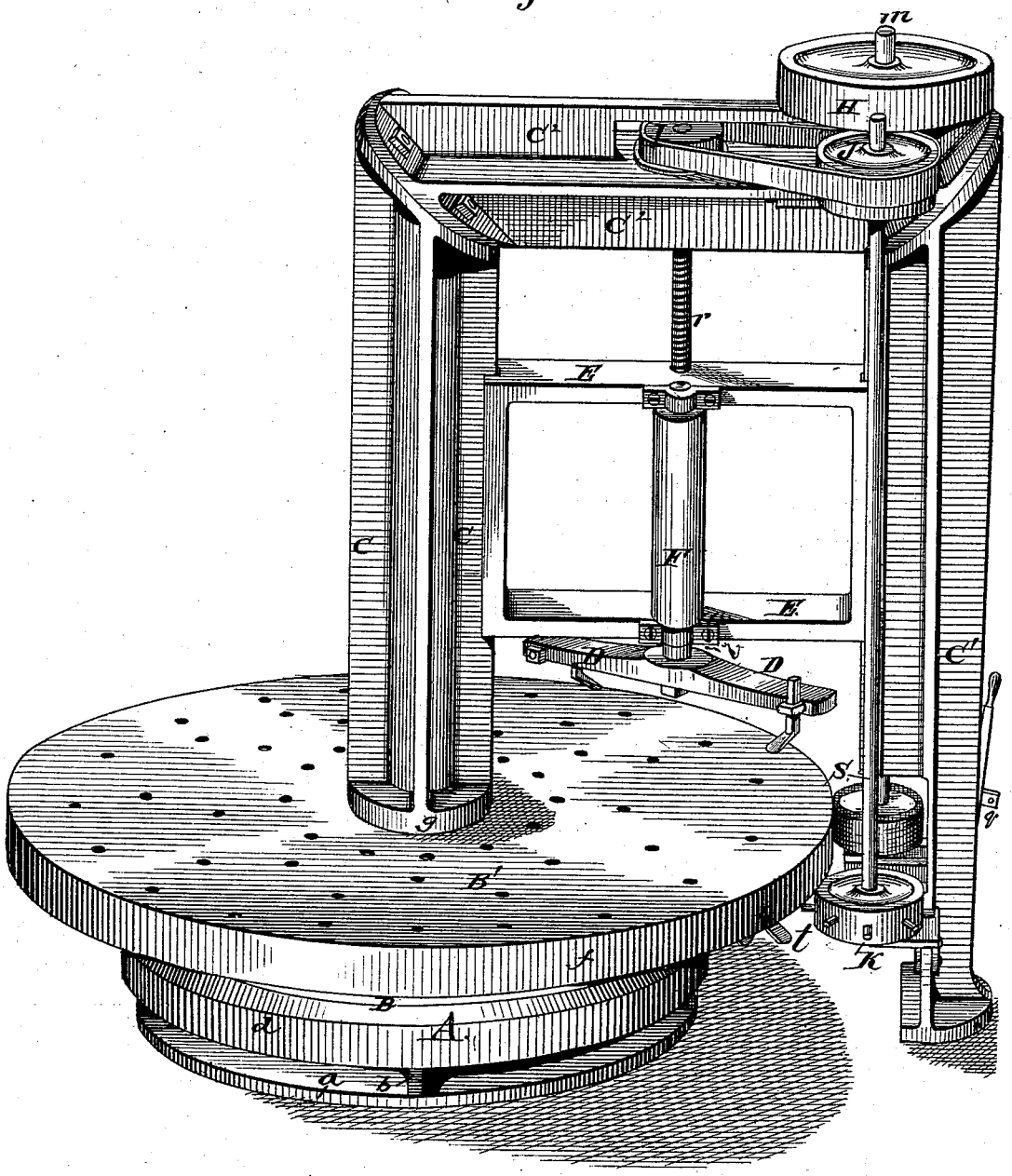
3 Sheets—Sheet 1.

A. STEVENSON.
Planing-Machine.

No. 219,602. Patented Sept. 16, 1879.

Fig. 1.



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3 Sheets—Sheet 2.

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Planing-Machine.

No. 219,602. Patented Sept. 16, 1879.

Fig. 2.

