

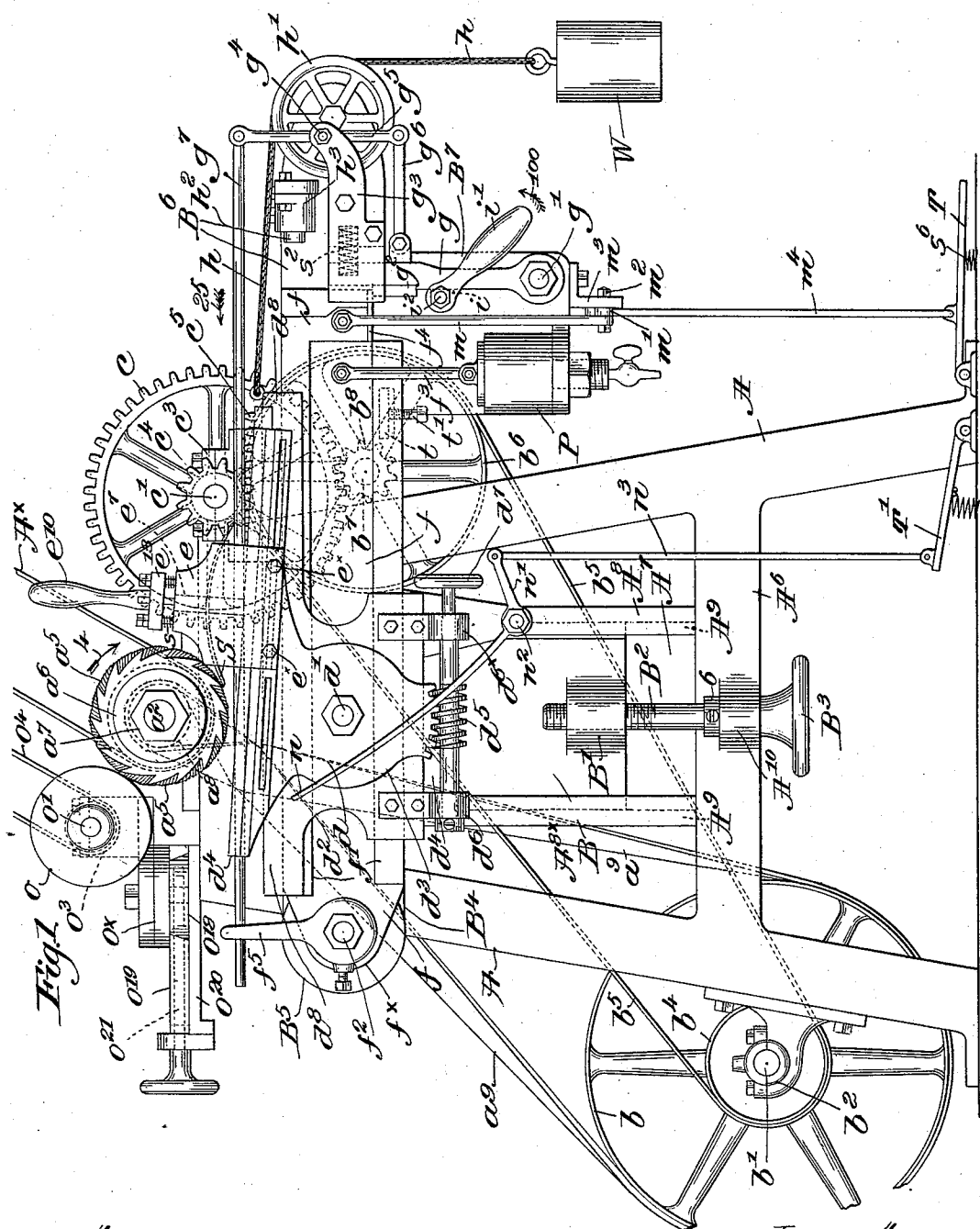
(No Model.)

3 Sheets—Sheet 1.

J. C. KILLAM.
SCARFING MACHINE.

No. 566,187.

Patented Aug. 18, 1896.



witnesses.

