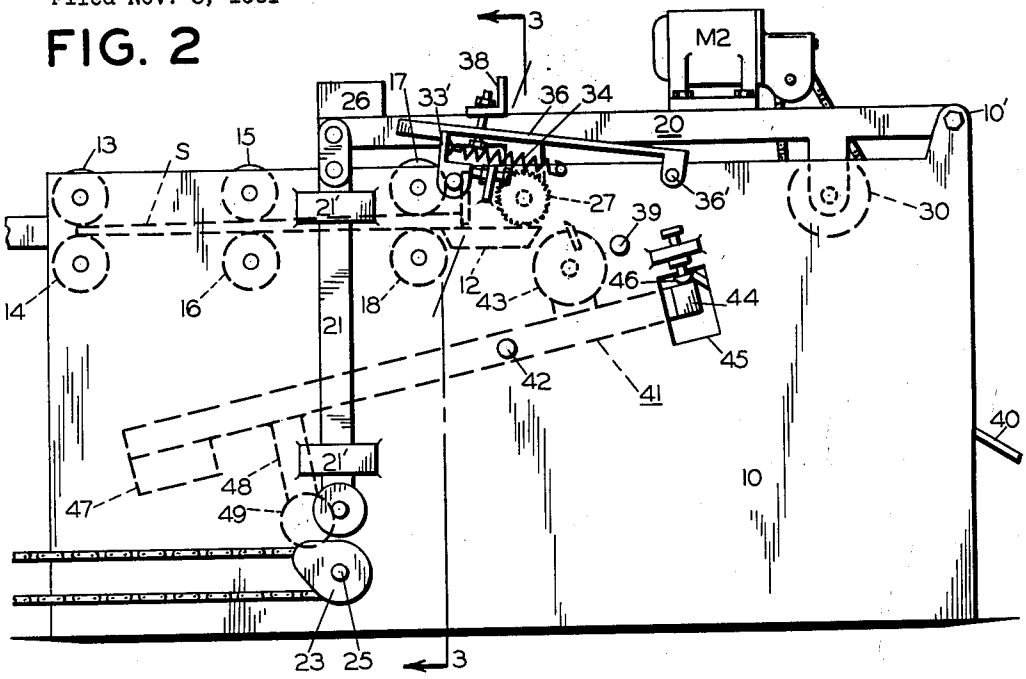
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MACHINE FOR FACING SHINGLES