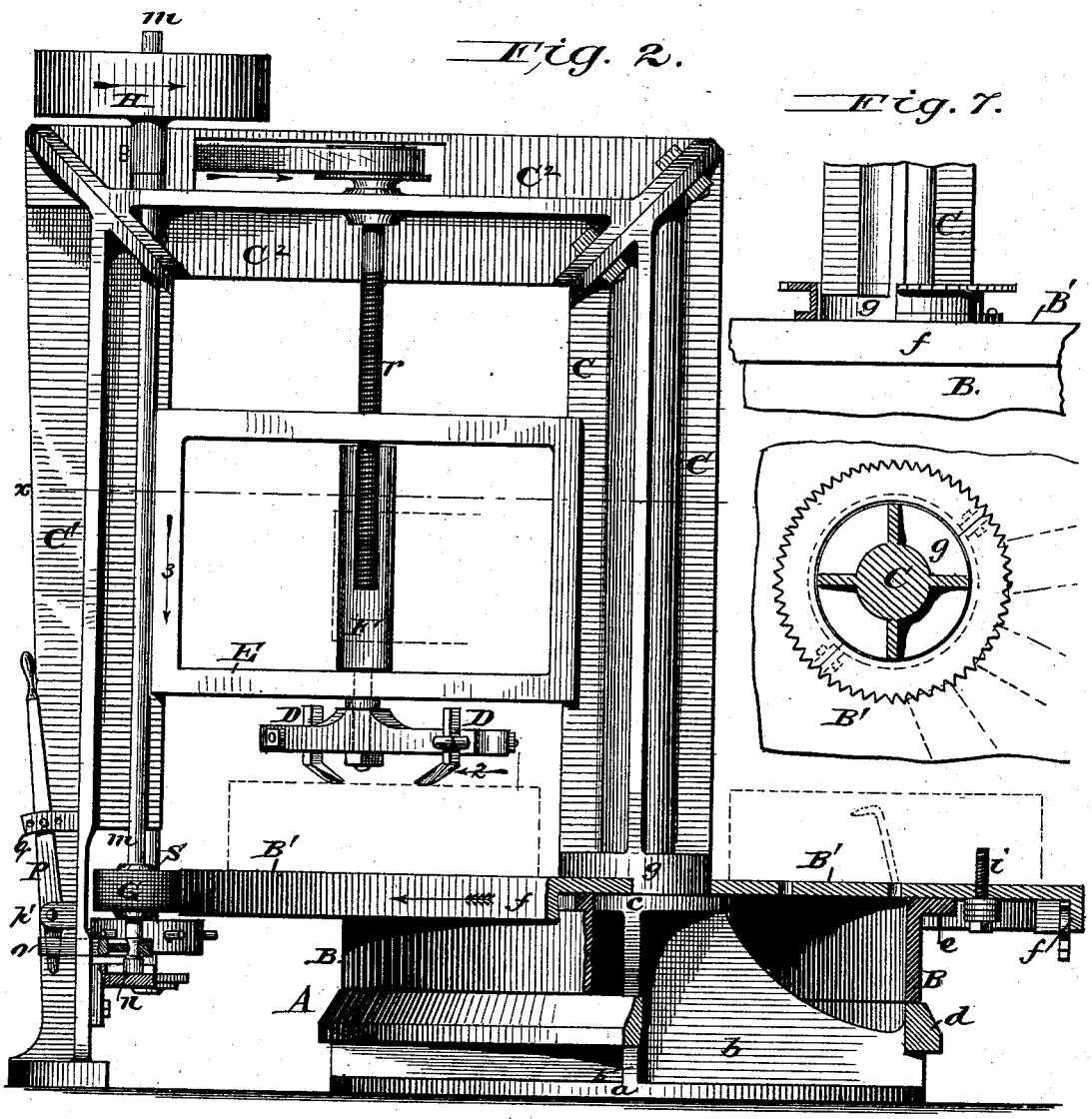

Fig. 7.

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Fig. 3.

