W. S. SHERMAN.

END MATCHER.

APPLICATION FILED MAY 9, 1910.

1,091,772.

Patented Mar. 31, 1914.

3 SHEETS—SHEET 1.

FIG. 5.

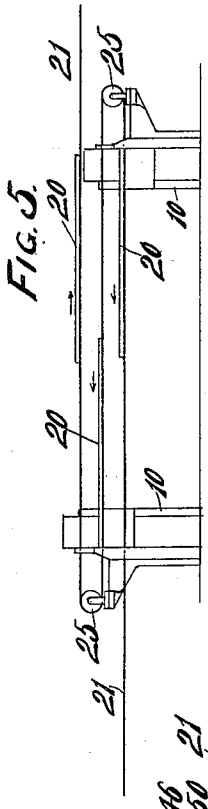


FIG. 1.

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3 SHEETS—SHEET 2.

FIG. 2.

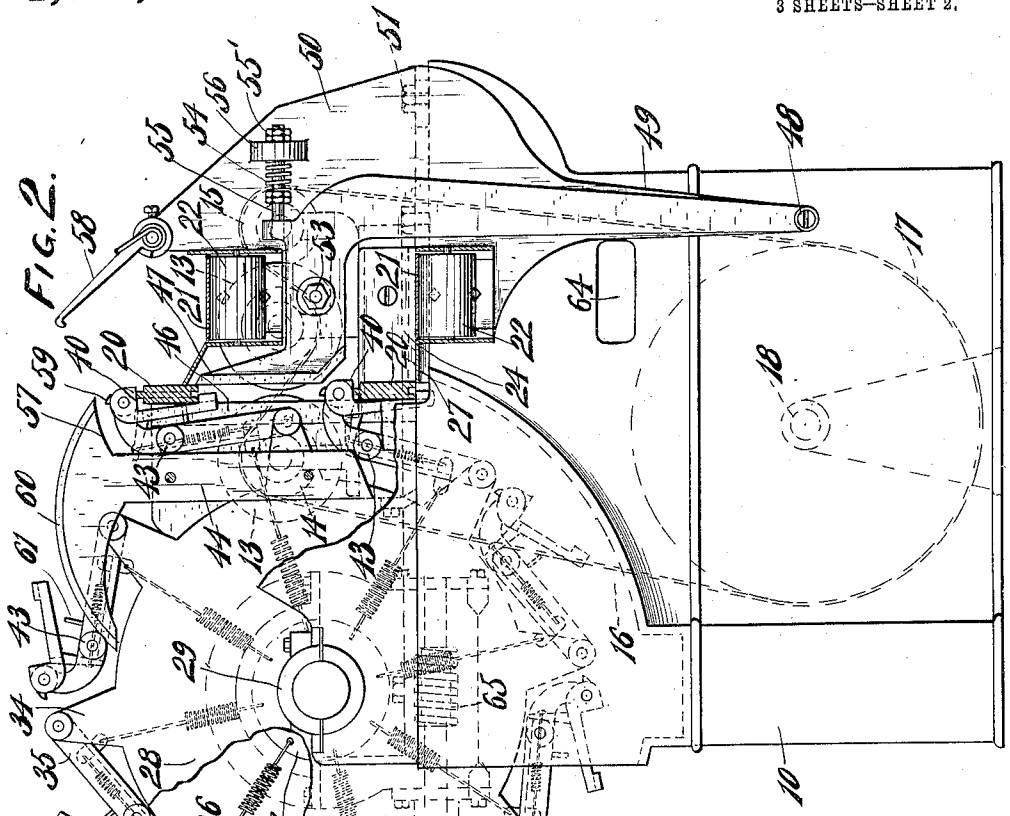
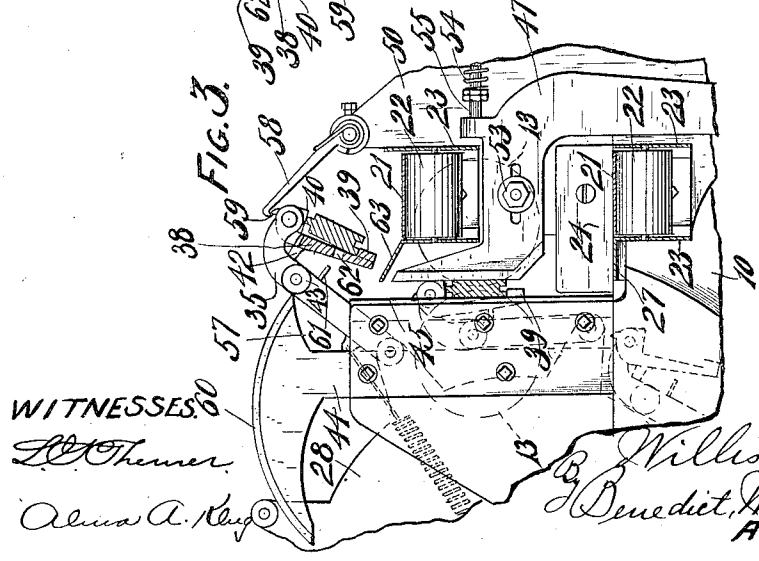