Frederick S. Grunhof.
John F. C. Prinkert

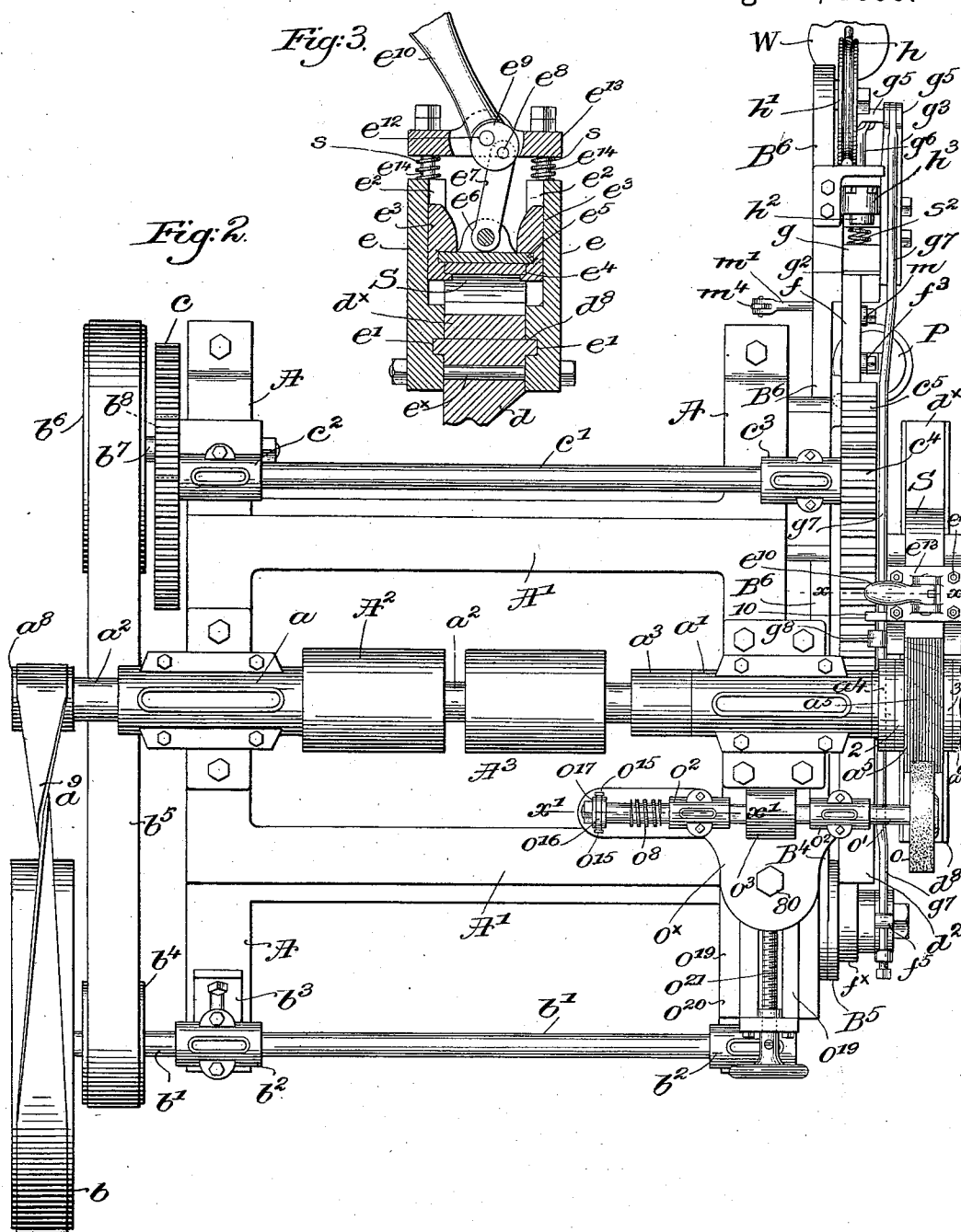
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Witnesses.