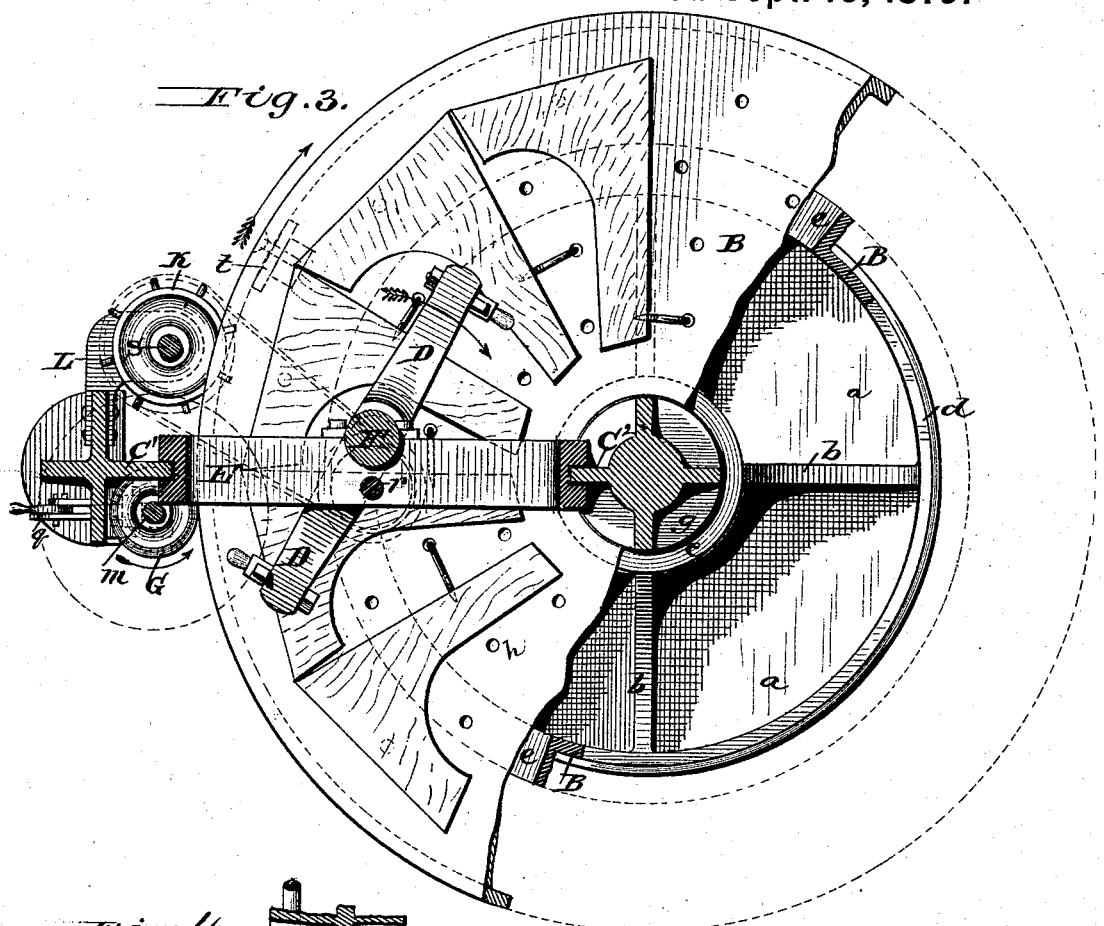


Fig. 4.

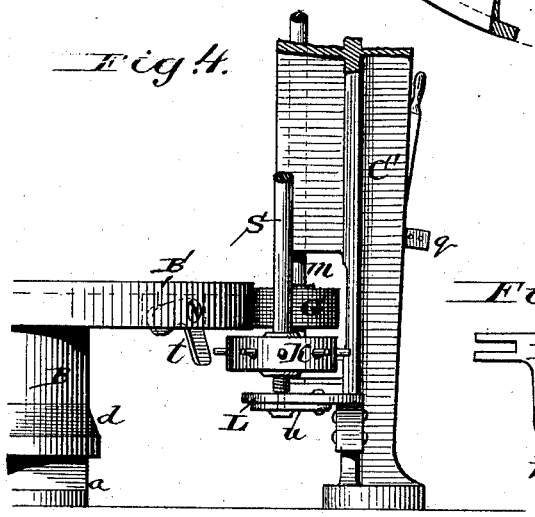


Fig. 6.

