(No Model.) 6 Sheets—Sheet 1.

A. WADSWORTH.

SAWING MACHINE.

No. 483,315. Patented Sept. 27, 1892.

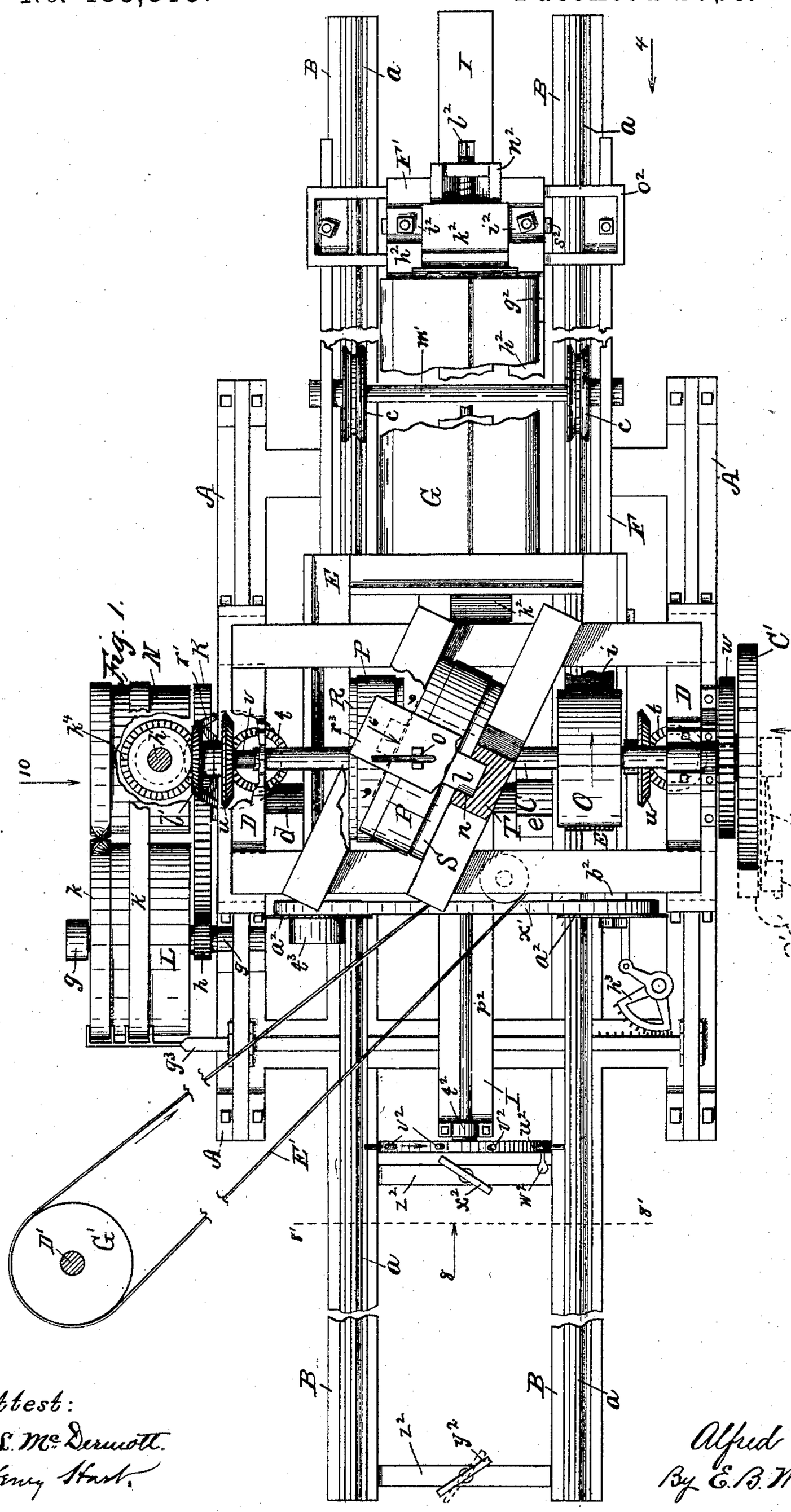

Fig. 1.

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A. WADSWORTH.

SAWING MACHINE.

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Fig. 2.