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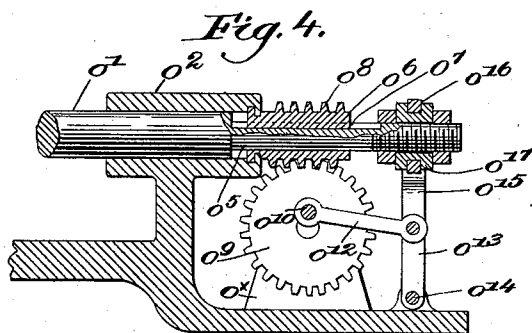
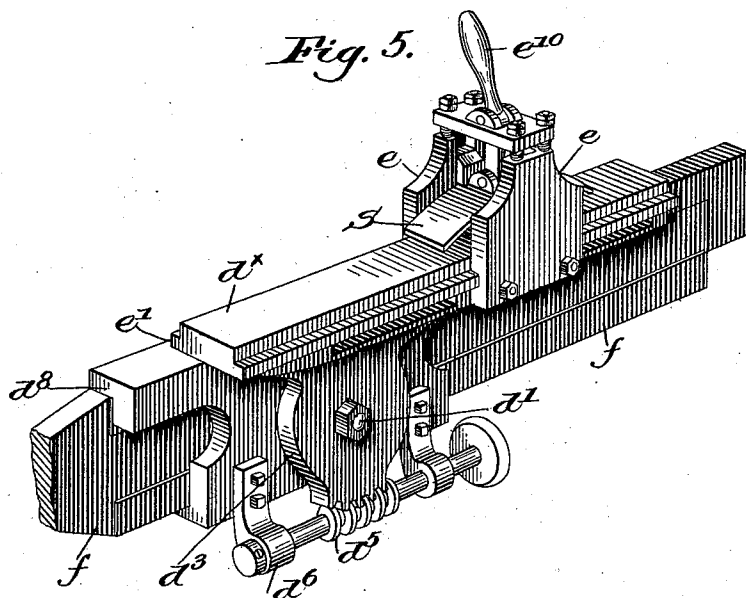
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3 Sheets—Sheet 3.

J. C. KILLAM.
SCARFING MACHINE.

No. 566,187.

Patented Aug. 18, 1896.



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UNITED STATES PATENT OFFICE.

JAMES C. KILLAM, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO THE BOSTON WOOD RIM COMPANY, OF BEDFORD, MASSACHUSETTS.

SCARFING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,187, dated August 18, 1896.

Application filed June 24, 1895. Serial No. 553,818. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. KILLAM, of Chelsea, county of Suffolk, State of Massachusetts, have invented an Improvement in Scarfing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Wooden wheel-rims have come into very extended use for bicycles and similar vehicles, and in order to make a smooth and strong joint the ends of the strip of wood which is to form the rim must be scarfed and brought down to a feather-edge.

Considerable difficulty has been experienced in producing the scarfs without chipping or slivering the wood, and in bringing the scarf to a feather-edge considerable hand-work must be employed, increasing the expense and decreasing the output.

This invention has for its object the production of a machine for scarfing the ends of wheel-rims in a rapid and accurate manner, whereby a fine feather-edge is obtained without any danger of splitting or chipping the wood.

In accordance therewith my invention consists in a scarfing-machine, substantially as will be hereinafter described in the specification, and particularly pointed out in the claims.

Figure 1 in side elevation represents a scarfing-machine embodying my invention, with the feed-table nearing the end of its feeding-stroke. Fig. 2 is a top or plan view of the machine shown in Fig. 1. Fig. 3 is an enlarged sectional detail of the work-clamp and its support, taken on the line xx , Fig. 2; and Fig. 4 is an enlarged sectional view of the traverse mechanism for the grinder, taken on the line xx , Fig. 2, and reversed. Fig. 5 is an enlarged detail view showing in perspective the work-support, slide-block, and cooperating parts.