FIG. 3.



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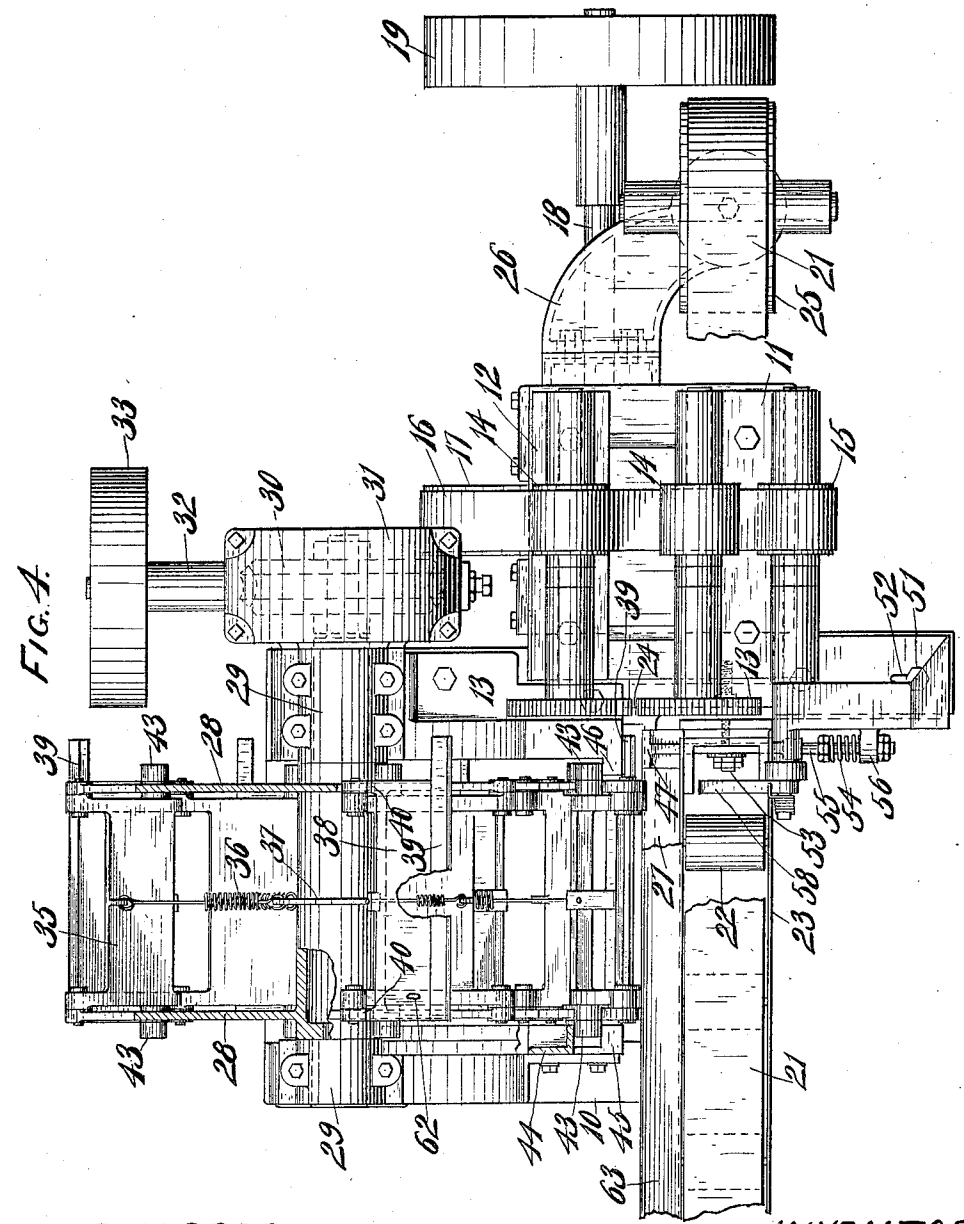
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3 SHEETS—SHEET 3.

