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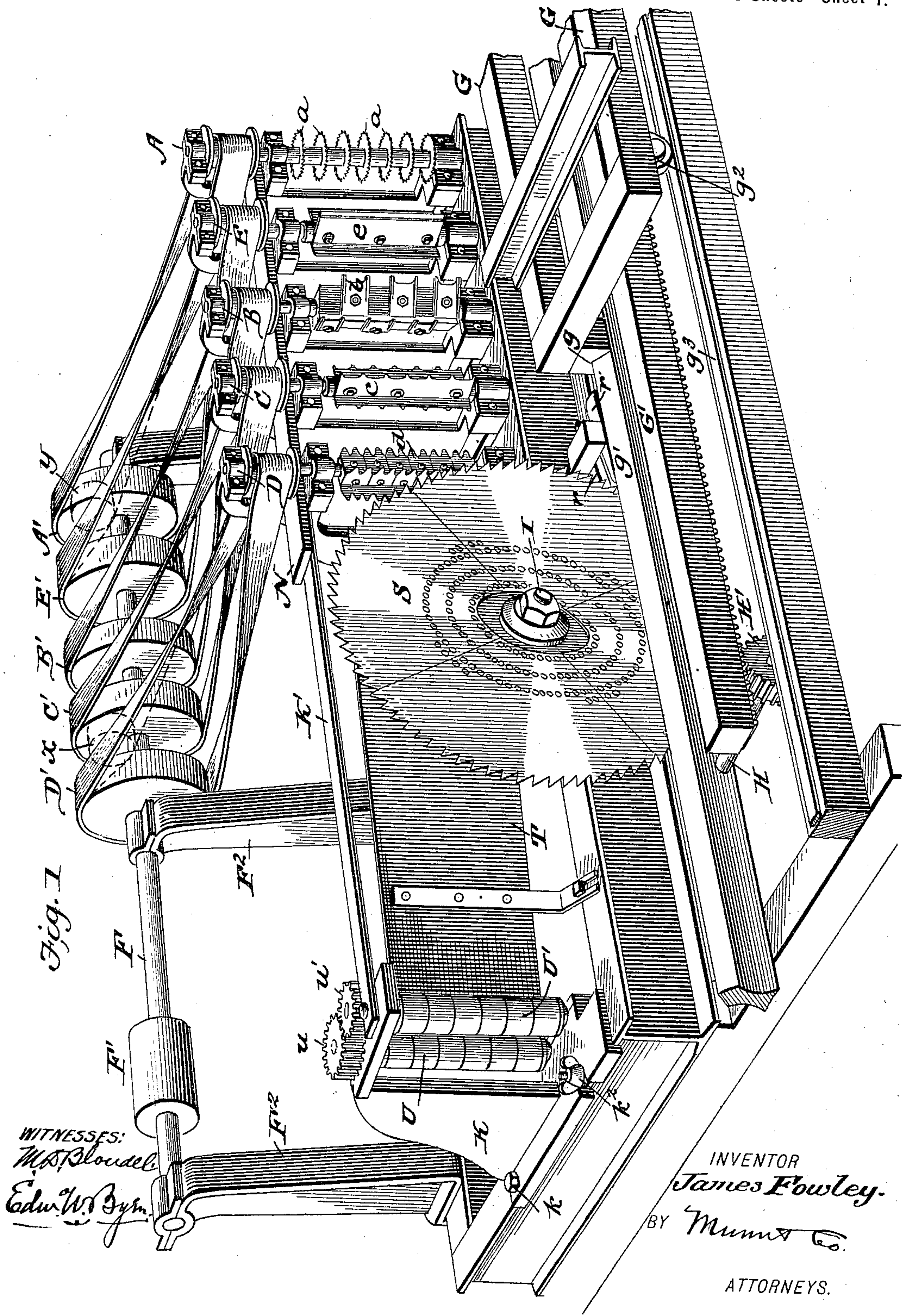
Patented Aug. 29, 1899.

J. FOWLEY.
HOOP MACHINE.

(No Model.)

(Application filed Nov. 7, 1898.)

5 Sheets—Sheet 1.



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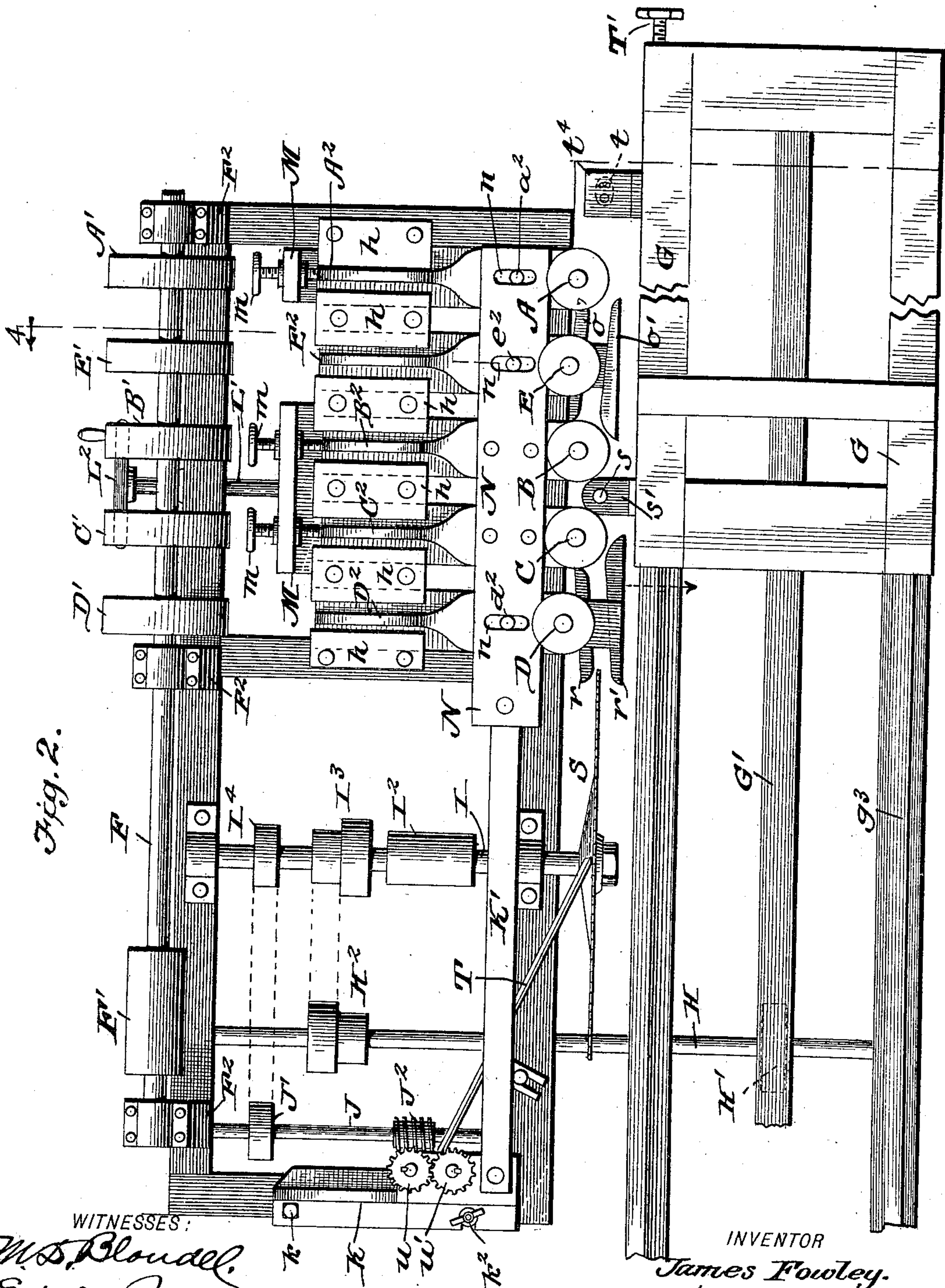
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5 Sheets—Sheet 2.