The side frames A of suitable shape to support the operative parts of the machine are rigidly connected by cross-girths A', the side frames having secured thereto suitable bearings a and a' for the cutter-carrying shaft a^2 , said shaft having mounted thereon fast and loose pulleys A² A³, respectively, (see Fig. 2,) driven by a belt A^x from a suitable source of power. (Not shown.) A collar a^3 on the shaft adjacent the inner end of the bearing a' and a collar a^4 at the other end prevent longitudinal movement of the shaft, the ends of which project beyond the sides of the framework. A series of thin circular saws a^5 are mounted on the projecting end of the shaft a^2 at the right-hand side of the machine, viewing Fig. 2, held between annular washers 2 3 by a collar a^6 , provided with a threaded nut a^7 to screw onto the shaft. The saws a^5 are set in such manner that the teeth of one will project slightly beyond the teeth of the next adjacent one, as shown in Figs. 1 and 2, forming thereby a cutter-head having a series of diagonally-arranged cutting-points whereby the work is cut by a shearing cut, entirely obviating chipping and splitting of the wood, and as the cutter-head is rotated in the direction of the feed of the work it is possible to produce a most perfect feather-edge, the arrow 4, Fig. 1, indicating the direction of rotation of the cutter-head. A small pulley a^8 on the opposite end of the cutter-shaft is connected by a crossed belt a^9 to a very much larger pulley b , fast on an auxiliary shaft b' , mounted in bearings b^2 on brackets b^3 , secured to the side frames A at one end of the machine, the shaft b' having fast thereon a pulley b^4 , connected by a belt b^5 to a larger pulley b^6 , fast on a short shaft b^7 , mounted in one end of the side frames, the left-hand one, as clearly shown in Fig. 2. A pinion b^8 (see dotted lines, Figs. 1 and 2) is secured to the short shaft in mesh with the teeth of a large gear c on a feed-actuating shaft c' , rotatable in suitable bearings c^2 c^3 and extended across the machine, the shaft c' beyond the bearing c^3 having fast thereon a pinion c^4 to engage at times and move a rack-bar c^5 , secured to or forming a part of the feed mechanism to be described.

Referring now to Fig. 1, a tilting work-support d is pivoted at d' on a slide-block d^2 and provided with a depending arm d^3 , having a segment-gear d^4 thereon to be engaged by a worm d^5 , mounted in bearings d^6 , secured to the slide-block d^2 and provided with a suitable hand-wheel d^7 , rotation of the worm d^5 in one or the other direction tilting the work-

support d on its pivot to adjust the angle at which the work approaches the cutter-head. The top of the work-support d is longitudinally extended at d^8 below and in the plane of the cutter-head, and preferably has secured to its upper side a bed d^x , of wood or other non-metallic material, upon which the strip to be scarfed is clamped. The work-clamp is shown enlarged and in cross-section in Fig. 3 and consists of two upright stands $e e$, grooved on their inner faces at e' to embrace the edges of the top d^8 of the work-support and rigidly secured in place by bolts e^x , extended through the work-support from side to side. Preferably V-shaped vertical grooves e^2 are formed in the upper ends of the stands to form guides for a spring-holder e^3 , having shoulders e^4 to receive a bent spring S , retained in place on the shoulders by a plate e^5 , let into grooves in the holder e^3 just above the spring. An ear e^6 on said plate is connected by a link e^7 (see Fig. 3) to a crank-pin e^8 on the disk-like end e^9 of a hand-lever e^{10} , pivoted at e^{12} in a slotted cross-head e^{13} , vertically movable on bolts e^{14} on the tops of the stands and yieldingly supported on springs s , surrounding the bolts.

As shown in Fig. 3, the lever e^{10} is thrown over to raise the clamping-spring S ; but when the work is inserted beneath the spring on the bed d^x the lever is turned to the right, Fig. 3, depressing the spring-holder e^3 and pressing the spring S firmly upon the work. The slide-block d^2 is rearwardly extended at d^9 beneath the pinion c^4 and has secured to it the rack-bar c^5 , which is driven by rotation of the said pinion when in engagement therewith, the rack-bar being located between the work-support d and the main frame of the machine, as shown in Fig. 2. The slide-block d^2 is grooved at its inner side to engage a guide-plate f , having bearing-surfaces f' , Fig. 1, and pivotally mounted at one end on a stud f^2 in a vertically-adjustable support, to be described, a link f^3 at its other end connecting the guide-plate f to the piston of a dash-pot P of any suitable construction and mounted as will be described, the dash-pot acting as a cushion to prevent shock when the guide-plate carrying the guide-block d^2 and the tilting work-support d is permitted to tip down on its pivot f^2 . On a cross-bar A^6 of one of the side frames A (see Fig. 1) is erected an upright plate or casting A^7 , having flanges A^8 , provided with undercut grooves A^9 (see dotted lines, Fig. 1) to receive therein and guide the depending flat leg B of a substantially T-shaped casting, a threaded boss B' on said leg being engaged by the threaded shank of an adjusting-screw B^2 rotatable in a bearing A^{10} on the brace A^6 and held from longitudinal movement by a collar C and the base of a hand-wheel B^3 , rotation of the screw in its bearing raising or lowering the T-shaped casting vertically.