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FIG. 2



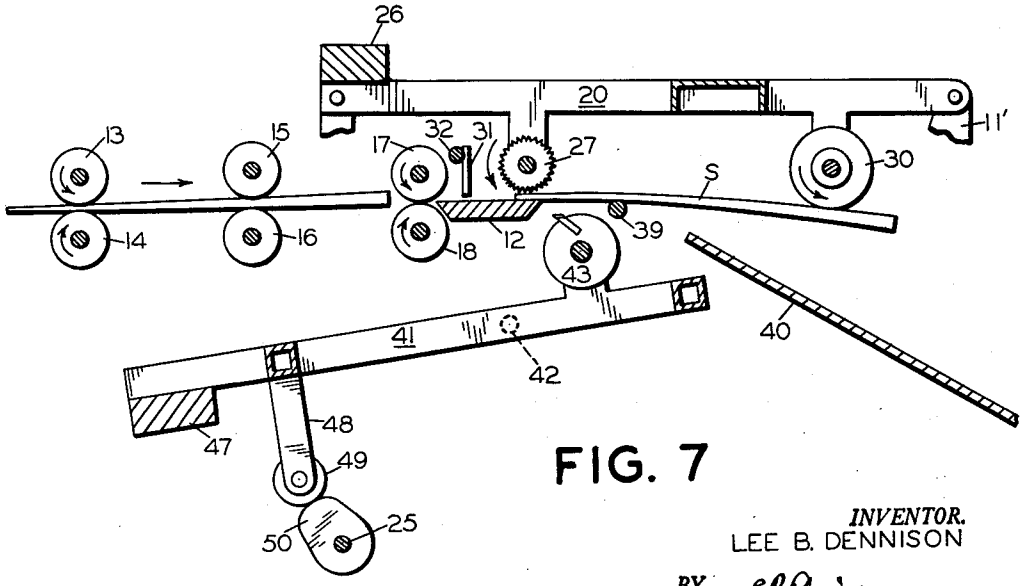


FIG. 7

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FIG. 4

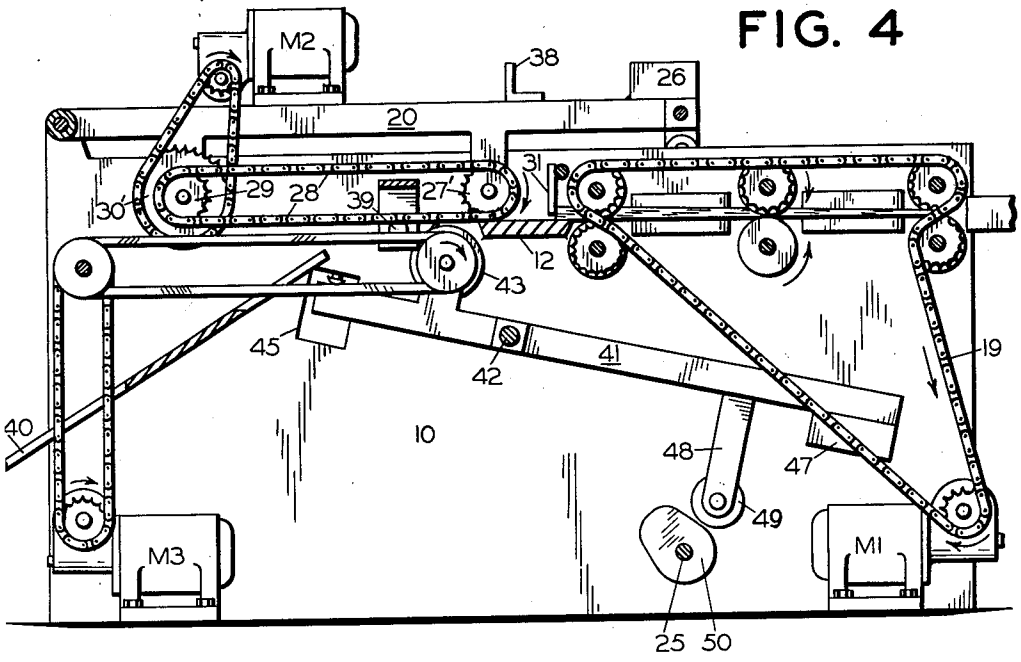
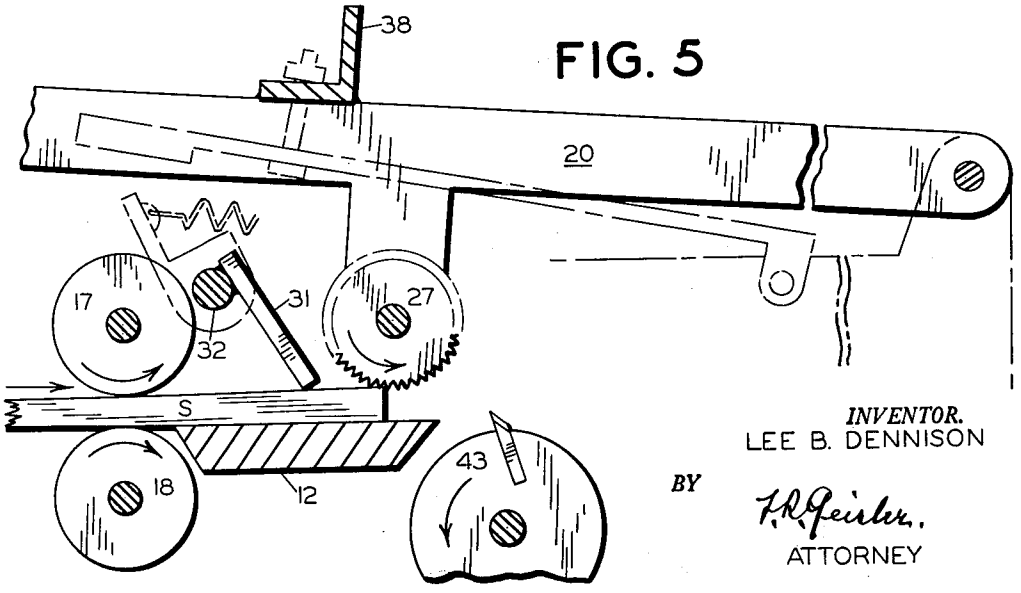