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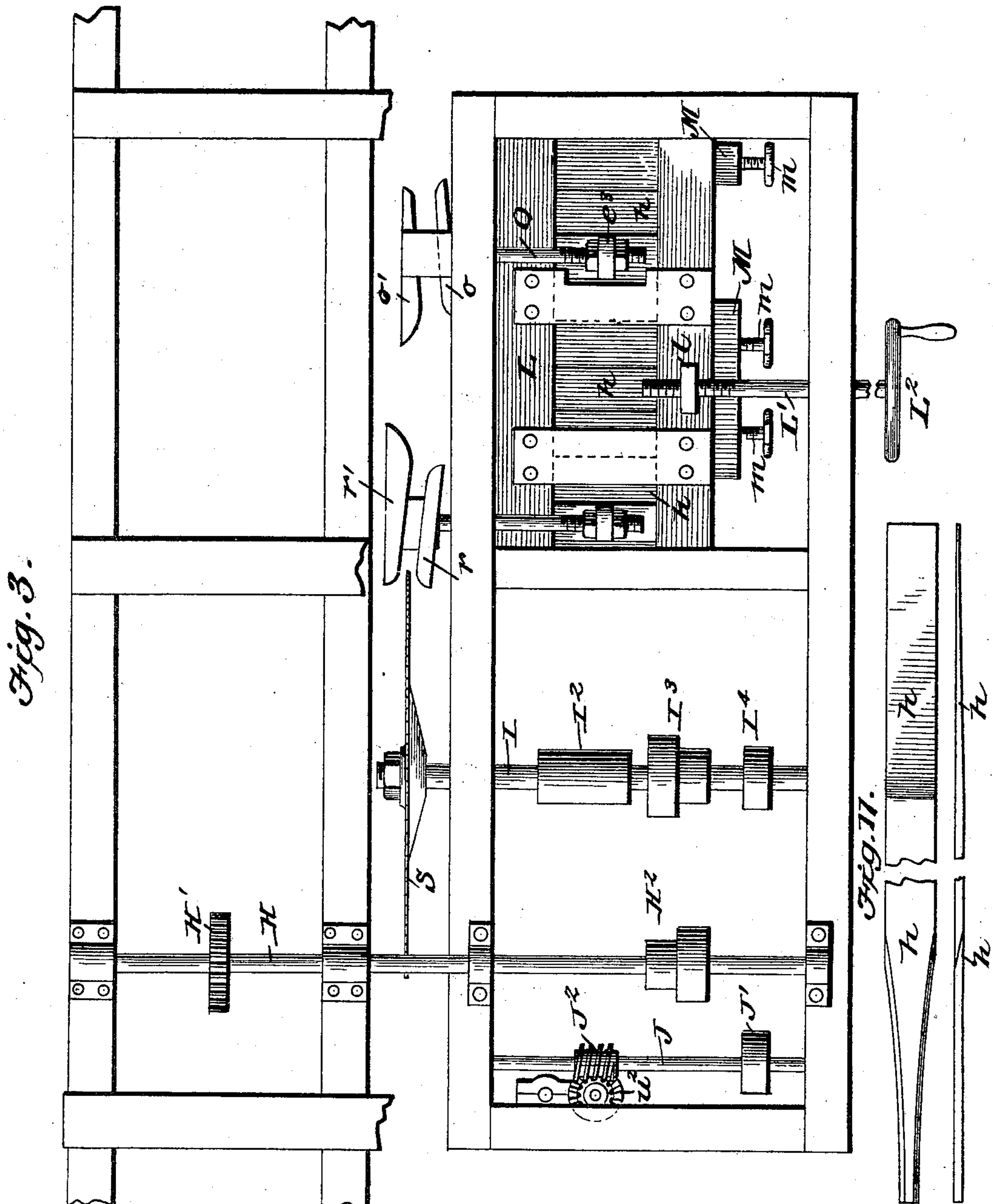
Patented Aug. 29, 1899.

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(Application filed Nov. 7, 1898.)

(No Model.)