To the shorter horizontal arm B^4 of the casting, which will be termed a "support," is

secured the stud f^2 on which the guide-plate f is pivoted, the arm having a circular boss B^5 thereon to form an extended bearing for the similarly-shaped end f^x of the guide-plate, the horizontal part of the support extending below the cutting mechanism and back of the guide-plate f to and beyond the right-hand end of the machine, as at B^6 , viewing Fig. 1.

A depending portion B^7 of the arm B^6 (see Fig. 1) has secured thereon the dash-pot P , and a rocker-arm g is pivoted on the part B^7 at g' , said arm having a shoulder g^2 thereon to normally engage the free end of the guide-plate f , as clearly shown in Fig. 1, a pad f^4 of rubber or other yielding material being preferably secured to the guide-plate at such point. The arm g is pressed toward the guide-plate by a spring s^2 , held in suitable recesses in the arm and in a stand g^3 , bolted to the part B^7 , said stand having pivoted thereto at g^4 a lever g^5 , connected by a link g^6 to the rocker-arm g , which acts as a locking-latch for the guide-plate f . A suitably-bent rod g^7 is jointed to the upper end of the lever g^5 and extends through a suitable support f^5 on the guide-plate f adjacent its pivot-stud f^2 , the rod passing through a vertically-slotted ear 10, (see Fig. 2,) secured to the inner side of the work-support d and adapted to engage an adjustable collar g^8 , fast on said rod g^7 , when the work-support has been moved to almost the end of its feeding-stroke to move the rod g^7 in the direction of the arrow 25, Fig. 1, such movement of the rod, by the intervening connections, drawing the rocker arm or latch g back against the spring s^2 and withdrawing its shoulder g^2 from the end of the guide-plate f , permitting the latter to swing down about its pivot f^2 . As the guide-plate thus swings down it carries with it the slide-block d^2 , work-support d , and the rack c^5 , withdrawing the work on the work-support from the action of the cutter-head and disengaging the rack from the teeth of its cooperating pinion c^4 .

When the rack and pinion are disengaged, the slide-block d^2 is drawn back to the right, Fig. 1, by means of a cable or other flexible connection h , attached at one end to said guide-block, and after passing over a guide-sheave h' , mounted on the arm B^6 of the adjustable support, it is attached to a weight W , heavy enough to slide the slide-block and work-support back on the guide-plate f into position to have the work removed and reversed or for a new strip to be placed in position to be scarfed. The rearward movement of the slide-block is limited by engagement with the plunger h^2 of a dash-pot or cushioning device h^3 , secured to the arm B^6 .

If for any reason it is desired to stop the feed and lower the work from the action of the cutter, the latch g may be rocked into releasing position by means of a cam-surface i (see dotted lines, Fig. 1) on a lever i , (shown as pivoted at i^2 on the part B^7 of the adjust-

able support,) the lever being turned in the direction of the arrow 100, Fig. 1.

The operation of the machine is as follows: A strip of wood to be scarfed is clamped upon the bed d^4 of the tilting work-support d , the latter having been adjusted to the proper angle by the devices described, and the free end of the guide-plate f is raised until it is engaged by the shoulder of the latch g , thus bringing the rack c^5 into operative engagement with its pinion c^4 , rotation of the latter moving the work slowly forward to the action of the cutter-head.