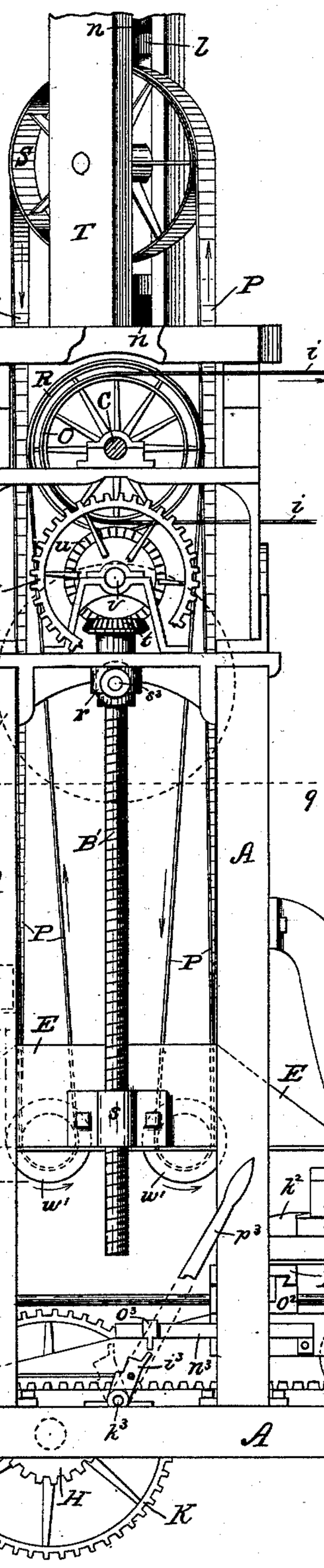
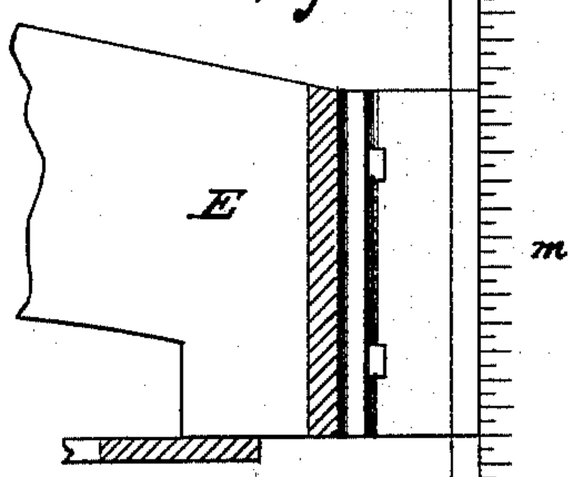
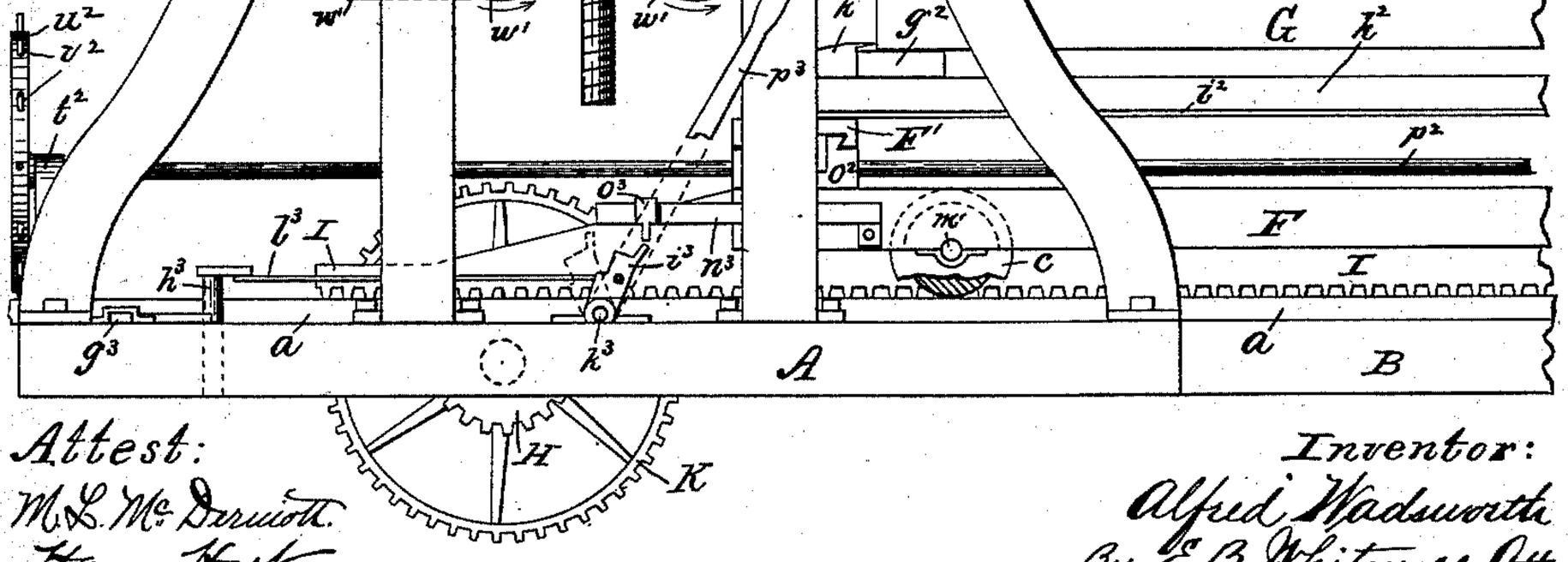


Fig. 3.





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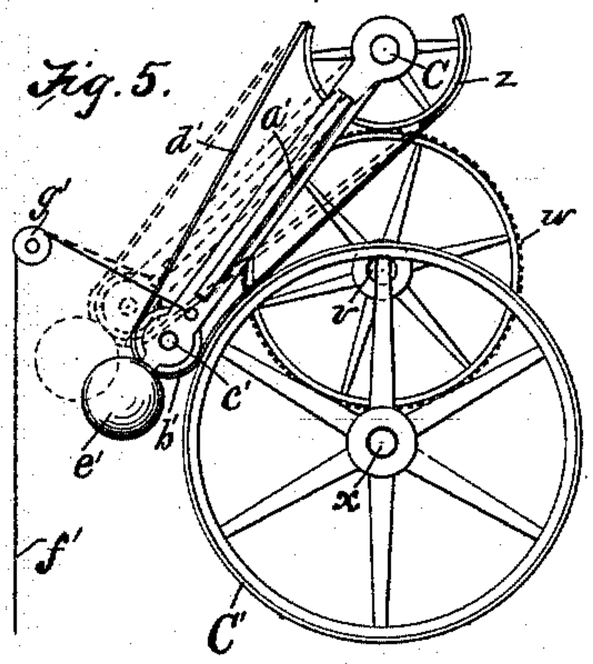
A. WADSWORTH

SAWING MACHINE.

No. 483,315. Patented Sept. 27, 1892.

Fig. 5.



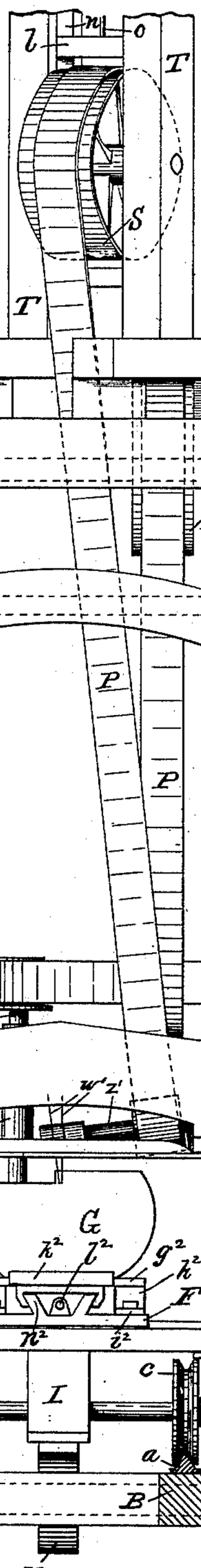


Fig. 4.