FIG. 5



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3,084,726

MACHINE FOR FACING SHINGLES

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Filed Nov. 3, 1961, Ser. No. 149,927
7 Claims. (Cl. 144—13)

This invention relates in general to means for facing or grooving machine-sawed shingles so as to cause the exposed surfaces of the shingles, when the shingles are laid in place, to simulate hand split shingles or shakes in appearance.

In particular, the present invention relates to the grooving of ordinary wedge-shaped shingles, in which the grooving of the surface must not extend to the thin end tip of the shingle and with which care must be taken to avoid splitting or otherwise mutilating the thin end tip. More specifically, the invention is concerned primarily with a device for grooving such wedge-shaped shingles in which each shingle will be fed to the grooving means butt end first.

An object of the invention is to provide an improved shingle facing machine through which the shingles are passed butt end first in which the travel of the shingles past the facing tool and the spacing of the consecutive shingles one from the other will be automatically regulated and timed by simple and practical control means so arranged as to engage and subsequently release the butt end of each shingle in succession.

In the apparatus illustrated and described in my United States Letters Patent No. 2,987,088, issued under date of June 6, 1961, the butt end of each shingle is engaged by a pin which is automatically raised to allow the shingle to continue its travel. However, the thrust of the shingle butt against such pin, as the pin is being raised, has sometimes resulted in the marring of the shingle butt, and, when the butt is of exceptional thickness, has sometimes failed to release a shingle and thereby cause the machine to jam.

A related object of this invention accordingly is to provide a shingle facing machine with holding and control means arranged for engagement with the but end of the shingle, the operation of which means will not be effected by variations in the thicknesses of the butt ends of the shingles, and which holding and control means cannot cause any marring of the shingle even though the shingle is of unusual thickness; and furthermore which will not stick or fail to function under any normal operating conditions.

In some shingle facing machines the grooving tool or cutter head is temporarily thrust upwardly into contact with the traveling shingle during the grooving operation, and then allowed to drop back into normal lowered position out of the path of the shingle. When shingles are grooved in rapid succession the quick upward thrusts imparted to the cutter head have a tendency to produce vibration or chattering of the cutter head while in raised position, with resulting undesirable irregularities in the grooving. Therefore an additional object of the present invention is to provide an improved shingle facing machine in which the cutter head is normally firmly held in raised position and momentarily lowered out of contact with the shingle only during the passage of the thin tip end of the shingle above the cutter head.

A further object of the invention is to provide an improved, simple and practical shigle facing machine which will operate efficiently and rapidly without requiring excessive care and without presenting any particular maintenance problems.

The manner in which these objects and incidental advantages are attained, and the construction and operation of this improved shingle facing machine, will be briefly

explained and described with reference to the accompanying drawings.

In the drawings, all of which are partly diagrammatic;

FIG. 1 is a top plan view of the machine with portions broken away for clarity and showing a shingle with its travel momentarily restrained by the stop gate in preparation for the grooving operation;

FIG. 2 is a side elevation taken on line 2—2 of FIG. 1;

FIG. 3 is a transverse staggered sectional elevation taken on the line indicated at 3—3 in FIG. 2;

FIG. 4 is a sectional side elevation on line 4—4 of FIG. 1;

FIG. 5 is a fragmentary sectional side elevation taken on the line indicated at 5—5 in FIG. 1, drawn to a larger scale, with certain outer members indicated by broken lines, showing the shingle released and moving forwardly and about to encounter the grooving cutter head;

FIG. 6 is a fragmentary side elevation drawn to the same scale as FIG. 5, showing the shingle during the grooving operation; and

FIG. 7 is a fragmentary sectional side elevation also taken on the line indicated at 5—5 in FIG. 1, drawn to the same scale as FIG. 1, but showing the shingle at the conclusion of the grooving operation and just prior to being released from the machine.