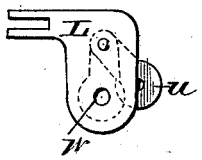
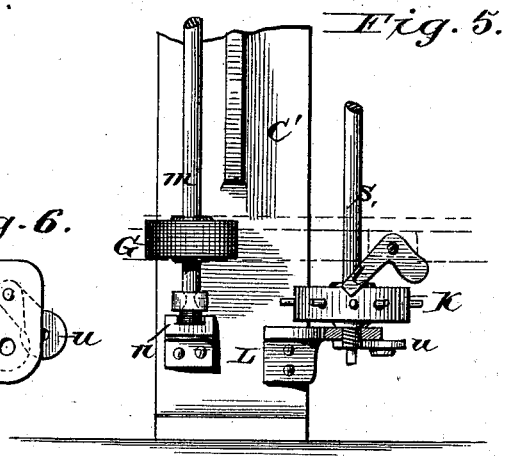


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUGUSTUS STEVENSON, OF KITTERY, MAINE.

IMPROVEMENT IN PLANING-MACHINES.

Specification forming part of Letters Patent No. **219,602**, dated September 16, 1879; application filed January 13, 1879.

To all whom it may concern:

Be it known that I, AUGUSTUS STEVENSON, of Kittery, in the county of York and State of Maine, have invented certain new and useful Improvements in Planing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to carriage-feeding planing-machines, or the class popularly known as "transverse" or "Daniels" planers.

In carriage-planing the lumber is guided in a true line by means of the ways on which the carriage moves, and the cutting performed with reference to the carriage movement instead of with reference to the surfaces or shape of the material being planed. All planing done in straight lines has, of necessity, to be performed upon this principle, and no machines except those with carriages are suited to the preparation of lumber that requires to be straight and "out of wind," as it is called.

Machines of this class have heretofore been constructed with a reciprocating carriage. As thus constructed the feed movement is intermittent and the time required for reversing is lost, wherefore the practical operation of the machine is slow.

Furthermore, carriage-planers thus constructed require a length equal to double the length of the longest material to be worked—that is, the track must be about twice the length of the carriage; consequently they require a large amount of shop-room.

Furthermore, curved timber, such as ships' knees, cannot be placed to advantage on the rectangular bed of a reciprocating carriage, and such beds will not take on bent or curved timber of an extended curve or angle.

The main objects of this invention are to increase the capacity of this class of planing-machines, to render them more compact, to better adapt them to the planing of bent or curved timber, and to dispense with the constant attendance of an operator.

The invention consists, first, in a circular rotating carriage carrying the material to be planed, in lieu of the reciprocating carriage heretofore used.

By this construction three objects sought are at once attained—namely:

First, it secures for this class of planers a continuous feed without disturbing the accuracy of the carriage movement. Thus the productive capacity of the machine is increased.

Second, it secures greater compactness of structure and movement, whereby shop-room is economized.

Third, it further enlarges the capacity of the machine by adapting the carriage to take on at once a greater quantity of ships' knees, or other like forms of material, according to its size and number of knives, and by adapting it to take on bent timber of extended curves and angles, which could not be received or planed on the old-style reciprocating carriage.

The invention consists, further, in the combination of means whereby the cutters are lowered automatically at each revolution of the table or carriage, and brought into position to take a new cut as each circuit of the table is completed. By this combination the constant attendance of an operator is rendered unnecessary.

The invention consists, further, in the combination of means for gaging the action of the cutters in connection with the automatic adjustment thereof, whereby when the requisite amount is planed off the lowering of the cutters will cease automatically.

By the use of this feature of the invention the machine may be adjusted to the performance of a set task and safely left to itself.

In the accompanying drawings, which represent a convenient arrangement of parts for carrying out the objects of this invention, Figure 1 is a perspective elevation of this improved planing-machine, taken at a point on the rear side of the cutter-frame. Fig. 2 is a true elevation taken at a point on the front side of the cutter-frame, showing a portion of the carriage and bed broken away to exhibit the structure thereof. Fig. 3 is a plan and section on line *x x* of Fig. 2, showing in dotted lines a number of ships' knees in position on the carriage, and exhibiting a cross-section of the standards and of the cutter-frame. Fig. 4 shows the parts for effecting the automatic adjustment of the

cutters. Fig. 5 shows the parts for automatically adjusting and gaging the cutters. Fig. 6 is a top view of the bracket with movable step, which supports the adjustable shaft for regulating and gaging the cutters. Fig. 7 shows a flat ring or annular plate, with radially-projecting pins or teeth, which is fastened around the annular inner edge of and above the surface of the table, against which the material may be driven, serving the purposes of a bench hook or dog.