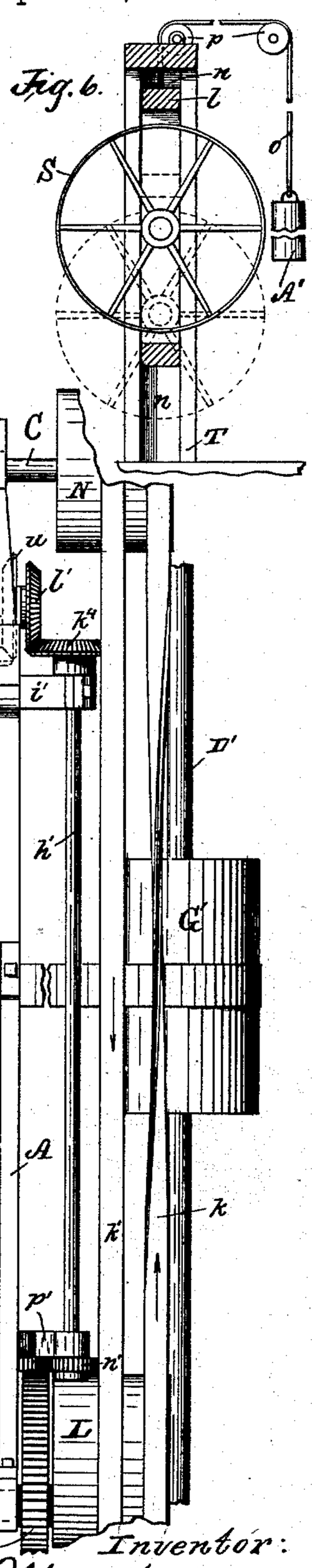


Fig. 6.

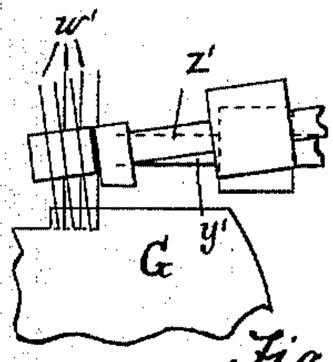


Fig. 7.

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A. WADSWORTH.

SAWING MACHINE.

No. 483,315. Patented Sept. 27, 1892.

Fig. 8.

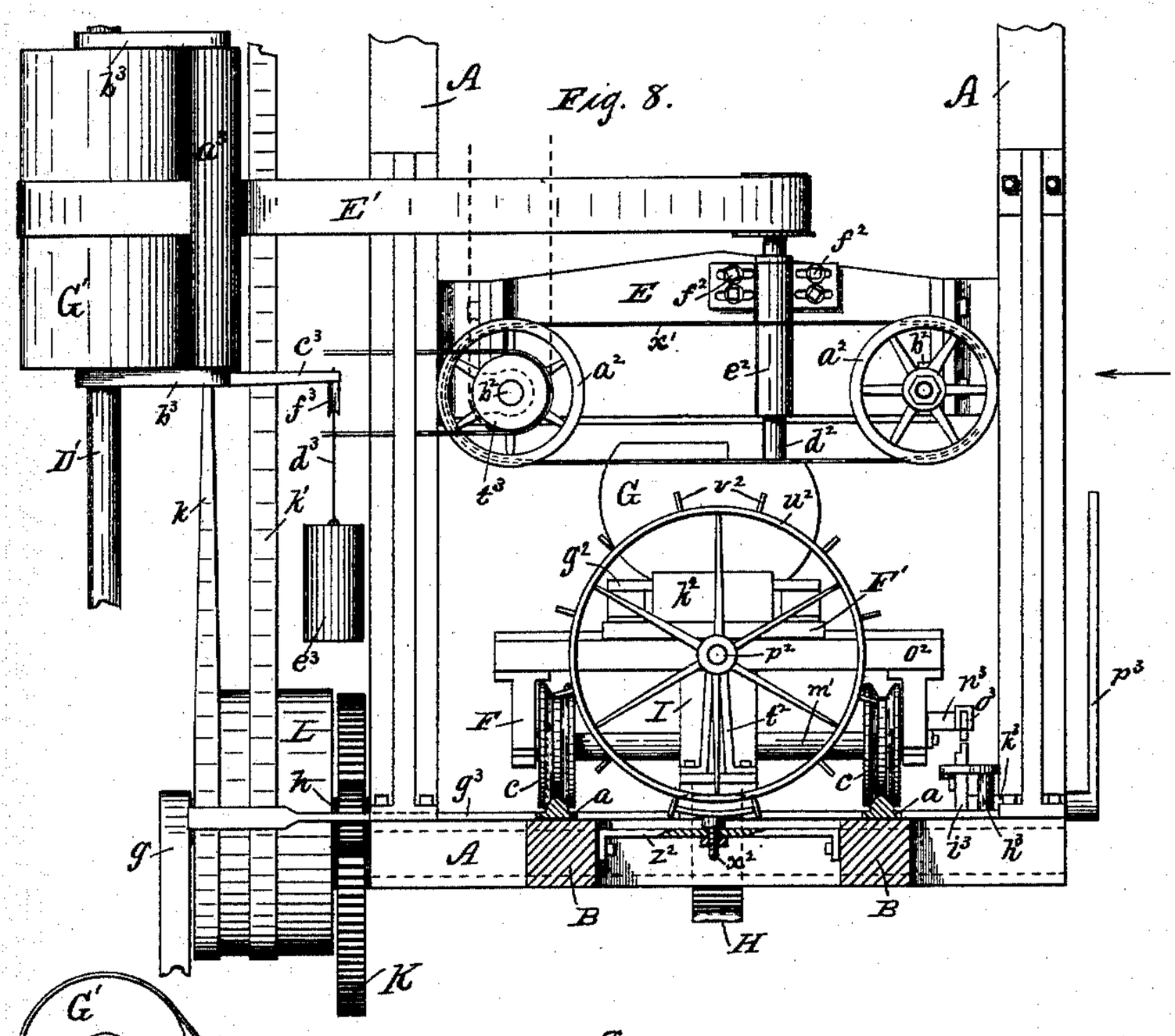

Fig. 9.