Referring first to FIGS. 1, 2 and 3, the machine is mounted in a suitable support frame including a pair of parallel side plates **10** and **11** connected by suitable cross members, which are not shown except the cross member **12**, which cross member **12** also serves as a guide support for the shingle during part of the travel of the shingle through the machine.

A shingle (indicated by S in the drawings) enters the machine butt end first from a conveyor (not shown) or other suitable feed means, and is moved along between cooperating pairs of feed rolls **13** and **14**, **15** and **16**, and **17** and **18**. The shafts for these feed rolls are mounted in suitable bearings (not shown) supported by the frame side plates **10** and **11**, the bearings for the shaft of the upper roll of each pair preferably being spring-mounted, as is customary with such devices. The shafts from most of these feed rolls carry sprockets which are engaged by an endless sprocket chain **19** (FIG. 4) driven from a motor M1.

A top frame assembly **20** is hingedly mounted at the top of the machine frame for limited up and down movement, being hingedly supported above the rear end of the machine frame and mounted on hinge stub shafts supported in upstanding ears **10'** and **11'** on the rear end of the side plates **10** and **11**. The forward end of this frame assembly **20** is supported on a pair of vertical slide bars **21** and **22** (FIG. 3) which slide up and down in pairs of guides **21'** and **22'** mounted on the outside faces of the side plates **10** and **11** respectively. The bottom ends of these side bars carry cam followers or rollers for engagement with a pair of identical cams **23** and **24** respectively (FIGS. 1, 2 and 3) secured on the opposite ends of the rotating shaft **25**. The shaft **25** is driven from a suitable source of power (not shown). Thus rotation of the shaft **25** and cams **23** and **24** causes the forward end of the frame assembly **20** to be moved upwardly to a limited extent intermittently. A weight **26** is mounted on the forward end of the frame assembly **20**.

A drive roller **27** is carried by the frame assembly **20**, its shaft being mounted in arms extending downwardly from the side members of the frame assembly **20**. The surface of this roller **27** is formed with sharp, longitudinally-extending ridges and grooves, or with other suitable means for firmly gripping the upper face of a shingle when the shingle is moved into contact with the roller **27**. A drive sprocket **27'** (FIGS. 1 and 4) on one end of the

shaft for the roller 27 is connected by sprocket chain 28 with a driven sprocket 29.

A second shingle-engaging roller 30 (FIGS. 1 and 7) is also carried by the frame assembly 20 and is located near the rear or hinged end of the frame assembly. A sprocket 30', as well as the sprocket 29 (FIG. 4) are secured on the shaft for the roller 30, and the sprocket 30' is driven by chain connection with a motor M2 mounted on the frame assembly 20.

A stop gate 31 (FIGS. 1, 3, 5 and 7) is secured at its top to a transversely extending hinge shaft 32 which is rotatably mounted in the side plates 10 and 11. A control bracket 33 (FIG. 6), having an upwardly extending control arm 33', is secured on the outer end of the shaft 32 beyond the side plate 10. A coil spring 34 has one end attached to the arm 33' and the other end secured to the side plate 10. This coil spring is under tension at all times and tends to move the shaft 32 and stop gate 31 clockwise (as viewed in FIG. 6). An adjustable limit stop 35 is mounted on a lug on the outside of the side plate 10 and limits the clockwise rotation of the bracket 33, and therewith of the shaft 32 and stop gate 31. When the bracket 33 is in engagement with the stop 35 the stop gate will be in the vertical position indicated in FIGS. 1, 2, 3 and 7. While the coil spring 34 exerts a force to hold the stop gate in this vertical closed position, the pull of the spring is not sufficient to prevent an advancing shingle from pushing the gate 31 counter-clockwise and sliding under the open gate, unless the gate is locked in such closed position in the manner presently explained.