5 Sheets—Sheet 3.



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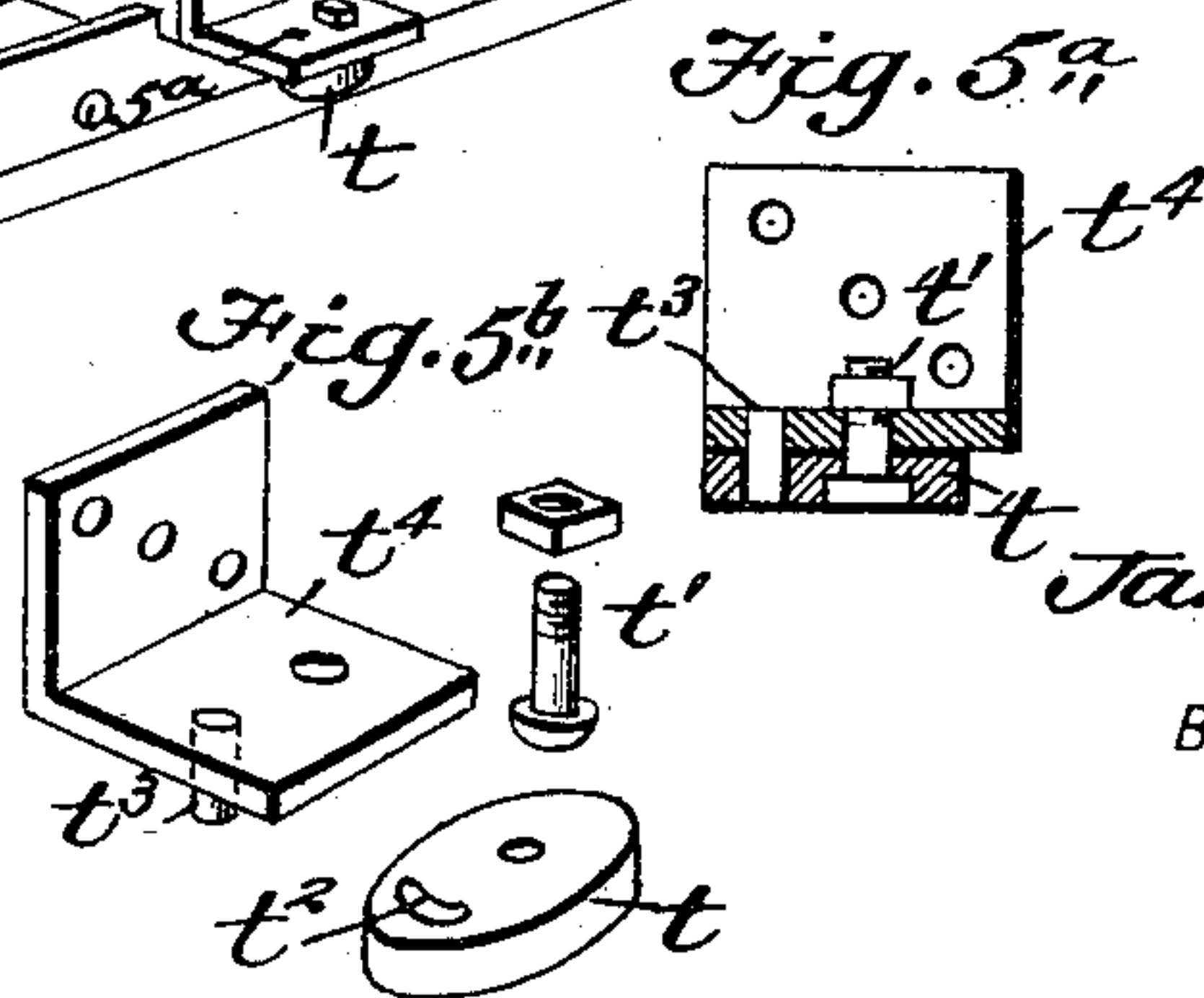
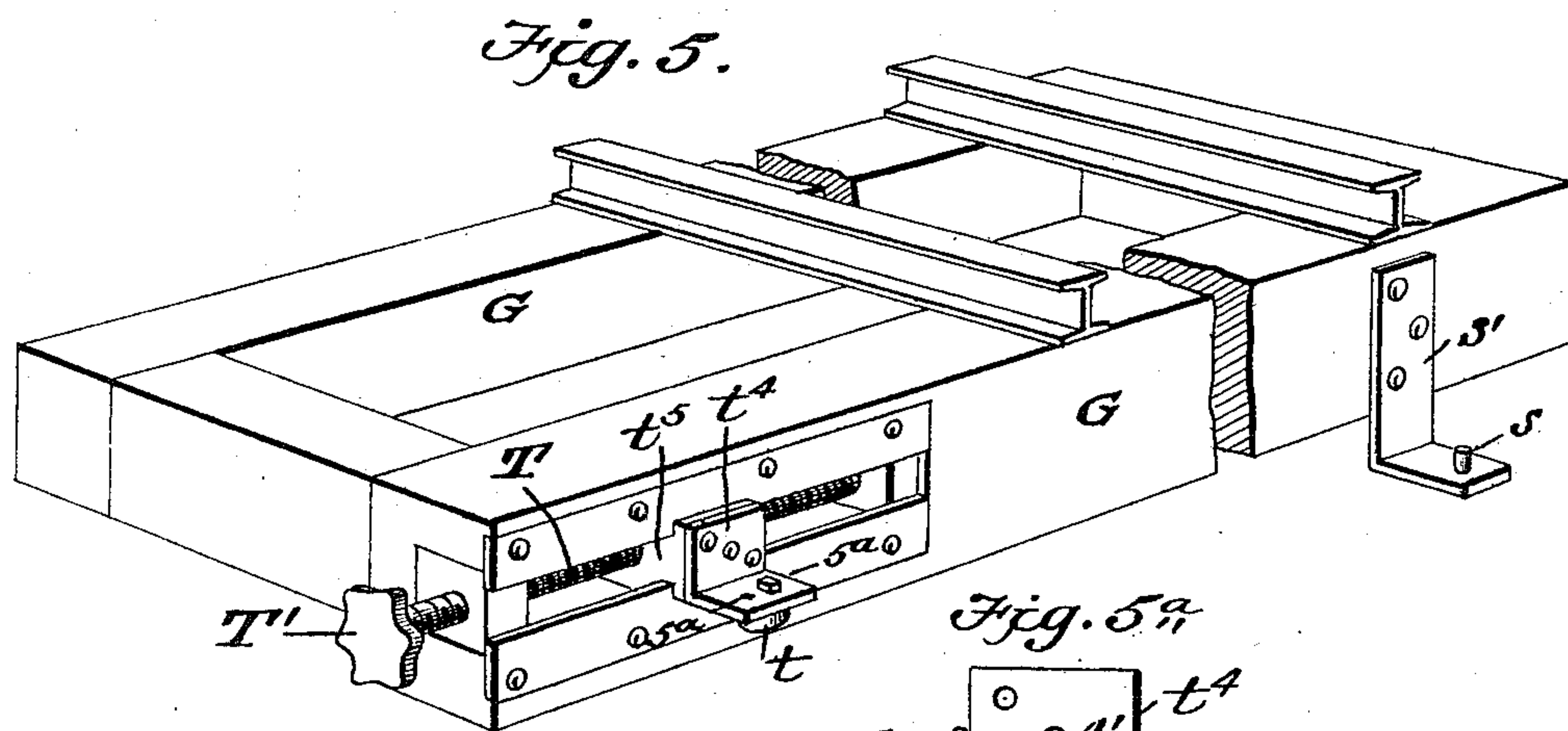