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A. WADSWORTH.

SAWING MACHINE.

No. 483,315. Patented Sept. 27, 1892.

Fig. 10.

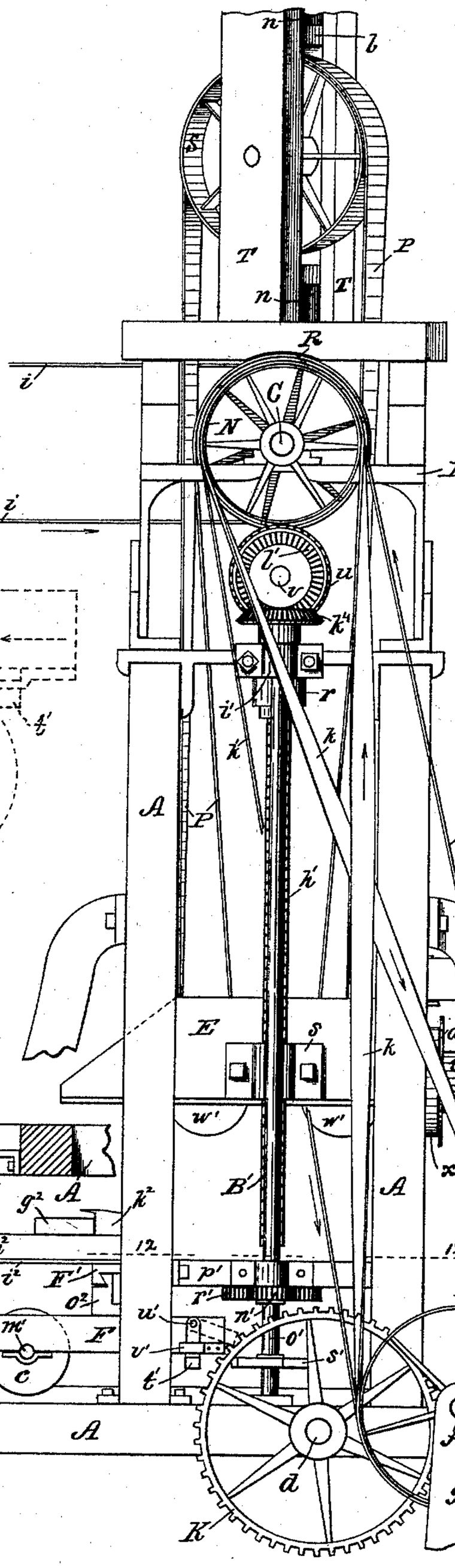


Fig. 11.

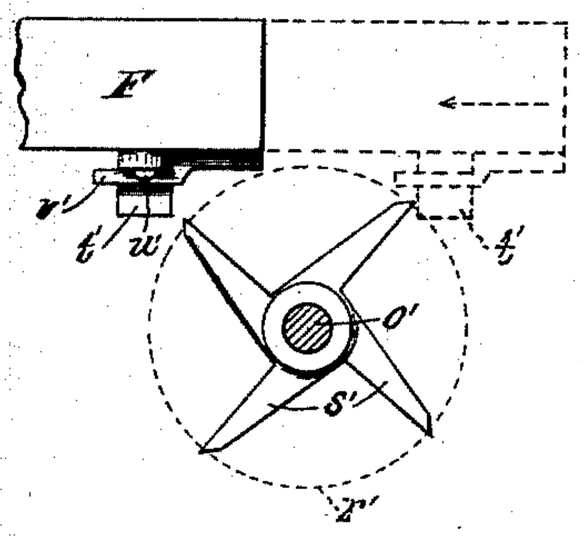
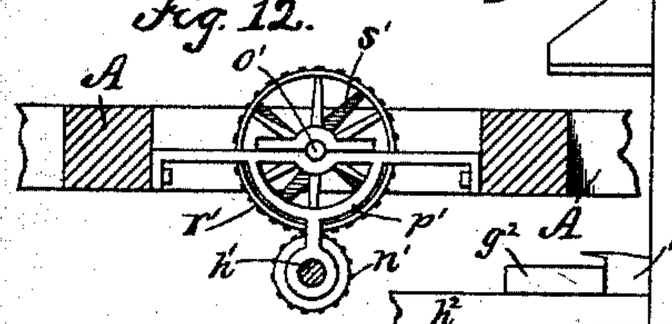


Fig. 12.



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(No Model.)

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A. WADSWORTH.

SAWING MACHINE.

No. 483,315. Patented Sept. 27, 1892.

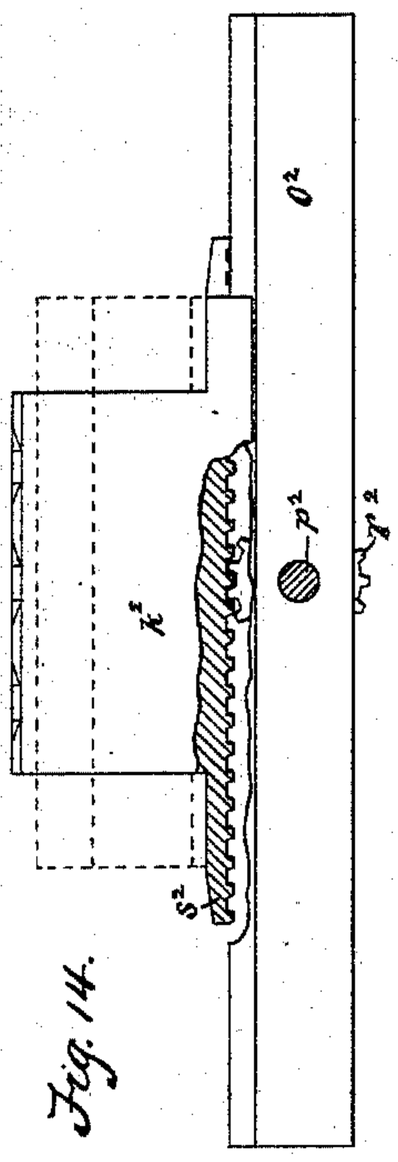

Fig. 14.