In order to conveniently raise the guide-plate into operative position, a link m is pivoted thereto and jointed to one end of a lever m' , fulcrumed at m^2 to a bracket m^3 , secured to the part B^7 , the other end of the lever m' being connected by a link m^4 to a treadle T , which the operator depresses with his foot, thereby lifting the link m and thereby the guide-plate f until it engages the locking-lever, a spring s^6 preventing undue movement of the treadle.

As it is desirable to always adjust the leading end of the work on the work-support I have provided a bent lever $n n'$, pivoted at n^2 to the frame, the arm n' being connected by a link n^3 to a second treadle T' , depression of the latter throwing the end of the long arm n of the bent lever up in front of the work and gaging its position, and after the work is clamped the treadle T' is released and the arm n swings down into inoperative position. (Shown in Fig. 1.)

As the work is fed forward beneath the cutters or saws a^5 they begin cutting at the extreme end of the work, rotating in the direction of the feed and thus avoiding splintering, and cut down the work to a feather-edge as fine as desired, the inclined position of the work-rest determining the angle of the scarf as the feed proceeds.

To maintain the cutters truly cylindrical, I have mounted a grinder o on a shaft o' , rotatable in bearings o^2 on an adjustable block o^x , and provided with a pulley o^3 , rotated by a bolt o^4 (see Fig. 1) driven from any suitable source of power, the grinder being tangent to the cutters, and it is reciprocated back and forth across their faces.

Referring to Fig. 4 it will be seen that the shaft o' is reduced at o^5 to receive thereon a sleeve o^6 , splined to the shaft at o^7 and provided with a worm o^8 in engagement with a worm-wheel o^9 , mounted on the block o^x , a wrist-pin o^{10} on said worm-wheel being connected by a link o^{12} with a rocker-arm o^{13} , pivoted at o^{14} to the block, and forked at its upper end at o^{15} to carry pivotally a ring o^{16} , loose in an annular groove in a hub o^{17} , fixed on the end of the shaft. Rotation of the worm and sleeve by the shaft o' in turn rotates the worm-wheel o^9 , which by the connections described moves the shaft o' longitudinally sufficiently to traverse the grinder back and forth over the cutters. The plate o^x is con-

nected by a bolt 80 to an undercut boss o^{18} (see Fig. 1) to slide on ribs o^{19} on a bracket o^{20} , bolted to the main frame A , an adjusting-screw o^{21} , rotatable in an ear on the bracket, engaging a threaded hole in the boss and moving it, and thereby the plate o^x and the mechanism carried thereby, toward and from the cutter-head to adjust the grinder o .

To prevent the guide-plate f from being lifted too high when it is moved into locking position, a projection t (see dotted lines Fig. 1) on the part B^7 of the vertically-adjustable support is adapted to be engaged by a set-screw t' , mounted in a suitable ear on the inner side of the guide-plate.

It will be understood that in all instances, no matter what the thickness of the work or the inclination of the scarf, the leading end of the work will extend to the extreme right-hand end of the bed d^x on the work-support, and such latter point must always at the beginning of the feed be at a fixed distance from the center of rotation of the cutter-head in order to bring the scarf down to a feather-edge, and the vertically-adjustable T-shaped support provides means for such adjustment, no matter what the thickness of the work or the inclination of the tilting work-support.

By means of the apparatus hereinbefore described the scarfing is rapidly and accurately performed, each scarf being exactly like its fellow, and the two being brought down to an exact, fine, and smooth feather-edge, requiring no after treatment by hand to finish them preparatory to joining the scarfed ends of the strip.

By means of the bolt 80, connecting the plate o^x to the boss o^{18} the grinder-shaft can be adjusted to tilt the grinder relatively to the faces of the saws to provide for wear of the mechanism.

I claim—

1. In a scarfing-machine, a rotating cutter-head, a tilting work-support movable beneath it, a slide-block to which said work-support is connected, and a guide-plate for said block, combined with means to move the work-support forward beneath the cutter-head, to feed the work thereto, the cutter-head being rotated in the direction of feed, substantially as described.