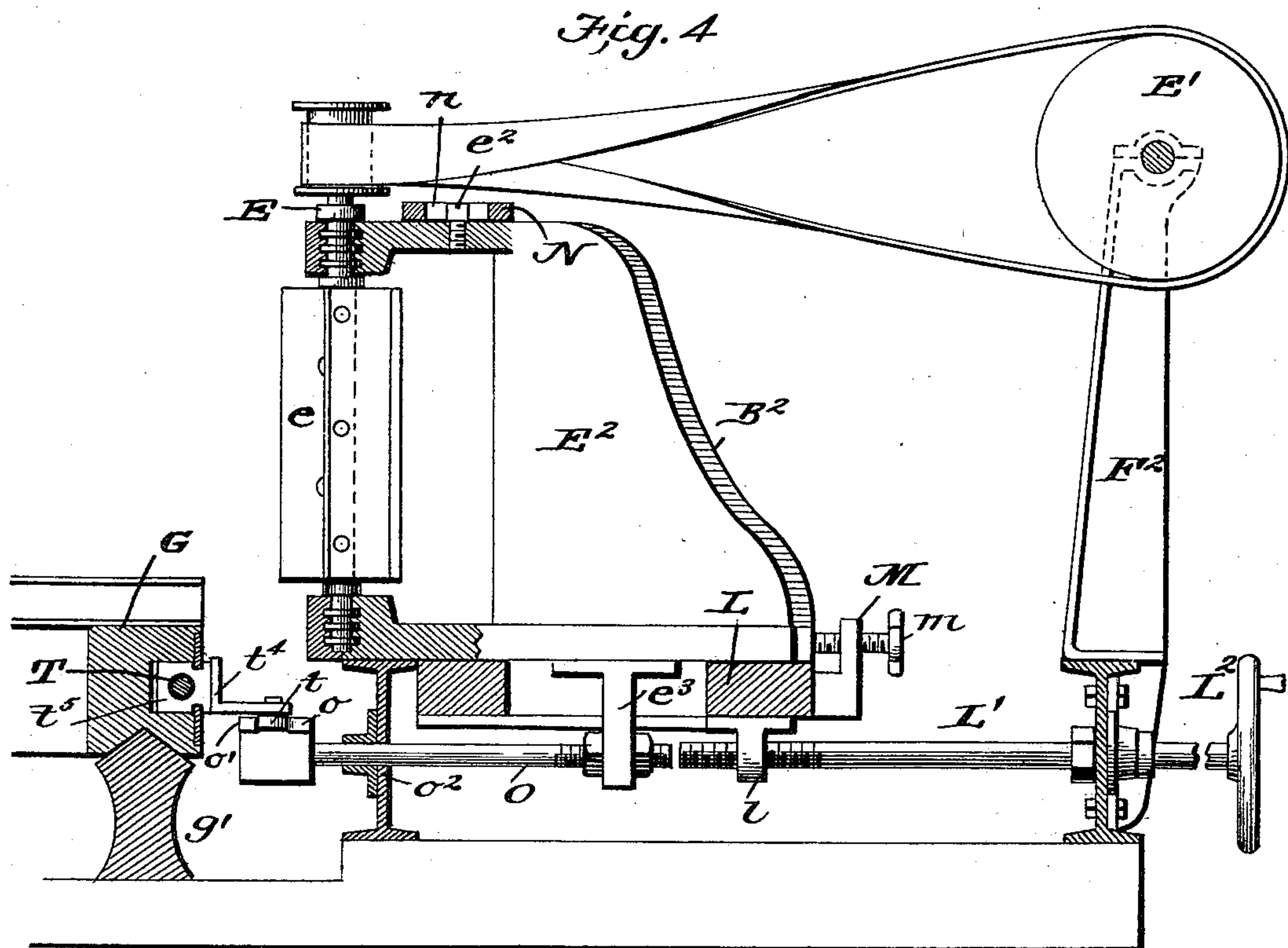
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(Application filed Nov. 7, 1898.)