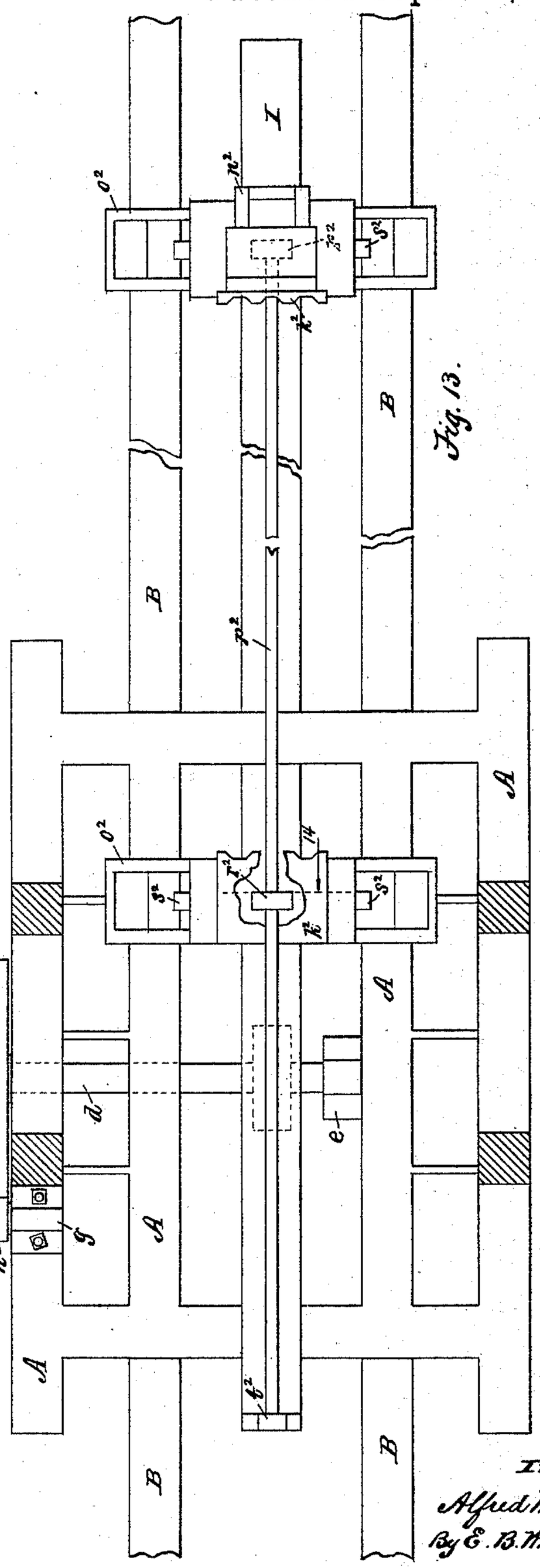

Fig. 13.

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Henry Hall.

Inventor:
Alfred Wadsworth,
By E. B. Whitmore, Atty

UNITED STATES PATENT OFFICE.

ALFRED WADSWORTH, OF WARSAW, NEW YORK.

SAWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 483,315, dated September 27, 1892.

Application filed March 11, 1892. Serial No. 424,574. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WADSWORTH, of Warsaw, in the county of Wyoming and State of New York, have invented a new and useful Improvement in Sawing-Machines, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

My invention is a sawing-machine designed more particularly for cutting hoops; but it may be used equally well for sawing lath, veneering, and thin boards and strips of wood generally, including siding or clapboards, stuff for berry-boxes, backs for picture-frames and mirrors, yard-sticks or rules, dominos, toy building-blocks, &c. This machine is constructed to saw said hoops and other pieces from logs without steaming; and it consists as to its essential parts of a carriage and dogs for holding the log and tracks for the carriage, together with saws of various kinds and arrangement and means for driving the saws and the carriage and for automatically feeding the log and the saws. The arrangement of the parts and mechanisms is such that hoops are cut from the log both ways or each time the log passes the saws, thus saving much valuable time that is commonly consumed in gigging back in machines of this class.

The invention is hereinafter fully described and the combinations of the parts particularly pointed out.

Referring to the drawings, Figure 1 is a plan of the machine condensed as to length with parts broken away and omitted. Fig. 2 is a side elevation of the main parts of the machine, seen as indicated by arrow 2 in Fig. 1, parts being omitted and other parts broken away. Fig. 3, drawn to a larger scale, shows one of the posts of the frame graduated to fractions of an inch with adjacent parts of the platen, the latter being vertically sectioned, as on the dotted line 3 3 in Fig. 9, and viewed as indicated by the arrow pointed thereon. Fig. 4 is an end elevation seen as indicated by the arrow 4 in Fig. 1, parts being broken away. Fig. 5 is an elevation of parts near the top of the frame, seen as indicated by arrow 5 in Fig. 4, parts being shown in two positions by full and dotted lines. Fig. 6 is an elevation of the belt-tightening pulley, seen as indicated by arrow 6′ in Fig. 1, parts of the frame being vertically sectioned, as on the dotted line 6 6 in said Fig. 1, the wheel being shown in two positions by full and dotted lines. Fig. 7 is a detached view showing a greater number of saws employed. Fig. 8 is an end elevation of parts of the machine, viewed as indicated by arrow 8 in Fig. 1, the track-timbers and tracks being transversely sectioned, as on the dotted line 8′ 8′ in said Fig. 1. Fig. 9 is a plan of some of the lower parts of the machine obscured in Fig. 1, the posts being horizontally sectioned, as on the dotted line 9 9 in Fig. 2, parts being broken away and omitted. Fig. 10 is a side elevation seen as indicated by arrow 10 in Fig. 1, parts being broken away. Fig. 11, drawn to a larger scale, is a plan of parts of the device for automatically lowering the saws. Fig. 12 shows other parts, the posts being horizontally sectioned, as on the dotted line 12 12 in Fig. 10. Fig. 13 is a plan of the base of the frame, showing parts not visible in Figs. 1 and 9, the posts being horizontally sectioned near the base. Fig. 14, drawn to a larger scale, shows some of the mechanism for moving the log sidewise, seen as indicated by arrow 14 in Fig. 13, parts being sectioned, as on the dotted line at point of arrow.