FIG. 4.



WITNESSES

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END-MATCHER.

1,091,772. Specification of Letters Patent. Patented Mar. 31, 1914.

Application filed May 9, 1910. Serial No. 560,237.

To all whom it may concern:

Be it known that I, WILLIS S. SHERMAN, residing in Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in End-Matchers, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention has for its object to provide a machine for cutting tongues and grooves in the ends of strips of flooring and the like and which will be automatic in the feed of the material therethrough and in the discharge of the material.

It is an object of the invention to facilitate the handling of the material being operated upon and thereby increase the capacity of the machine.

Another object of the invention is to provide an end matcher of such a construction that its adjustment for handling work of different thickness may be easily accomplished without loss of time.

With the above and other objects in view the invention consists in the end matcher herein claimed, its parts and combinations of parts and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts: Figure 1 is a front elevation of an end matcher constructed in accordance with this invention; Fig. 2 is an end elevation thereof showing the feed drum in position to receive a strip of flooring in one of its work carriers; Fig. 3 is a similar view of a fragment thereof with the feed drum in position to discharge a strip of flooring from one of its work carriers; Fig. 4 is a plan view of the machine, with parts broken away for clearness of illustration; and, Fig. 5 is a diagram of two of the end matchers of this invention connected together by a conveyer in such a manner as to perform the work upon the different ends of the strips of material.

In these drawings 10 indicates a frame forming a bed on which are adjustably mounted bases 11 and 12 having cutters 13 journaled thereon. The arbor for each of the cutters 13 is provided with a pulley 14 and the base 11 is also provided with an idle pulley 15 and a belt 16 drives these pulleys by first passing over the idle pulley 15 and then under the cutter pulley 14 on the base 11 and then over the other cutter pulley 14, and receives its motion by passing around a drive pulley 17 on a countershaft 18 which is suitably positioned and driven by a pulley 19 from any suitable source of power. The cutters 13 are thus driven in opposite directions so that their adjacent portions move together in an upward direction, the particular machine illustrated being thus arranged for cutting the tongue on the end of a strip of flooring or the like. The modification necessary in the mate to the particular machine shown consists in substituting a single cutter in a vertical plane at right angles to the plane of the cutters here shown, its function being to cut the groove in the opposite end of the strip of flooring or the like.

The strips of flooring 20 or other work to receive the end matching operation, as shown in Fig. 1, enter the machine on a suitably driven conveyer belt 21 which is supported upon rollers 22 journaled in side plates 23 and comes to a standstill upon meeting with a stop 24 in its path, said stop being secured to the frame 10 and best shown in Figs. 2 and 3. The conveyer belt 21 after passing beneath the stop 24 passes around a pulley 25 which is swiveled in an extension bracket 26 laterally adjustable on the frame 10 and then returns in the opposite direction from the direction of the feed of material to the present machine and constitutes a discharge conveyer for the present machine and a feed conveyer for the mate to the present machine as shown in diagram in Fig. 5, this stretch of the belt being also supported by rollers 22 between side plates 23. The operator, who stands at the front of the machine, which is the near side, as shown in Fig. 1, turns the strip of flooring up on its rear or grooved edge and while its end is still in engagement with the stop 24 slides it rearwardly along a table or work support plate 27 extending from the upper edge of the side plate 23 and into a position where it will be engaged by a carrier of a feed drum to be presented thereby to the action of the cutters.

The feed drum 28 is journaled in the frame 10 and comprises a pair of circular heads carried by a tubular core with trunnion ends which fit in the bearings 29 of the frame, one of the trunnion ends being provided with a worm wheel 30 contained in a worm casing 31 where it is driven by a worm 65, carried by a shaft 32 which is driven by its pulley 33 from any suitable