(No Model.)

5 Sheets—Sheet 4.



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Fig. 6

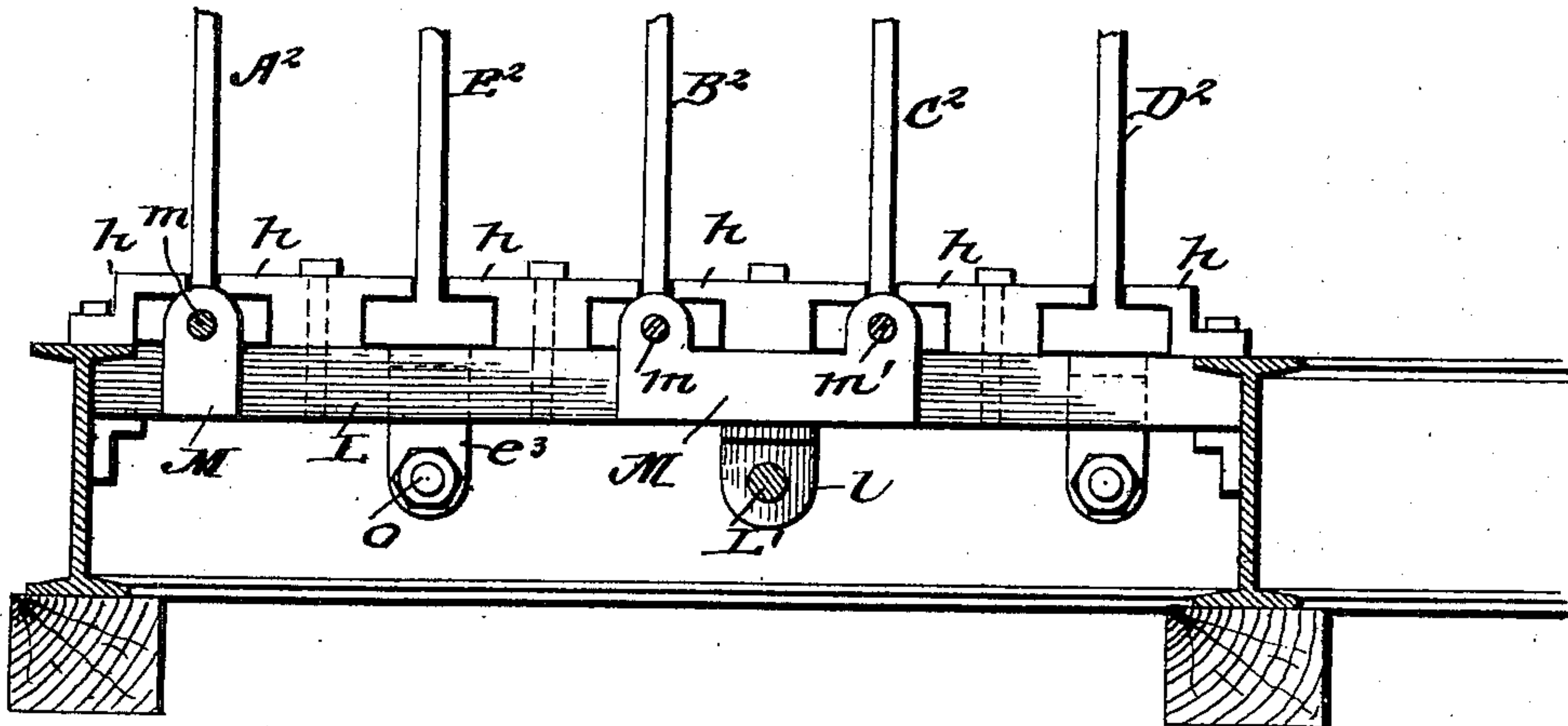


Fig. 7.

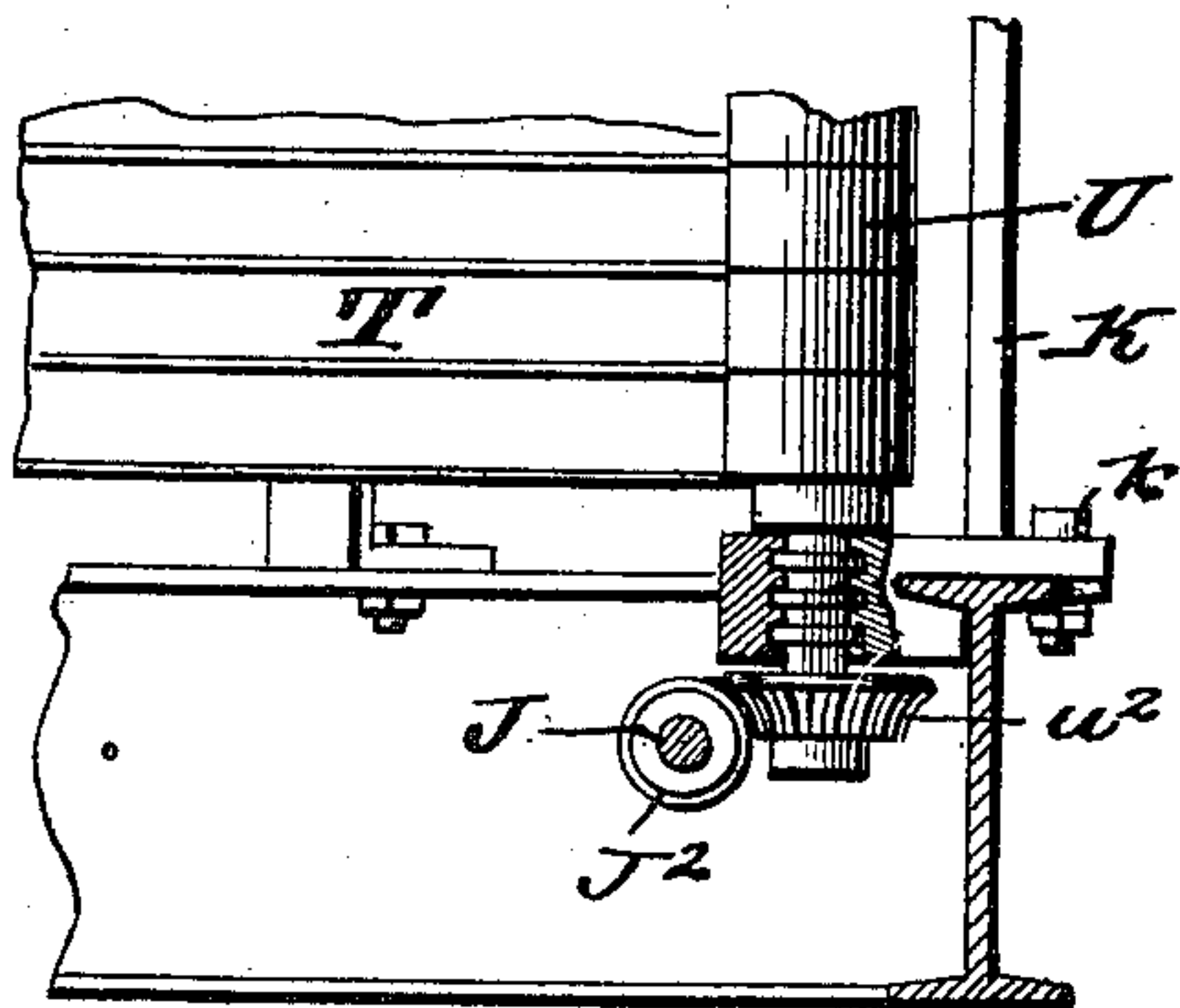


Fig. 8.