Referring to the parts shown in the drawings, A is the frame of the machine, which is made of iron.

F is a carriage for holding the log.

B are parallel timbers for holding horizontal tracks *a*, upon which the carriage rolls.

C is a driving-shaft for the carriage and other parts, resting in bearings or supports D above the frame.

E is an iron platen or frame for holding the saws, adapted to slide vertically in ways *b*, Figs. 3 and 9, in the vertical corner-posts of the frame. The carriage rolls along the tracks *a* upon grooved wheels *c*, held on axles *m*′.

G is the log.

H, Figs. 8 and 9, is a stout pinion beneath the machine for moving the carriage, the pinion engaging the teeth of a longitudinal rack I, secured to the carriage. This pinion is held upon a horizontal cross-shaft *d*, resting in bearings in the base of the frame, one being shown at *e*, Figs. 9 and 13. At its outer end this shaft holds an overhanging spur-gear K.

At L is shown a system of three belt-pulleys of ordinary construction upon a shaft *f*, the intermediate narrow pulley being rigid with the shaft, while the outside wider pulleys are idlers turning freely upon the shaft. This shaft is held in bearings *g g* and is provided with a pinion *h*, engaging the teeth of the gear K.

k k' are driving-belts for the pulleys L, leading from an overhanging pulley N upon the driving-shaft C, the belt *k* being crossed to give a reverse motion to the carriage.

i is the main driving-belt for the machine, leading from a motor or some convenient driving-wheel onto a pulley O on the driving-shaft C. P is a driving-belt for some of the saws held by the saw-frame or platen, receiving motion from a pulley R, rigid with the driving-shaft C.

S is a carrying tightening-pulley or idler for the belt P, held in a sliding frame *l* over the driving-shaft.

T are vertical guide-posts for the frame *l*, connected at the top by a cross-tie r^3 and formed with inner opposing channels *n* for the frame *l* to slide in. The frame *l*, with the pulley S and a part of the belt P, is balanced by a counter-weight A', Fig. 6, connected with the frame by a cord *o*, resting on idle-pulleys *p p*. By means of this arrangement of the parts the tension of the belt P is kept uniform, while the platen E is moved upward or downward in the ways in the frame. When the platen is raised or lowered, the pulley S moves correspondingly upward or downward, the weight A' being sufficient to hold the belt taut at all times.

The saw-frame or platen is held by stout vertical screws B', one at each side of the frame of the machine, as shown in Figs. 2, 9, and 10. The screws have bearings at *r* in the upper part of the frame and pass through threaded rests *s* at the sides of the platen. These screws are provided at their upper ends with beveled pinions *t*, which are engaged by beveled gears *u*, held by a horizontal shaft *v*, just above the frame. (See Fig. 1.)

At one end the shaft *v* is provided with an overhanging spur-gear *w*, Figs. 1, 2, 4, and 5.

x is a stud held at s^3 rigid with the frame, upon which turns a friction-wheel and hand-wheel C' and pinion *y*, the latter engaging the gear *w*, said wheel and pinion being as one piece and turning together. By means of this hand-wheel the attendant standing at the side of the machine may move the platen upward or downward as may be required. One corner-post of the frame is graduated into fractions of an inch, forming a scale *m*, (clearly shown in Fig. 3,) which enables the attendant to move the platen downward through measured distances—for instance, corresponding to the width of a hoop.

As large logs—say three or four feet in diameter—are cut up in the machine the platen necessarily has to be raised through a considerable distance when a new log is put onto the carriage. To thus raise the platen by means of the hand-wheel C' is somewhat laborious. I therefore provide means by which this may be done by the power of the machine. This mechanism is best shown in Figs. 4 and 5. Upon the outer extended end of the driving-shaft C, I secure a belt-pulley *z* in line with the wheel C'. Outside of this pulley and upon the shaft C, I attach an arm *a'*, turning freely upon the shaft, and provide it near its outer end with a small band-pulley *b'*, held upon a stud *c'* opposite the pulley *z*.

d' is a band on the pulleys *z* and *b'*, which is caused to bear against the face of the friction hand-wheel C' by means of a weight *e'*, as shown.

f' is a cord passing over a pulley *g'* and attached to the arm *a'*, by means of which said arm, with its belt *d'*, may be pulled upward away from the wheel C', as indicated by dotted position in Fig. 5. Now the belt *d'* runs continuously while the shaft C revolves, and whenever it is wished to raise the platen by means of the power of the machine the arm *a'* is allowed to swing downward to bring the belt *d'* against the wheel C'. When not in use, the belt is held off the wheel C' by pulling the cord downward and fastening it by some convenient means. Besides these means for raising and lowering the platen, there are other means provided (shown most clearly in Figs. 4, 10, and 12) for lowering the platen automatically.

h' is a vertical shaft on the side of the machine opposite the wheel C', held in bearings *i' p'*, rigid with the frame. At its upper end this shaft is provided with a miter-gear k^4, which engages a similar gear *l'* on the shaft *v*. At its lower end it is provided with a pinion *n'*.

o' is a short vertical shaft held at its upper end in the bearing *p'* and its lower end in a bearing in the frame, provided with a gear *r'* to engage the pinion *n'*. Upon this shaft *o'* is a star-wheel *s'*, (see, also, Fig. 11,) the extended arms of which being in position to be acted upon by a dog *t'*, held by the carriage F. This dog is pivoted at *u'*, so that it may be turned down vertically into action or thrown up out of action, as indicated by the dotted position in Fig. 10. The dog when in position to act is held by a clip *v'* rigid with the carriage. As indicated in Fig. 11, the carriage, just as it is about to finish its movement toward the left, brings the dog against an arm of the star-wheel and turns the latter through a part of a revolution, which lowers the platen a certain distance by means of the connecting mechanism. When the carriage moves in the opposite direction, should the dog encounter an arm of the star-wheel it is simply pushed out of the way by the latter and does not act.