2. In a scarfing-machine, a rotating cutter-head, a guide-plate pivotally supported at one end beneath it, and a latch to normally support its other end, a guide-block movable longitudinally on said plate, a rack-bar on said block, and a rotatable feed-pinion adapted to mesh therewith when the plate is lifted, combined with means to continuously rotate the pinion, and a releasing device for the latch, controlled by movement of the guide-block, to release the guide-plate at a predetermined time and thereby disengage the rack and pinion, substantially as described.

3. In a scarfing-machine, a rotating cutter-head, a tilting work-support movable beneath it, means to move the work-support toward

the cutter-head at an angle, to feed the work, and means to automatically change the path of movement of the work-support when the feed is reversed, substantially as described.

5 4. In a scarfing-machine, a rotating cutter-head, a pivotally-mounted guide-plate beneath it, means to vary the inclination of said guide-plate, a work-support reciprocable on the guide-plate, means to feed the work-sup-
10 port toward the cutter, and devices to control the inclination of the guide-plate in accordance with the direction of movement of the work-support, substantially as described.

5 5. In a scarfing-machine, a rotating cutter-head, a pivotally-mounted guide-plate beneath it, a work-support movable on said guide-plate and having a rack-bar, a continuously-rotated pinion to at times engage said rack-bar, to feed the work to the cutter-head,
20 means to automatically change the inclination of the guide-plate at the end of the feed, to disengage the rack and pinion, and independent means to return the work-support to starting position, substantially as described.

25 6. In a scarfing-machine, a tilting guide-plate, a slide-block thereon, and means to move it back and forth upon the plate, combined with a tilting work-support pivotally mounted on the block, for adjustment to and
30 from the plane of movement thereof, and devices to adjust said guide-plate, to vary the angle of the line of feed, substantially as described.

35 7. A work-support having an elongated top, a bed thereon, and upright stands secured to the work-support at opposite sides of the bed, combined with a spring-holder vertically movable in said stands above said bed, a clamping-spring mounted in the lower side of said
40 holder, means above said holder to depress the holder to clamp the spring upon the work as it rests upon the bed, and means to adjust and limit the clamping movement of said holder toward and from said bed, substan-
45 tially as described.

8. In a scarfing-machine, a cutter-shaft mounted in fixed bearings, a cutter-head thereon, a T-shaped adjustable support below the cutter-head, and a guide-plate pivoted
50 at one end to said support and at the other end normally engaged by a latch, combined

with means to adjust the support vertically toward and from the cutter-head, a work-support movable longitudinally of said guide-plate, a rack and pinion to move it in one di-
55 rection, independent devices to move it in the opposite direction, and means to automatically disengage the rack and pinion at the end of the feed, substantially as described.

9. In a scarfing-machine, a rotatable cut-
60 ter-head, a guide-plate pivotally mounted below it, and a latch to normally hold said plate at a fixed angle, combined with a reciprocable work-support on the guide-plate, feed mechanism therefor, independent retracting
65 devices, means to automatically render said feed mechanism inoperative at the end of the feed and to release the latch of the guide-plate, substantially as described.

10. In a scarfing-machine, a work-support, 70 a slide-block upon which it is mounted, provided with a rack-bar, and a guide-plate for said block, pivotally supported at one end, combined with a rotating feed-pinion to co-
operate at times with the rack-bar, to feed 75 the work, a latch to normally engage and support the free end of the guide-plate and hold the rack-bar in engagement with the pinion, mechanism to disengage the latch and guide-
80 plate, and a manually-operated device to lift the guide-plate into locked position, substantially as described.

11. In a scarfing-machine, a work-support, a slide-block upon which it is mounted, a
85 guide-plate pivotally supported at one end and on which the slide-block is longitudinally movable, combined with feed mechanism for the work-support, a latch to normally support
90 the free end of the guide-plate, releasing devices for the latch, including a rod adapted to be moved by the guide-block at the end of the feed movement, to throw out of operation
the feed mechanism, and a cushioning device for the free end of the guide-plate when re-
95 leased, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES C. KILLAM.

Witnesses:

FREDERICK L. EMERY,
AUGUSTA E. DEAN.