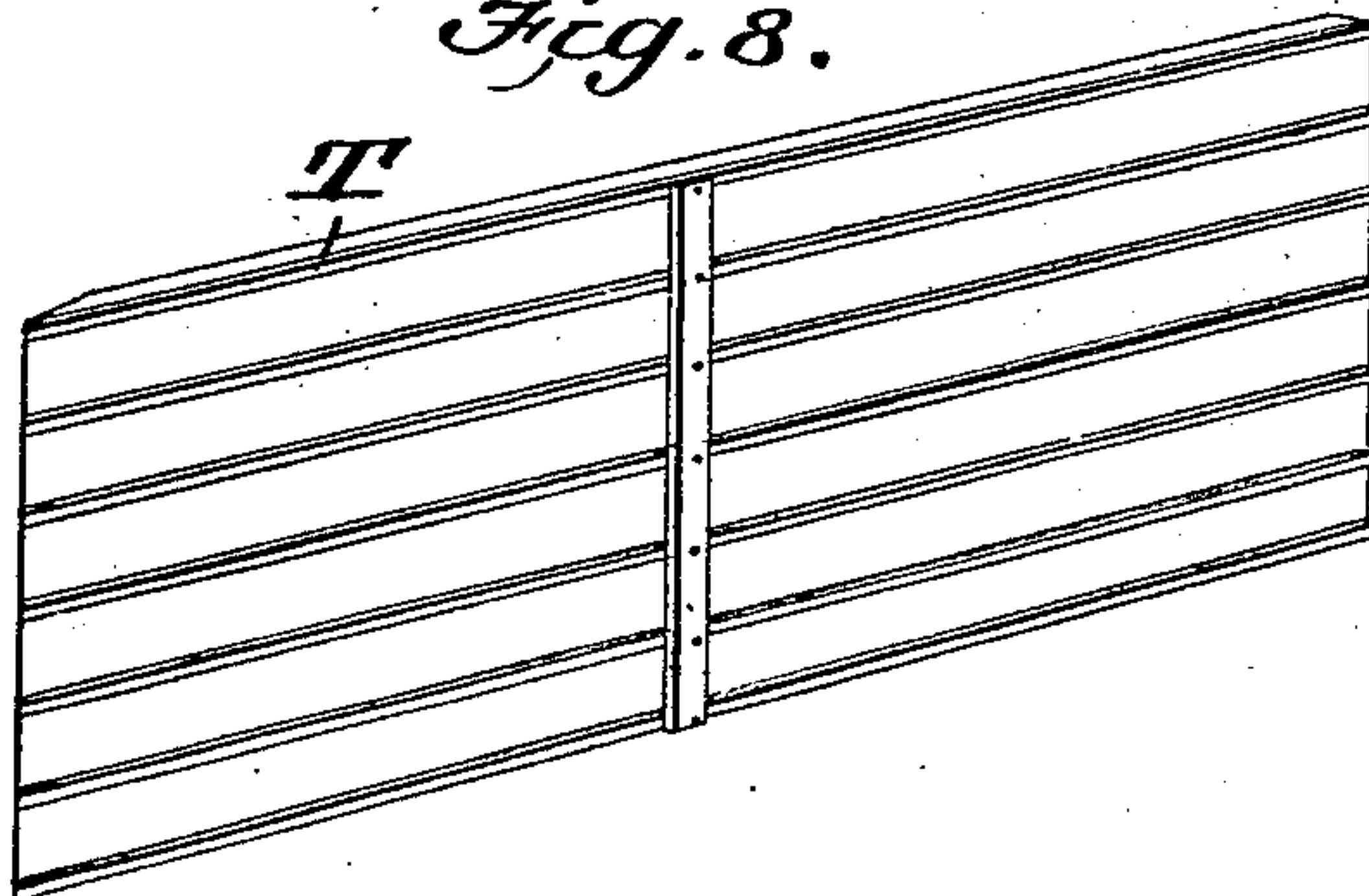


Fig. 9.