In this machine I use for doing various kinds of work circular saws *w'* and a band-saw *x'*, Figs. 4, 7, and 9, the band-saw being best shown in Figs. 1, 8, and 9. The vertical circular saws

are held on arbors y' and z', carried within the platen, the arbor z' being slightly inclined, as shown. This inclined arbor, with its saws, is used in making hoops or similar strips having one inclined face. One or more circular saws may be used on these two arbors, as shown in Figs. 4 and 7. Where more than one are used on the inclined arbor, their radii are made to increase according to the slant of the arbor, so that their lower peripheries shall be on a horizontal line, as shown in Fig. 7. In cutting lath or other strips having parallel sides—such, for instance, as are to be cut up in measuring-rules, dominoes, building-blocks, &c.—the saws are removed from the inclined arbor. These saws are of ordinary construction and held to the respective arbors in the ordinary manner by screw-nuts at the ends of the arbors, spacers of proper thickness being inserted between the saws to do the work required.

The idle-pulley S is set to one side of the driving-pulley R (see Figs. 1 and 4) and is inclined or turned horizontally out of line, which position is rendered necessary on account of the inclined position of the arbor z'. The parts being thus placed, the belt P runs smoothly around all the pulleys—that is to say, the driving-pulley R, the idler S, and the small pulleys on the two arbors y' and z'.

The horizontal circular saw w' is held upon a vertical arbor d^2, Figs. 4, 8, and 9, which runs in a sleeve e^2, secured to the platen by clamping-bolts f^2. The clamping-bolts pass through horizontal slots in the sleeve, so that the arbor may be moved laterally to cut more or less deeply in a horizontal direction into the log. This horizontal saw serves to cut off the hoops or other strips cut from the log by the saws of the arbors y' and z'.

The arbor d^2 is rotated by means of a belt E', leading from a vertical rotary drum G' at one side of the machine. This drum is made long vertically, so that the belt may move upward or downward along upon it as the platen is raised or lowered, as above mentioned.

The band-saw x', which is horizontal, is used in part for cutting thin boards or pieces from the top of the log—such, for instance, as veneering, siding, &c. When this saw is used, the arbor d^2 is removed from the machine and the saws on the arbor y' and z' may or may not be used, according to circumstances. The band-saw runs on carrying-wheels a^2, held upon studs b^2, rigid with the platen. One wheel is provided with a belt-pulley t^3 to receive a driving-belt from some convenient driving-pulley, by means of which the saw is operated.

The log when dogged to place rests primarily upon cross-blocks g^2, Figs. 2 and 8, one at either end. These cross-blocks rest upon longitudinal timbers h^2, which in turn are held by longitudinal iron tie-bars i^2. (See also Fig. 4.) The dogs k^2 for holding the log are of common construction and operate in the usual manner. The forward dog is rigid with the carriage, and the rear dog is moved longitudinally along ways n^2 by a traverse-screw l^2 of common form. (Clearly shown in Fig. 1.) The dogs are held upon head-block F', fitted to move laterally on slides o^2, forming part of the carriage. This is for the purpose of moving the log laterally in the machine. Automatic means are provided for moving the log laterally at each run of the carriage forward and backward upon the tracks a. p^2, Figs. 1, 2, and 13, is a shaft extending longitudinally through the carriage, provided with two pinions r^2, one under each of the carriage-heads F'. (See Fig. 14, also.) Each carriage-head is provided with a transverse horizontal rack s^2, to be engaged by a pinion r^2. At the left the shaft rests in a bearing or support t^2, and it is provided with an overhanging wheel u^2, having peripheral radial pins v^2. A handle w^2, inserted in the wheel, enables the attendant to move the carriage-heads and log sidewise in either direction. Inclined trips x^2 and y^2 are secured to the track-timbers B beneath the wheel by means of cross-bars z^2. (See Fig. 8.) These trips serve to turn the wheel at each end of the run of the carriage by means of the pins in the wheel coming in contact with the trips as the carriage is about stopping.

This machine is designed to have the saws cut the log while it is moving in each direction—that is to say, hoops or strips are cut from the log when it is moving forward or to the left and backward or to the right, all parts of the machine being calculated with reference to this kind of service. The lateral feed mechanism for the log is so arranged that just before the motion of the carriage in either direction upon the tracks ceases and after the log has left the saws a pin of the feed-wheel u^2 comes in contact with one of the inclined trips x^2 or y^2, as the case may be, which turns the wheel slightly in the direction indicated by arrow. This shifts the log toward the observer, as appears in Fig. 1, so that when it is carried again under the saws hoops or other pieces will be cut from it. By this means the hoops or other strips are cut from the log each time it passes the saws, and there is no loss of time in gigging back. This cutting in both directions along the log can of course be done only when the circular saws are in use alone and the band-saw removed. By having a number of feed-wheels u^2, with the pins v^2 differently spaced, to place upon the shaft p^2 separately the lateral feed of the log just described may be regulated at pleasure. For instance, if there are but two vertical saws used, as shown in Fig. 4, the lateral feed of the log will be equal to but the thickness of two hoops plus the saw-kerfs; but if more saws are used, as shown in Fig. 7, the lateral feed of the log each time will need to be greater. This construction and arrangement of the parts so that the saws may cut both ways along the log are an essential and important part of my invention, for, on account of this, very much time is saved

and the rapidity of the work done by the machine is greatly increased. The circular saws, it will be understood, may rotate in either direction, and they will cut equally well whether the log is moved against them in either direction.