A latch bar 36 (FIGS. 1, 2 and 6) is pivotally mounted at 36' on the side plate 10 for up and down movement. The free end of this latch bar is slidably mounted on a bolt 37 suspended from a bracket 38 extending out from the side of the top frame assembly 20. The latch bar 36 has a shoulder adapted, when the frame assembly 20 is in lowered position and the bracket 33 is in engagement with the stop 35, to engage the top of the arm 33' and lock the stop gate 31 in closed position until the latch bar is lifted by upward movement of the top frame assembly 20.

When the top frame assembly 20 is in the normal lowered position, as illustrated in FIG. 2, and the stop gate 31 is locked in closed position, the butt end of the traveling shingle S will come into engagement with the locked stop gate and the movement of the shingle will then be halted until the cams 23 and 24 lift the top frame assembly 20. This causes the latch bar 36 to be lifted out of engagement with the top of the arm 33', whereupon the forward thrust of the shingle S, produced by the constantly rotating feed rolls, will cause the butt end of the shingle to push the stop gate open (as indicated in FIG. 5). Then, with the subsequent lowering of the top frame assembly 20, the stop gate 31 will nevertheless be kept open by the engagement of the shingle with the bottom edge of the stop gate as long as the shingle continues to slide along under the stop gate (as shown in FIG. 6). Even though the end of the latch bar 36 beyond the shoulder portion will now momentarily rest on the top of the arm 33', the engagement of the top face of the shingle with the stop gate, as the shingle slides along under the stop gate, will keep the gate from returning to locked position. However, as soon as the shingle has moved out from under the stop gate 31, the spring 34 will cause the stop gate to move to closed position and the shoulder of the latch bar, by engaging the arm 33', will cause the stop gate to remain locked until the top frame assembly 20 is again raised.

As apparent from FIGS. 5 and 6, no marring of the butt end or of the top face of the shingle can occur with the movement of the shingle past the stop gate. With the lifting of the latch bar 36, which occurs with the raising of the frame assembly 20, there can be no failure of the stop gate to open, regardless of any collection of debris, and similarly there can be no failure of the stop gate to close as long as a shingle is not passing beneath the stop gate. Furthermore, variations in the thickness of the singles or of the butt ends of the shingles cannot cause any failure in the functioning of the stop gate. These are important features of the invention.

When the stop gate is unlocked, as previously explained, the shingle moves along (butt end first) over the cross member 12 and encounters the drive roller 27. The momentary raising of the top frame assembly 20, causing the unlocking of the stop gate, raises the drive roller 27 sufficiently to cause the butt end of the advancing shingle to start to move under the drive roller and to be engaged by the drive roller. The subsequent lowering of the top frame assembly 20 then causes the drive roller 27 to bear down on the top of the shingle. Consequently there will be a positive drive constantly exerted on the shingle until the shingle has passed entirely beyond the drive roller 27. During this period the facing of the bottom surface of the moving shingle takes place as will be explained.

The shingle moves along over a shaft 39, the ends of which are rotatably supported by the side plates 10 and 11. Finally the shingle comes into contact with the driven roller 30 (FIG. 7), which is of larger diameter than the drive roller 27, and the shingle moves beneath this roller 30, causing a slight momentary flexing of the shingle, until the thin end of the shingle leaves the drive roller 27. Then the shingle tips downwardly and forwardly and slides off onto the chute 40 and passes from the machine.