source of power. Each of the circular heads of the feed drum 28 is provided with radial arms 34 and between these arms of the two heads are pivotally mounted carrier frames 35 which are free to swing away from the drum, but are normally held against the drum heads by means of springs 36 connecting them with a flange 37 on the drum core. The free ends of the carrier frames 35 bend outwardly and have pivotally mounted between them the work carriers 38 which are in the form of plates with a work seating flange 39 at their outer ends and work engaging shoulders 40 at their inner or pivotal ends. These work carriers are free to swing outwardly from the carrier frames and are normally held in such outer position by springs 41 connecting arms 42 projecting from the carriers with the carrier frames near their pivotal ends, such arms 42 engaging the carrier frames to limit the outward movement of the work carriers. In the rotation of the feed drum the work carriers are successively presented in position to engage the work on the table 27, the carrier frame 35 being provided with rollers 43 at its sides to travel against stationary guides provided therefor on the frame to cause the carrier frames to swing with relation to the drum for this purpose. One of these guides for the rollers 43 at one side of the drum is formed by a guide strip 44 secured to the frame, its beveled lower end, as shown in Fig. 2, standing in the path of the rollers 43 to cause them to ride outwardly and thereby swing the carrier frames forwardly toward the operator and the work carriers 38 suspended therefrom are thus brought into a position with relation to the table 27 which will cause them to engage with the strip of flooring which has been pushed rearwardly on said table against guides 45 and 46 so that the lower edge of the work will rest upon the work supporting flange 39 of the carrier and the upper edge of the work will engage beneath the work engaging shoulders 40. When thus engaged the work will be lifted by the feeding drum, its engagement at one end by the carrier being such that it is lifted bodily in a horizontal position, the weight of the free end binding it between the flange 39 and the shoulders 40. In this manner work is fed to the cutters with its end held rigidly in position to have the cutting operation produced at right angles to the lines of its side edges, whether it is a long or a short strip. After swinging the carrier frames forwardly to receive the work in the carriers the rollers 43 ride up the vertical front edge of the guide plate 44 and between said guide plate and a guide strip 45 also rigidly mounted on the frame, the rollers on the other side of the drum at the same time bearing against a guide flange 46 of the frame so that during the passage of the work between the cutters 13 the movement of the carriers is in a substantially straight line. The work itself is guided to travel in a vertical course by bearing against the other side of the guide strip 45 and the other side of the guide flange 46 from the surfaces thereof engaged by the rollers 43 and is held firmly against these guide surfaces by means of a swinging presser guide 47 which has a substantially vertical presser face bearing against the work with a beveled lower end to prevent the work binding therewith, said presser guide being pivotally mounted at its lower end 48, at a sufficient distance from the engaging surface thereof to cause the engaging surface to remain approximately vertical notwithstanding the slight movements of the guide in pressing against work differing somewhat in thickness.

The pivotal connection for the presser guide 47 is carried by an arm 49 of an adjustable head block 50 which is slidably mounted on the frame, being clamped thereto by means of screws 51 passing through elongated slots 52 thereof, so that the machine may be set for operating upon work of different thickness. The presser guide 47 is set in position with a predetermined spring pressure against yielding therefrom, a bolt 53 passing through a slot therethrough and clamping it to the face of the head block 50 but permitting the pivotal play thereof and a spring 54 mounted on a stem 55 projecting from the presser guide and bearing against set nuts thereon at one end and against a lug 56 of the head block 50 at the other end. The work being of slightly greater thickness than the normal distance between the presser block 47 and the guides 45 and 46 will be tightly clamped by the presser guide against moving out of its right line feed course during its travel past the cutters and work of slightly greater than normal thickness will be accommodated by the yielding of the presser guide thereto. The normal position of the presser guide is determined by set nuts 55′ on the stem 55 engaging the lug 56.

When the work has completed its upward course between the cutters and its lower edge has cleared the presser guide 47 the carrier frame is given a sudden forward movement by the rollers 43 riding against a cam surface 57 of the cam guide 44, which movement is to bring the work above the upper conveyer formed by the return length of the conveyer belt 21, before referred to, and may result in the work becoming free from the carrier. In case the work is not released from the carrier in this forward movement of the carrier frame a spring hook 58 projecting from the head block 50 comes into engagement with a lug 59 on the work carrier just as the roller 43 passes off the

cam surface 57 and starts its quick return movement toward the feed drum on the curved cam surface 60 of the cam guide 44 and this quick movement of the carrier frame under the action of its spring 36 while the lug 59 is engaged by the hook 58 causes the carrier to be violently thrown toward the carrier frame so that a pin 61 projecting from the carrier frame will enter an opening 62 in the carrier and strike the work and knock it off the flange 39 on to the upper conveyer. The movement of the carrier produced by its engagement with the hook 58 may be sufficient to discharge the work without awaiting the action of the pin. The side piece 23 of the upper conveyer is provided with an inclined flange 63 to guide the work onto the conveyer as it falls from the carrier. The swinging movement of the carrier to release the work disengages the lug 59 from the hook 58 and the carrier is then returned to its normal position by its spring 41, while the carrier frame is returned to its normal position by spring 36 with an easy movement under the guidance of the cam surface 60.