The same letters of reference are used in all the figures in the designation of identical parts.

A in the drawings represents the bed of the machine, on which the carriage rotates. This bed consists of the bed-plate *a*, the ribs *b*, the upper plate, *c*, and the rail or track *d*. The bed-plate *a* is circular in form, and the ribs *b*, rising therefrom, extend diametrically across the same, intersecting at the center thereof. At the circumference of the bed-plate the ends of the ribs *b* are, for a short distance above the plate, flush with the edge thereof; thence they recede toward the center, where they support the plate *c* at a higher elevation. The plate *c* is of small diameter compared with plate *a*. The ends of the ribs support the rail *d*, which encircles the bed and constitutes a part of the track on which the carriage moves.

The carriage consists of a short cylinder, B, and a table, B′. The cylinder is of a diameter equal to the diameter of the rail or track *d* of the bed, and is of about half the diameter of the table, more or less.

The table may be of a diameter of twenty feet, more or less. If over twelve feet in diameter, a double set of cutting-arms would be required.

The lower end of the cylinder fits onto the track *d*. Its upper end is provided with a flange, *e*, to which the table is fastened by means of rivets or otherwise. The outer edge of the table is provided with a downwardly-projecting flange, F. The plate *c* is provided with a boss, *g*.

A round hole is cut in the center of the table, of a diameter somewhat smaller than the diameter of the plate *c*, but sufficiently large to fit over the boss *g*. The outer rim of the plate *c* thus forms a flange, upon which the under side of the inner edge of the table is supported, and constitutes the other half of the track upon which the carriage runs or rotates. The boss *g*, against which the inner edge of the table abuts, serves as a guide to keep the carriage in position as it revolves around the boss.

The tracks *d* and plate *c* are planed perfectly true and parallel, as are likewise the lower end of the cylinder B and the inner edge of the table B′, which are made to fit accurately thereon. The table is provided with numerous small holes *h*, through and into which screws *i*, with spring washers or dogs, may be inserted, for fastening the material to be planed to the table. The table may also be provided around its inner edge with an annular plate or ring, raised somewhat from the surface of the table, having teeth or pins radiating outward, against which the material to be planed may be driven and dogged.

Rising from the center of the bed A is the upright standard C, constituting an outer post, and forming a part of the frame for supporting and guiding the sliding frame which carries the cutter-head. C^1 is the other leg or standard of said frame, rising from the floor on a level with the plate *a* at a point near the outer rim of the table. The standards are of angle-iron, and are united by a girder, C^2, also of angle-iron, the parts being bolted together at the top. The standard C and the bed A may be cast in one piece.

The cutter-head B is of any suitable construction. It is shown as attached to the end of a vertical shaft, which has its bearings in the vertically-sliding frame E. The sides of this frame are provided with grooves or ways, in which it is adapted to slide on the inner flanges of the X angle-iron standards C C^1.

Between the upper and lower bars of the frame E on the shaft *l* is the pulley F, from which a belt extends to the driving mechanism (located at any convenient point) for driving the centers.

The carriage is rotated by means of a small friction-pulley, G, which is made to bear against the outer rim or flange, *f*, of the table. This pulley is attached to the shaft *m*, which is driven by the larger pulley H, which latter is connected by a belt with the driving mechanism. The lower end of this shaft *m* is movable toward or from the table, being stepped into a groove in the arm *n*, (best seen in Fig. 5,) which forms the support and bearing for this end of the shaft. Near its lower end the said shaft passes through a hole in the inner end of a sliding arm, *o*, which slides in a slot in one of the side flanges of the standard C^1. To the outer end of slide *o* is attached a hand-lever, *p*, fulcrumed at *p′*, by means of which, in connection with the devices described, the friction-pulley G is pressed in contact with or released from the table, to start or stop the rotation thereof. The lever is provided with a locking device, whereby the friction-pulley may be held in or out of contact with the table. As shown, this locking device consists of an arm, *q*, with a series of holes and a loose pin. The pin is inserted in any one of the holes, according to the adjustment desired, and, projecting through the arm, enters a corresponding hole in the lever, or forms a rest therefor. The shaft *m*, at the point where it is grasped by the slide *o*, is made smaller, as shown, to reduce friction.