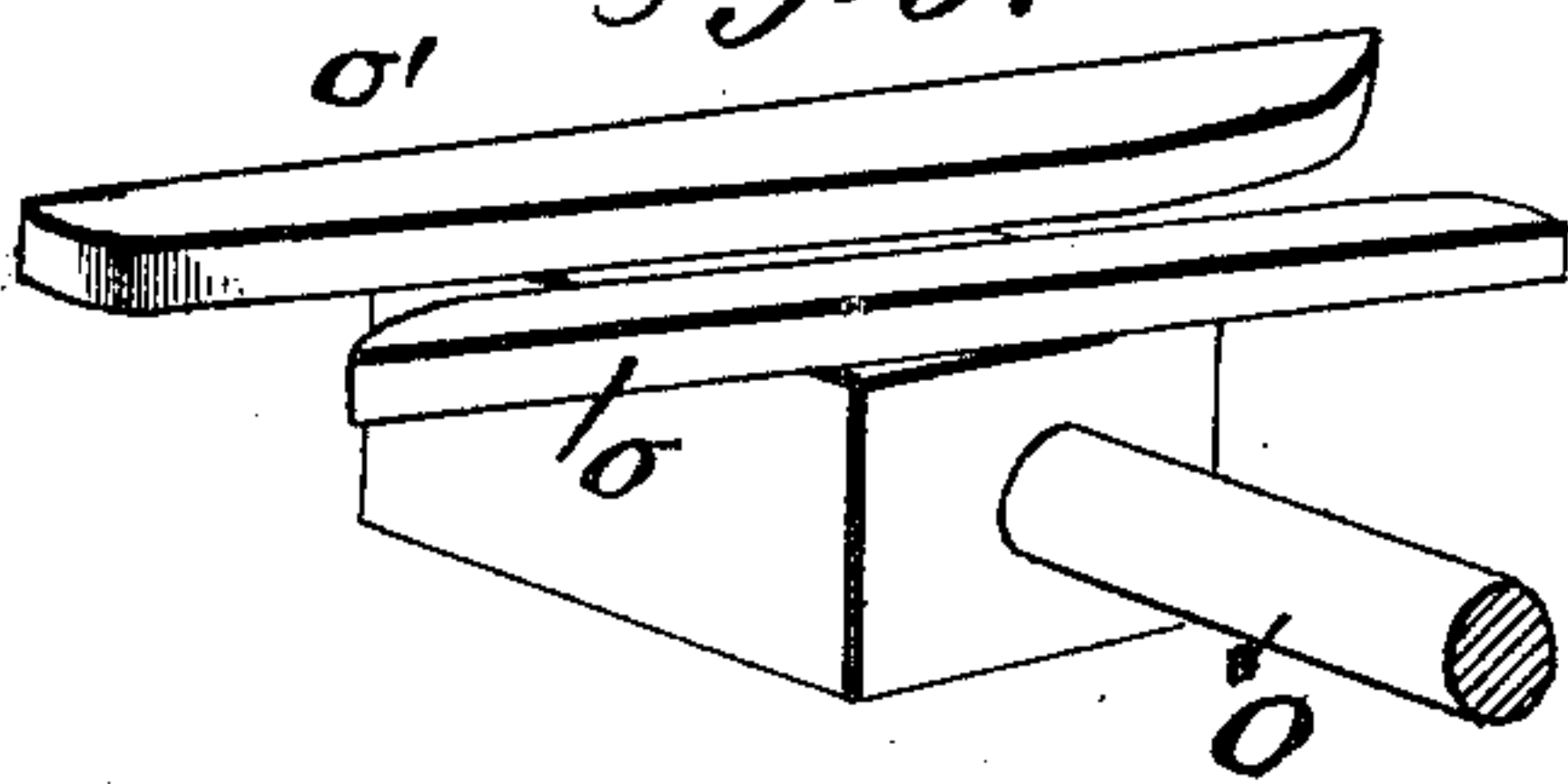
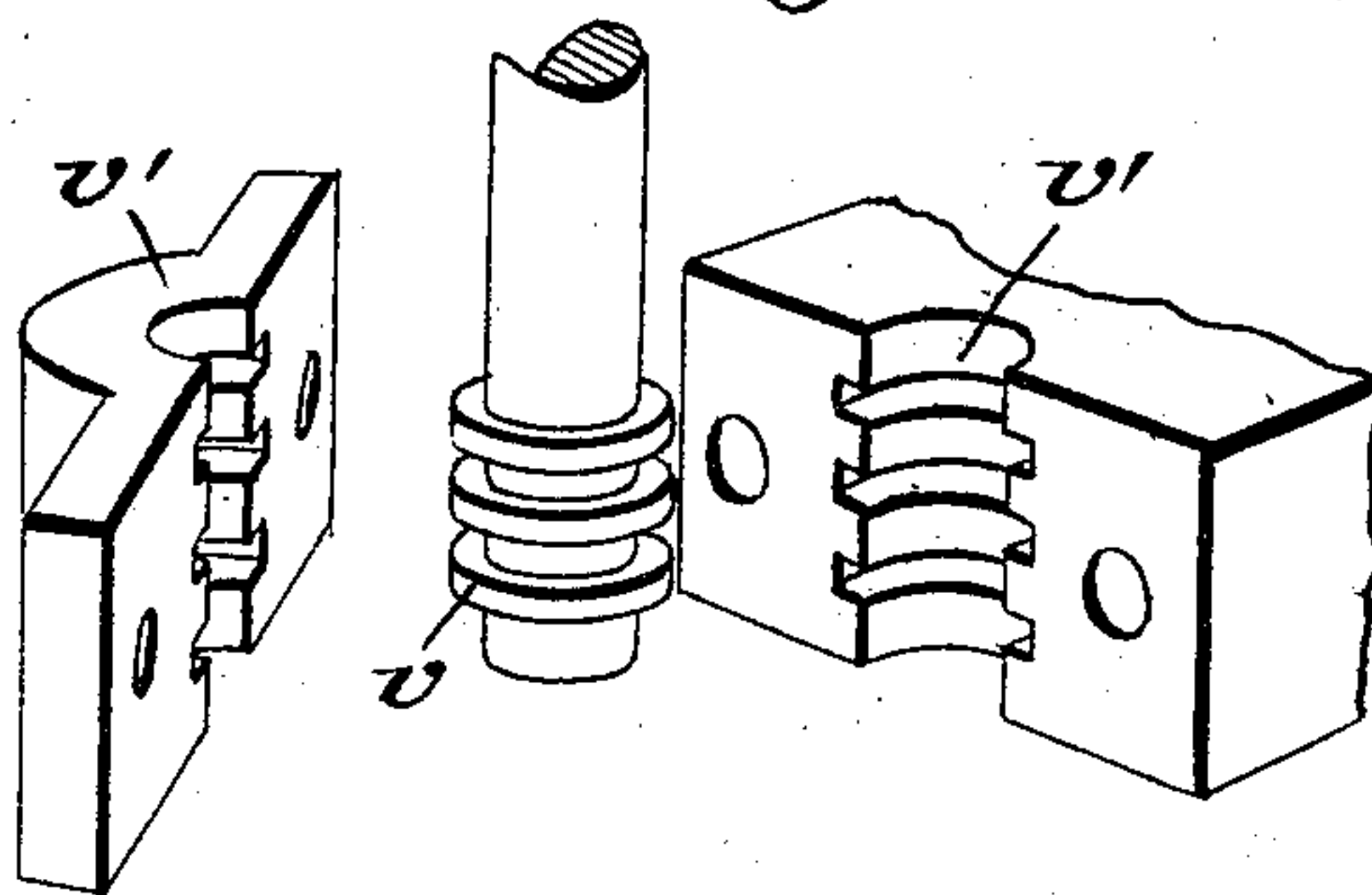


Fig. 10.



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JAMES FOWLEY, OF COBDEN, ILLINOIS.

HOOP-MACHINE.

SPECIFICATION forming part of Letters Patent No. 632,107, dated August 29, 1899.

Application filed November 7, 1898. Serial No. 695,730. (No model.)

To all whom it may concern:

Be it known that I, JAMES FOWLEY, of Cobden, in the county of Union and State of Illinois, have invented a new and useful Improvement in Hoop-Machines, of which the following is a specification.

My invention is in the nature of a machine for making barrel-hoops directly from the log, with one end tapered to a thin edge to form the lap and the other end pointed to form the outer wrap. It is an improvement upon the machine for which Letters Patent No. 568,671 were granted me September 29, 1896; and it consists in the peculiar construction and arrangement of parts, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a perspective view of the entire machine, taken from the log side. Fig. 2 is a plan view with the driving-belts omitted. Fig. 3 is an underneath or inverted plan view. Fig. 4 is a vertical transverse section on line 4 4 of Fig. 2. Fig. 5 is a perspective view of the inner side of the log-carriage broken in the middle and with the two ends brought together to shorten the view. Fig. 5^a is a sectional view on line 5^a 5^a of Fig. 5. Fig. 5^b are detached views of the parts shown in Fig. 5^a. Fig. 6 is a rear view of the bases of the sliding frames that carry the cutter-heads. Fig. 7 is a rear view, partly broken away, of the hoop-guides and drawing-rolls that take the severed hoops from the saw. Fig. 8 is a rear view of the hoop-guide alone. Fig. 9 is a perspective view of one of the advancing-cams for two of the cutter-heads. Fig. 10 is a perspective view of the separated bearings of the cutter-heads, and Fig. 11 shows in side and edge views the two ends of a completed hoop as made by my machine.