As shown in Figs. 1 and 4 the flanges 39 of the work carriers are extended beyond the carriers so as to support the work close to the cutters and between the guide 46 and the presser guide 47, to efficiently carry short as well as long strips.

With this invention the work is automatically fed to the machine against the stop 24 and it is only necessary for the operator to stand each strip on its rear edge and force it rearwardly across the table 27 against the guides 45 and 46 when one of the work carriers as it comes into position engages therewith, the machine automatically caring for the work during the remainder of the operation thereon, by lifting it by means of the carrier through the guideway between the guides 45 and 46 on the one side and the guide 47 on the other side where it is held with its face tightly against the guide 46 by the pressure of the guide 47 and in this movement the cutters operate thereon to cut the tongue or the groove as the case may be and then the work is ejected from the carrier in the manner described and deposited on the upper conveyer by which it is carried to the next machine or to the store room. The operator receives the strip with its face uppermost so that when it is turned to stand on its rear edge the face bears against the guide 46 to fix the position of the tongue or the groove with relation to said face of the work and then when the work is discharged on to the upper conveyer it is again left face uppermost, for this upper conveyer of the first end matching machine constitutes the lower conveyer of the other end matching machine as shown in Fig. 5 where the operation is repeated and the finished strip is delivered from the second machine by the upper conveyer thereof to the store room or other desired place. The second machine is preferably provided with an opening 64 in its frame through which the lower conveyer of the first machine passes.

In adjusting the machine to accommodate flooring of different thickness it is only necessary to change the position of the head block 50 to bring the presser guide 47 nearer to or farther from the stationary guides 45 and 46, the bracket extension 26 of the frame carrying the pulley 20 of the conveyers being correspondingly adjusted in position on the frame and the cutters being changed in their relation to each other by the adjustment of the bases 11 and 12 to stand the proper distance apart and the proper distance from the face of the guide 46 to produce the tongue for the new work.

The operation of the machine is quick and accurate, being largely automatic, and is easily adjustable for changing from work of one thickness to work of another thickness, while the arrangement of the conveyers is such that the end matching for both ends of the strip is facilitated and the work is quickly introduced to the machines and carried therefrom.

The pull on the work and the point from which the pull is made prevents the lower edge of the work from having a tendency to move away from the guides as with some other machines.

What I claim as new and desire to secure by Letters Patent is—

1. An end matcher, comprising a cutter, guides for leading work to the cutter, and a rotary feed mechanism comprising pivotally suspended work carriers adapted to receive and hold the work while forcing it along the guides to receive the action of the cutter.

2. An end matcher, comprising a cutter, guides positioned to lead work thereto, a rotary feed drum, swinging carrier frames carried thereby, and work carriers pivotally suspended from the carrier frames adapted to receive the work and carry it through the guides to receive the operation of the cutter.

3. An end matcher, comprising a cutter, guides in position to lead work thereto, a rotary feed drum, carrier frames movably mounted on the feed drum, work carriers pivotally suspended from the carrier frames, and a cam engaged by the carrier frames for causing them to move with relation to the drum to cause the work carriers to travel in an approximately straight line at one portion of their circuit of movement, said work carriers being adapted to receive work and carry it during their straight line movement between the guides and into engagement with the cutter.

4. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging

carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum and move the carriers in an approximately straight line at one portion of the circuit of movement thereof, said work carriers being adapted to receive work, and guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers.

5. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum and move the carriers in an approximately straight line at one portion of the circuit of movement thereof, said work carriers being adapted to receive work, guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers, and a cam in the path of the rollers to violently swing the carrier frames for ejecting the work from the work carriers.

6. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum and move the carriers in an approximately straight line at one portion of the circuit of movement thereof, said work carriers being adapted to receive work, guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers, and a hook in the path of the work carrier adapted to engage therewith and cause the work carrier to swing with relation to the carrier frame.

7. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum and move the carriers in an approximately straight line at one portion of the circuit of movement thereof, said work carriers being adapted to receive work, guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers, a hook in the path of the work carrier adapted to engage therewith and cause the work carrier to swing with relation to the carrier frame, and a pin on the carrier frame for striking and ejecting the work from the work carrier when the work carrier is swung by the hook.

8. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum and move the carriers in an approximately straight line at one portion of the circuit of movement thereof, said work carriers being adapted to receive work, guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers, a cam in the path of the rollers to violently swing the carrier frames for ejecting the work from the work carriers, a hook in the path of the work carrier adapted to engage therewith and cause the work carrier to swing with relation to the carrier frame, and a pin on the carrier frame for striking and ejecting the work from the work carrier when the work carrier is swung by the hook.

9. An end matcher, comprising a cutter, guides for leading work to the cutter, a rotary feed mechanism for receiving the work and carrying it through the guides into engagement with the cutter, a stop, a conveyer for bringing the work into position against the stop, and a table upon which the work may be tilted on edge from the conveyer and forced into the feeding mechanism while in engagement with the stop.

10. An end matcher, comprising a cutter, guides for leading work to the cutter, a rotary feed mechanism for receiving the work and carrying it through the guides into engagement with the cutter, a stop, a conveyer for bringing the work face up into position against the stop, a table upon which the work may be tilted on edge from the conveyer and forced into the feeding mechanism while in engagement with the stop, and a conveyer into which the work is discharged face up from the feeding mechanism after passing the cutter.

11. An end matcher, comprising a frame, a feed drum mounted thereon, swinging carrier frames carried by the feed drum, swinging work carriers carried by the carrier frame, a cutter adjustably mounted on the frame, a head block adjustably mounted on the frame, a guide fixed on the frame, a yielding guide mounted on the head block and held in position with relation to the other guide with spring pressure, said work carriers being adapted to receive work and carry it through the space between the guides into engagement with the cutter and the adjustments of the cutter and of the head block permitting the operation on work of different thickness.

12. An end matcher, comprising a frame, a feed drum mounted thereon, swinging carrier frames carried by the feed drum, swinging work carriers carried by the carrier frames, a cutter adjustably mounted on the frame, a head block adjustably mounted on the frame, a yielding guide pivotally mounted on the head block, a spring bearing upon the yielding guide for holding it with pressure in position with relation to the other guide, said work carriers being adapted to receive work and carry it through the space between the guides and into engagement with the cutter, and conveyers carried by the head block to bring the work to the carriers and to carry it therefrom.

13. A pair of end matcher machines connected by a belt conveyer, each machine comprising a cutter, work guides, and a work feeding mechanism adapted to lift work vertically through the work guides and past the cutter, said conveyer bringing the work to the work feeding mechanism below the cutter and for carrying the work from the work feeding mechanism above the cutter, whereby the upper conveyer of one machine constitutes the lower conveyer of another machine.

14. An end matcher, comprising a cutter, work guides for leading work to the cutter, a rotary member, carrier frames pivotally mounted on the rotary member, guides for the carrier frames, and carriers pivotally suspended from the carrier frames to receive work and carry it through the work guides while the carrier frames are in engagement with their guides.

15. An end matcher, comprising a cutter, guides for leading work to the cutter, a suitably operated carrier frame, and a work carrier pivotally suspended from the carrier frame and adapted to receive work and carry it through the guides into engagement with the cutter.

16. An end matcher, comprising a cutter, a rotary feed drum, spring retracted swinging carrier frames thereon, spring retracted swinging carriers on the carrier frames, rollers on the carrier frames, a cam in the path of the rollers for causing the carrier frames to swing on the feed drum, said work carriers being adapted to receive work, and guides between which the work is carried by the work carriers into engagement with the cutter during the straight line movement of the work carriers.

17. An end matcher, comprising a cutter, work guides for leading work to the cutter, a rotary member, carrier frames pivotally mounted on the rotary member, guides for the carrier frames, carriers suspended from the carrier frames to receive work and carry it though the work guides while the carrier frames are in engagement with their guides, and means for swinging the carriers to discharge the work after it has passed the cutter.

18. An end matcher, comprising a cutter, guides for leading work to the cutter, a suitably operated carrier frame, a work carrier suspended from the carrier frame and adapted to receive work and carry it through the guides into engagement with the cutter, and means for swinging the carrier to discharge the work therefrom after it has passed the cutter.

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

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."