A lower frame assembly 41 (FIGS. 2, 3, 4 and 7) is mounted on a pivot shaft 42, the ends of which pivot shaft are supported in the side plates 10 and 11 respectively. The driven rotating cutter head or shingle facing tool 43 is carried on this lower frame assembly 41. As shown in the drawings, the pivot shaft 42 for this lower frame assembly 41 is located off-center in the frame assembly 41. The cutter head 43 is mounted on the shorter or lighter end of this assembly. An arm 44 (FIG. 2) extends from one side of the shorter end of this assembly and extends out through a window 45 in the side plate 10 and is arranged to engage an adjustable stop 46. Due to the overbalanced mounting of the frame assembly 41 this frame assembly will normally be in the position indicated in FIG. 2, with the arm 44 bearing up against the stop 46, and thus the cutter head 43 will normally be in the maximum raised position. As a further means for maintaining the lower frame assembly 41 firmly in this normal position (except when the frame assembly 41 is momentarily moved from such position), an extra weight 47 is carried on the lower heavier end of the frame assembly 41. The cutter head 43 is driven from a motor M3 through the intermediary of suitable connecting means, as shown in FIG. 4.

When the frame assembly 41 is in the normal position previously described (and as indicated in FIG. 2), the cutter head 43 will be in the raised operative position for grooving the bottom face of a shingle as the shingle is moved along by the drive roller 27. However, as the thin end of the shingle begins to pass beneath the drive roller 27, the cutter head 43 is momentarily lowered by a tilting of the lower frame assembly 41, which causes the grooving of the shingle face by the cutter head to be discontinued a short distance from the thin tip of the shingle.

An arm 48 (FIGS. 3, 4 and 7), extending downwardly from the center of a cross bar in the lower heavier end of the frame assembly 41, carries a roller 49 which is adapted to be periodically and momentarily engaged by the extending peripheral portion on a cam member 50 which is secured on the rotating shaft 25. The cam member 50 is so shaped and arranged with respect to the end cams 23 and 24 on the shaft 25 (which cause the lifting of the top frame assembly 20 previously described) that

the engagement of the cam **50** with the roller **49** occurs a predetermined period after the raising and lowering of the top frame assembly **20**, and at the moment when the thin end of the shingle is passing under the drive roller **27**. In this way the cutter head **43** is momentarily lowered a slight distance when the thin end of the shingle is passing above it, and consequently any possibility of the thin end of the shingle being encountered by the cutter head is prevented.

At all other times, except when the cutter head is momentarily lowered in this manner, the cutter head remains in the raised position, and after being momentarily lowered, it is returned immediately to normal raised position, and is in this normal raised position prior to the lifting of the top frame assembly **20** and the unlocking of the stop gate for the shingle. In several other shingle facing machines the rotating cutter head is normally in lowered position and is momentarily raised for performance of the grooving or cutting operation. In the rapid succession in which the facting of shingles necessarily takes place in factory production of such faced shingles, it has been found that the sudden lifting of the cutter head into cutting position each time has a tendency to cause considerable vibration of the cutter head in the raised position, and this, under some conditions, may result in irregular, rough or imperfect grooving. However, by having the cutter head normally in raised, instead of lowered position, and by having the cutter head and supporting frame returned to such normal position in advance of the freeing of the shingle by the stop gate, any such vibrating tendency of the cutter head support during the cutting operation is practically entirely eliminated. This is another feature of the invention.

Minor modifications in various parts of the machine will be possible without departing from the principle of the invention and the scope of the claims, but the machine, constructed as illustrated and described has proved to be very practical during extensive and continued operation, and consequently the machine as illustrated is regarded as the preferred embodiment of the invention.

I claim:

1. In a shingle facing machine of the character described through which shingles are passed butt end first, a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle through the machine, said stop gate normally resting in closed position, said stop gate so arranged that a traveling shingle can push said gate open and slide past said gate except when said gate is locked in closed position, locking means connected with said top frame assembly for locking said gate in closed position, said locking means so arranged as to be placed in unlocking position by each upward movement of said top frame assembly, second shingle drive means in the machine positioned beyond said stop gate and arranged for engagement with the top face of the shingle passing through said stop gate, a lower frame assembly mounted for up and down oscillation in said main frame, means for vertically oscillating said lower frame assembly, and a driven cutter head mounted on said lower frame assembly beneath the path of a traveling shingle and beyond said stop gate and so positioned as to contact the lower face of a shingle passing on from said stop gate when said cutter head is in raised position, said oscillating means for said top frame assembly and said oscillating means for said lower frame assembly so arranged and synchronized that said cutter head will always be returned to raised position prior to the raising of said top frame assembly and the unlocking of said stop gate.