For moving the table a rack and pinion or a rope and drum may be used; but the friction-wheel is regarded as preferable, as being more easily controlled and less liable to accident.

The devices for automatically adjusting and gaging the cutting mechanism are best seen in Figs. 1, 4, 5, and 6. The sliding frame E,

carrying the cutters, is supported in the usual manner by a screw-shaft, *r*, having a pulley, I, from which a belt passes to pulley J on the upper end of the vertical shaft S. The latter shaft passes down on the rear side of the standard C¹, and is provided with a wheel, K, the outer rim of which is about even with the outer rim of the table at a point just below the flange *f* thereof. This wheel is provided with pins, which project under the flange *f* as the wheel is rotated. A catch, *t*, is fastened to the flange *f*, and as the table completes a revolution said catch comes in contact with one of said pins and turns the wheel partially around. This motion of the wheel K, being communicated through the band-pulleys I J to the screw *r*, causes the cutter-frame to descend slightly, and thereby brings the cutters in position to take a new cut in the material being planed. The turning of the wheel brings another pin in position, which is in turn struck by the catch on the completion by the table of another revolution. The catch *t* is attached to the flange *f* by means of a screw or otherwise, and is adjustable so as either to come in contact with or escape the pins of wheel K, as desired. By turning it up under the flange the table may revolve continually without changing the position of the cutters. The wheel K serves also as a hand-wheel, with which to regulate or adjust the cutters.

The means for gaging the automatic adjustment of the cutters, whereby the machine may be set to plane off a certain prescribed amount, reducing the timber to the required thickness, and to automatically cease its cutting action when the prescribed limit is reached, are best seen in Figs. 4, 5, and 6. The shaft S is supported by the bracket L, in which the end of the shaft has its bearings. This bracket is attached to the standard C¹, and is provided on its under side with a hinged slide, *u*. This slide has a small depression, which, when the slide is swung shut, as shown in Fig. 4, is directly under the hole *w* (seen in Fig. 6) in the sole of the bracket. The toe of the vertical shaft projects through the hole *w* and rests in said depression of the slide. The slide *u*, which thus, when shut, forms the step for the shaft, may be provided with suitable means for holding it in place. The toe, being of smaller diameter than the hole *w*, rotates therein without contact with the sides thereof. When the parts are thus adjusted the table may rotate independently, and the cutters will continue to descend at each revolution thereof if the catch *t* be adjusted so as to come in contact with the pins.

When it is desired to gage the machine to cut to a given depth, the shaft S is raised out of the step in the slide *u* and said slide is swung open. The shaft is then let down, and a left-handed screw-thread on the end thereof takes in a corresponding thread in the hole *w*, as shown in Fig. 5. If it is desired to plane off a depth of material equal to the length of the screw-thread, the machine is then started. As the wheel K is turned at each revolution of the table, the shaft S descends, each time effecting a lowering of the cutter-head, and continues so to do until the hub or boss of the wheel comes in contact with the bracket, when it becomes completely wound up, so to speak, in the left-handed screw-threads, and will thenceforth cease turning. When the shaft has reached this point the catch *t*, which has been adjusted to suit the length of the screw-thread, will pass over said pin, and further lowering of the cutters will cease.

The machine may be gaged to cut any desired depth by raising or lowering the catch *t*, so that as the shaft descends in the screw-threads the pins on the wheel K will fall below the catch, and escape contact therewith at the proper moment. The pulley J is of sufficient width to permit the belt to slide thereon in conformity with the rise and fall of the shaft.

By the use of the means just previously described the constant attendance of an operator may be dispensed with. After adjusting the parts to the desired gage, the operator may remain away an indefinite time.