Should complete gangs of saws be employed on the arbors y' z' sufficient to cut over the whole width of the log at one passage over it, this lateral feeding of the log would not be needed and the wheel u^2 would be removed. The feeding in this case would be only the downward feed of the platen by means of the dog t' and the star-wheel s', above described, or by the attendant by means of the hand-wheel C′ and the scale m, already set forth. In case such gangs of saws are employed the vertical arbor d^2 is removed and the horizontal sawing is done with the band-saw.

The vertical arbor d^2 is turned by a belt E′, leading from a drum G′, as has been already stated. Should the drum be placed near the arbor and the belt be necessarily short, I employ an automatic tightener—like, for instance, that shown in Figs. 8 and 9. This tightener consists of a vertical roller a^3 held near to and parallel with the drum by hangers b^3 b^3, centered on the shaft D′ of the drum. An arm c^3, extending from the lower hanger b^3, is connected by means of a cord d^3 with a weight e^3, the cord passing over a pulley f^3. Thus arranged this weight holds the roller firmly against the outside of the belt at all times and serves to take up any slack in the latter that might be caused by moving the arbor toward the left, as shown in Fig. 8, for the purpose of cutting more deeply in a horizontal direction into the log. If the arbor be moved in the opposite direction, the consequent pull upon the belt would press the roller back and slightly raise the weight, a substantially uniform tension being maintained upon the belt under all circumstances. If in setting up a machine it prove in any case more convenient to place the drum more distant from the saw, employing a longer belt, this tightening device may be dispensed with.

The means employed for shifting the driving-belts k k' for the carriage are not claimed to be new.

As shown, g^3, Figs. 2, 8, and 9, is a shifter for the belts, resting upon the base of the frame A, this shifter being forked upon the belts in the usual manner. The shifter is provided with teeth near its opposite end, which are engaged by a toothed segment h^3, which is connected with the arm i^3 of a rock-shaft k^3 by a rod l^3.

n^3 is an operating-bar or operator for the shifter secured to the log-carriage. This bar is provided with an adjustable dog o^3 to act upon the arm i^3 as the carriage moves toward the right, as appearing in Fig. 2. When said arm is thrown to the right by the dog, as shown in full lines in said figure, the belts k k' will be shifted by means of the intermediate mechanism to reverse the motion of the carriage and cause it to move to the left. At the opposite end the carriage is provided with a similar operating-bar and dog, which, encountering the arm i^3 as the carriage moves to the left, turn it to the left, as indicated by dotted position. This serves to again shift the belts and cause the carriage to again move toward the right. This mechanism is in principle much like that used on iron-planers for a similar purpose. The rock-shaft k^3 is provided with a hand-lever p^3 outside the frame A, so that the motion of the carriage may at any time be reversed or stopped altogether by the attendant.

For cutting up logs of different lengths the rear slide F′—the one shown at the right in Fig. 1—is moved forward or back along the carriage, as may be required. Longitudinal timbers h^2 and tie-bar i^2, of different lengths, are also employed for logs of different lengths; also, the pinion r^2, under the movable slide F′, is made longitudinally adjustable upon the shaft p^2, by means of a spline in the shaft or other well-known means not involving invention. The outer trip y^2 is also longitudinally adjustable upon the track-timbers B, so that it may be set to engage the wheel u^2 for different lengths of run of the carriage. The carriage is caused to run to a greater or less distance along the tracks by shifting the dogs o^3 and the bars n^3 of the belt-shifting mechanism; also, when the wheels u^2, having pins v^2 differently spaced, are employed for varying the lateral feed of the log the trips x^2 and y^2 are turned horizontally to correspond, as indicated by the dotted position of y^2, this being permitted on account of the threaded stems of the trips and the nuts beneath the bars z^2. (See Fig. 9.)

What I claim as my invention is—

1. A machine for sawing hoops, having a traveling carriage, in combination with a vertically-movable platen over the carriage, a horizontal saw and a pair of upright saws carried by the platen, the arbor of one of the upright saws being horizontal and the other arbor of the pair being inclines, a driving-shaft over the platen at right angles with the carriage, a driving-pulley on said shaft, a vertically-movable idle-pulley over the driving-pulley, and a circuit-belt for the upright saws, resting upon the driving-pulley and pending at either side thereof, the pendent branches of the belt passing around the respective arbors of the upright saws and thence over the idle-pulley, substantially as shown.

2. A machine for sawing hoops and other strips of wood, having a reciprocating carriage and a vertically-sliding saw-frame or platen over the carriage, and vertical and horizontal saws held by the platen, in combination with automatic means, substantially as shown, for lowering the saws for each cut, substantially as described and shown.

3. A machine for sawing hoops from a log

while passing in either direction, having a rectilinear reciprocating carriage for carrying the log, in combination with a set of independent rotary saws consisting of a horizontal circular saw and a pair of upright circular saws, one of the latter being vertical and the other inclined, and feed mechanism to move the log at each forward and backward motion of the carriage, substantially as shown and described.

4. A machine for sawing strips of wood, having, in combination, a vertically-movable platen or saw-frame, saws held by the platen, vertical screws for holding the platen, gears on the screws, a shaft *v* over the screws, with gears to engage the gear on the screws, a driving-shaft over the shaft *v*, a belt-wheel on the driving-shaft, a gear on shaft *v*, a friction-wheel and a pinion intermediate between said belt-wheel and gear on shaft *v*, a weighted arm on the driving-shaft, and a belt on the belt-wheel, substantially as shown.

5. In a hoop-machine, a carriage, a vertically-movable platen over the carriage, a horizontal and an inclined saw-arbor held by the platen, a driving-shaft over the platen, a driving-wheel on the shaft, a vertically-movable idle-pulley over the driving-shaft, and a driving-belt on the driving-wheel, extending downward to the saw-arbors and thence upward over the idle-pulley, all combined and arranged substantially as shown and described.

In witness whereof I have hereunto set my hand this 8th day of December, 1891, in the presence of two subscribing witnesses.

ALFRED WADSWORTH.

Witnesses:
ENOS B. WHITMORE,
J. O. MCCLURE.