2. In a shingle facing machine of the character described through which shingles are passed butt end first, a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted at one

end on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle through the machine in said first shingle feeding means, a hinge shaft for said stop gate, said stop gate extending from said hinge shaft into the shingle path, said stop gate normally resting in closed position, resilient gate closing means exerting a constant force to hold said stop gate in normal closed blocking position, said resilient gate closing mean so arranged as to enable a traveling shingle to push said stop gate open sufficiently to slide past said stop gate except when said stop gate is locked in closed position, locking means connected with said top frame assembly for locking said gate in closed position, said locking means so arranged as to be placed in unlocking position by each upward movement of said top frame assembly, second shingle drive means in the machine positioned beyond said stop gate and arranged for engagement with the top face of a shingle passing through said stop gate, a lower frame assembly mounted for up and down oscillation in said main frame, means for vertically oscillating said lower frame assembly, and a driven cutter head mounted on said lower frame assembly beneath the path of a traveling shingle and beyond said stop gate and so positioned as to contact the lower face of a shingle passing on from said stop gate when said cutter head is in raised position, said oscillating means for said top frame assembly and said oscillating means for said lower frame assembly so arranged and synchronized that said cutter head will always be returned to raised position prior to the raising of said top frame assembly and the unlocking of said stop gate.

3. In a shingle facing machine of the character described through which shingles are passed butt end first, a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle in said first shingle feeding means, a substantially horizontal hinge shaft in said main frame for said stop gate, said stop gate extending downwardly from said hinge shaft into the shingle path, a spring exerting a constant force to hold said stop gate in normal lowered closed clocking position, said spring permitting the traveling shingle to push said stop gate open sufficiently against the force of said spring to slide under the bottom edge of said stop gate except when said stop gate is locked in closed position, a locking latch carried by said top frame assembly for locking said gate when said gate is swung down into closed position when said top frame assembly is in lowered position, said locking latch causing said gate to be unlocked upon each upward movement of said top frame assembly, a second frame assembly hingedly mounted in said main frame, a cutter head carried by said second frame assembly and positioned beyond said stop gate, and means for vertically oscillating said second frame assembly and operating in synchronism with said oscillating means for said top frame assembly to cause said cutter head to be positioned for contacting a shingle when a shingle is released by said stop gate with the upward movement of said top frame assembly.

4. In a shingle facing machine of the character described through which shingles are passed butt end first, a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle through the machine, said stop gate normally resting in closed position, said stop gate so arranged that a traveling shingle can push said gate open and slide past said gate except when said gate is locked in closed position, locking means connected with said top frame

assembly for locking said gate in closed position, said locking means so arranged as to be placed in unlocking position by each upward movement of said top frame assembly, a drive roll carried by said top frame assembly positioned beyond said stop gate and arranged for engagement with the top face of a shingle passing through said stop gate, the upward movement of said top frame assembly causing said drive roll to be raised for receiving the butt end of a traveling shingle and the subsequent lowering of said top frame assembly causing said drive roll to bear down on the shingle beneath said drive roll, a lower frame assembly mounted for up and down oscillation in said main frame, means for vertically oscillating said lower frame assembly, and a driven cutter head mounted on said lower frame assembly beneath and beyond said drive roll and so positioned as to contact the lower face of a shingle when the upper face is engaged by said drive roll when said cutter head is in raised position, said oscillating means for said top frame assembly and said oscillating means for said lower frame assembly so arranged and synchronized that said cutter head will always be returned to raised position prior to the raising of said top frame assembly.