The operation of the machine is as follows: The pulleys F and H being set in motion by means of the respective belts connecting them with the driving mechanism, the cutter-head is made to rotate rapidly in the direction of the arrow 2, and the table or carriage, to which is firmly dogged the material to be planed, slowly revolves in the direction of arrow 1 and feeds the material under the cutters. When the table has completed one revolution it has brought the whole upper surface of the material carried on the carriage in contact with the cutters, if there be no irregularities; and if it be required to further plane the same, the cutter-head is adjusted, either automatically, as previously described, or by hand, in the direction of arrow 3, and the planing continues.

Fast and loose pulleys and belt-shipping mechanism may be provided, so that the motion of the machine may be reversed when desired, as when planing a single short piece.

It will be observed that, while this machine is especially useful in planing bent or curved timber, it can be used with equal advantage for straight timber whose length does not exceed the diameter of the table.

In addition to the objects previously stated as gained by this machine, the following advantages may be specified, namely: That, being simple and of few parts, it is not liable to get out of order, and it is constantly leveling its own track.

What is claimed as the invention is—

1. In a planing-machine, a rotary carriage carrying the material to be planed, in combination with an adjustable rotary cutter-head moving on an axis other than the prolonged axis of the bed, substantially as described.

2. In a planing-machine, the combination of a bed having two circular tracks of different

diameter and a rotating carriage traveling thereon, having annular bearings adapted to fit said tracks, substantially as described.

3. In a planing-machine, a circular bed consisting of the plates *a c*, ribs *b*, rail *d*, and boss *g*, in combination with a carriage rotating thereon, consisting of the cylinder B, having flange *e* and table B′ attached thereto, substantially as described.

4. In a planing-machine, the combination of a rotary carriage carrying the material to be planed, an adjustable rotary cutter-head, and devices automatically adjusting the latter intermittently at each revolution of the carriage, substantially as described.

5. In a planing-machine, the combination of a rotary carriage carrying the material to be planed, an adjustable rotary cutter-head, devices automatically adjusting the latter at each revolution of the carriage, and devices for gaging the automatic adjustment of the cutter-head, whereby the machine may be adjusted to the performance of a set task, and will automatically cease planing when its set task is finished, all substantially as described.

6. In a planing-machine, the combination of a rotary carriage carrying the material to be planed, a friction-roller for operating the same, and an adjustable rotary cutter-head, substantially as described.

7. In a planing-machine, a circular rotating carriage carrying the material to be planed, provided with a downwardly-projecting flange, in combination with a friction-roller in contact with said flange for operating the carriage, substantially as described.

8. In a planing-machine, a circular rotating carriage carrying the material to be planed, provided with a downwardly-projecting flange, in combination with an adjustable friction-roller for operating the same, readily adjustable in or out of contact with said flange, substantially as described.

9. In a planing-machine, the combination of a rotating carriage carrying the material to be planed, a friction-roller on a movable shaft for operating the carriage, a slide grasping the end of said shaft, a lever for operating the latter, and means for locking the parts to hold the roller in or out of contact with the carriage, substantially as described.

10. In a planing-machine, as a means for effecting the automatic adjustment of the cutter-head, the combination of an adjustable catch attached to the carriage, and a wheel provided with a series of pins projecting from its periphery, against which the said catch acts to turn the wheel at proper intervals of time, substantially as described.

11. In a planing-machine, as a means for gaging the automatic adjustment of the cutter-head, the combination of a shaft provided with a left-handed screw-thread, which takes into a corresponding screw-thread in a stationary arm or bracket, a wheel attached to said shaft provided with a series of pins projecting from the periphery thereof, and an adjustable catch attached to the carriage, which acts upon said pins at proper intervals of time to turn said wheel, whereby, as the said wheel is turned, the shaft and wheel descend until the said pins fall below the point to which the catch is adjusted, and the said catch passes over the same without action, substantially as described.

12. The bracket L, provided with a screw-threaded bearing, *w*, and with a hinged slide, *u*, adapted to act as a step when closed, substantially as described.

13. In a planing-machine, a rotating carriage carrying the material to be planed, provided in the center with a ring or plate raised above the surface, having teeth or prongs radiating outward, against which the material may be driven to fasten it, in combination with a rotating cutter-head, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

AUGUSTUS STEVENSON.

Witnesses:

J. D. SWAIN,

THOMAS J. PETTIGREW.