5. In a shingle facing machine of the character described through which shingles are passed butt end first, a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle through the machine, a substantially horizontal hinge shaft for said stop gate, said stop gate extending downwardly from said hinge shaft into the shingle path beyond said first shingle feeding means, gate closing means exerting a constant force to hold said stop gate in normal lowered closed blocking position, said gate closing means so arranged as to enable a traveling shingle to push said stop gate open sufficiently to slide under the bottom edge of said stop gate except when said stop gate is locked in closed position, locking means connected with said top frame assembly for locking said gate when said gate is swung down into closed position with said top frame assembly in lowered position, said locking means so arranged as to be placed in unlocking position by each upward movement of said top frame assembly, second shingle drive means in the machine positioned beyond said stop gate and arranged for engagement with the top face of the shingle passing through said stop gate, a lower frame assembly mounted on a rock shaft in said main frame, said rock shaft being parallel to the hinge axis for said top frame assembly and to said hinge shaft for said stop gate, said lower frame assembly being off-balance on said rock shaft, means for vertically oscillating one end of said lower frame assembly, and a driven cutter head mounted on the lighter end of said lower frame assembly beneath and beyond said drive roll and so positioned as to contact the lower face of a shingle when the upper face is engaged by said drive roll while said lighter end of said lower frame assembly is in raised position, said means for vertically oscillating said lower end of said lower frame assembly so arranged that said lighter end of said lower frame, and therewith said cutter head, will normally be in raised position and intermittently momentarily lowered, and said oscillating means for said top frame assembly and said oscillating means for said lower frame assembly so arranged and synchronized that said cutter head will always be returned to normal raised position prior to the raising of said top frame assembly and the unlocking of said stop gate.

6. The combination set forth in claim 5 with the addition of an adjustable stop limiting the upward movement of said lighter end of said lower frame assembly and thereby defining the normal elevated position of said cutter head.

7. A shingle facing machine through which shingles are passed butt end first, said machine including a main frame, first shingle feeding means in said main frame, a top frame assembly hingedly mounted at one end on said main frame, means for vertically oscillating the free end of said top frame assembly, a hinged stop gate in said main frame for momentarily halting the travel of a shingle in said first shingle feeding means, a substantially horizontal hinge shaft for said stop gate, said stop gate extending downwardly from said hinge shaft into the shingle path, spring gate closing means exerting a constant force to hold said stop gate in normal lowered closed blocking position, said spring closing means so arranged as to enable a traveling shingle to push said stop gate open sufficiently to slide under the bottom edge of said stop gate except when said stop gate is locked in closed position, locking means connected with said top frame assembly for locking said gate when said gate is swung down into closed position and when said top frame assembly is in lowered position, said locking means so arranged as to be placed in unlocking position by each upward movement of said top frame assembly, a drive roll carried by said top frame assembly positioned beyond said stop gate and arranged for engagement with the top face of the shingle passing through said stop gate, the upward movement of said top frame assembly causing said drive roll to be raised for receiving the butt end of a traveling shingle and the subsequent lowering of said top frame assembly causing said drive roll to bear down on the shingle beneath said drive roll, a lower frame assembly mounted on a rock shaft in said main frame, said rock shaft being parallel to the hinge axis for said top frame assembly and to said hinge shaft for said stop gate, said lower frame assembly being off balance on said rock shaft, means for vertically oscillating the heavier end of said lower frame assembly, a driven cutter head mounted on the lighter end of said lower frame assembly beneath the path of a traveling shingle and beyond said stop gate and so positioned as to contact the lower face of a shingle when the upper face is engaged by said drive roll while said lighter end of said lower frame assembly is in raised position, and a stop limiting the upward movement of said lighter end of said lower frame assembly, said means for vertically oscillating said lower frame assembly so arranged that said lighter end of said lower frame assembly, and therewith said cutter head, will normally be in raised position and intermittently momentarily lowered, and said oscillating means for said top frame assembly and said oscillating means for said lower frame assembly so arranged and synchronized that said cutter head will always be returned to normal raised position prior to the raising of said top frame assembly and the unlocking of said stop gate.

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