I will first describe the several operations of forming hoops from the log and afterward describe these operations in detail.

The general method of making a series of hoops at one operation from a log is the same as that shown in my previous patent. In my present machine there are five or more vertical cutter-shafts in front of the main saw instead of three, as in my said patent, and they have a different order of action. Referring to Fig. 1, the first shaft A is armed

with a series of horizontal saws *a*, which cut a series of parallel horizontal kerfs into the log, the saws being separated a distance equal to the width the hoops are to be. The second vertical shaft E is armed with straight cutter-blades *e* and is a lap-planer. Although second in position, it is not second in order of action, as will be explained hereinafter. The third shaft B is armed with molding-cutters *b*, whose function is to round the edge of the hoops and form the hoops on the log. The fourth vertical shaft C has smoothing cutter-blades *c*, with a series of scalloped or semi-elliptical edges that bevel and smooth the hoops on the log and follow behind the molding-cutter *b*, and the fifth vertical shaft D has blades *d* with V-shaped notches, that point the ends of the hoops. All these cutters are arranged in front of the main vertical saw S, which is of the circular type and is formed in sections of four or more plates. The order of action of these several devices is as follows: Cutter-shafts E and D and their blades *e* and *d*, whose frames have a back-and-forth movement, are back and out of range of engagement with the log when it starts forward. As the log, which has a flat side, approaches the saw S said log is first acted upon by the gang of saws *a* and has a series of horizontal saw-kerfs cut into it. Planer *e* being back or out of range of contact with the log does not yet act. After the saws *a* act the molding-cutters *b* form the hoops on the log, and then the smoothing-cutters *c* bevel and smooth the surface. Then just before the front or left-hand end of the log reaches the saw the pointing-cutters *d* come forward and point the hoop-sections on the front end of the log. The log then, with its connected hoop-strips fast to it, passes to the saw S, which severs all the hoop-strips into individual or detached hoops with pointed ends, as seen on the left of Fig. 11, which then pass into the individual grooves of the hoop-guide plate T (see Figs. 8 and 7) and are received between the vertical drawing-rolls U U', Fig. 1, which draw them through. As the rear end of the log approaches the saw S the vertical shaft E, with its straight lap-cutters, advances to the log and for a short distance at the rear or right-hand end of the log cuts the butt-end of the log to a bevel to

form the lap of the hoop like those shown on the right of Fig. 11. The flat tapered end of these hoops (shown on the right of Fig. 11) forms the lap to accommodate the double thickness of the lapped ends when placed about a barrel and the pointed end forms the outside wrap.

The order of action of the cutter is indicated by the sequence of the letters A B C D E, Fig. 1. The cutter-shafts all have band-pulleys on their upper ends connected by belts to corresponding driving-pulleys A' B' C' D' E' on a main horizontal drive-shaft F, supported in bearings in standards F² and driven through a belt connecting with pulley F' from any suitable source of power. The advance movement of the shafts D and E is very slight, and the slack of their belts is sufficient to accommodate said movement without special adjustment, and for this purpose their belts may be arranged to run a little more loosely than the others and, if desired, be provided with weighted tension-rollers running on top of the same in the usual way, as indicated in dotted lines at x and y .

G is the log-carriage, one side of which has (see Fig. 1) a slide-block g , that rides back and forth upon a V-shaped rail g' , that is kept well lubricated, while the other side of the carriage has rollers g^2 , that ride upon a rail g^3 . From the bottom of the carriage there projects horizontally between the tracks $g' g^3$ a long rack-bar G' , having teeth on its lower side that are engaged by a pinion H' on a shaft H for running the carriage back and forth. This shaft H (see Fig. 2) is driven by cone-pulleys H² by a belt (shown in dotted lines) from other cone-pulleys I³ on a shaft I, which latter also carries the circular saw S and a drive-pulley I², connected by a belt with the driving power. On the shaft I there is also another pulley I⁴, connecting by a belt (shown in dotted lines) with another pulley J' on a shaft J, which latter has a worm J², engaging (see Fig. 7) with a bevel worm-wheel u^2 on the drawing-roll U, which drawing-roll U is connected to the other one, U', by gears $u u'$, as shown in Figs. 1 and 2. This supplies the power for pulling the severed hoops from the saw through the guides in the plate T. These drawing-rolls are journaled in a movable frame K, Fig. 1, which is pivoted about a bolt k to the base-frame and has its upper end stayed by a brace K' and its lower end tightened and secured by a set-screw k' , passing through a slot in the base of frame K. By removing the brace K' and loosening the screw k' the frame K, with the drawing-rolls, may be thrown back and out of the way about the pivot-bolt k as a center.

I will now describe the means by which the five cutter-shafts in front of the main saw are adjusted to and from the log.

L, Figs. 3 and 4, is a base bearing the frames A² B² C² D² E² of all five of the vertical cutter-shafts. This base has a depending lug l , through which is tapped a screw-shaft L', hav-

ing outside the main frame a crank-wheel L², by turning which the base L, with the five cutter-shafts, may be adjusted bodily to or from the log. The cutter-shafts A, B, and C have an independent adjustment on the base L, and for this purpose their frames A² B² C² (see Fig. 2) slide in guides $h h$ on said base and are operated by set-screws $m m$, tapped through a stationary flange M on said base L and bearing against the frames A² B² C², carrying said shafts. The frames B² C² move with the top plate N; but the frame A² has a pin a^2 at its upper end, that moves in a slot n of plate N, so as to be independently adjusted.

The two automatically-adjustable cutter-shafts D and E have special operating mechanism controlled by the movements of the log-carriage as follows: The two frames E² D², (see Fig. 2,) which carry these shafts, slide between the guides $h h$ below and at the top have pins $e^2 d^2$, that slide in slots $n n$ in the top plate N. From the bottom of the frame E², bearing the planer e , (see Figs. 3 and 4,) there projects a lug e^3 , to which is rigidly attached a horizontal slide-bar O, passing freely through a guide o^2 in the base-frame. This rod bears on its outer end two cams o and o' , Figs. 2 and 9. A similar connection is made for the other frame D², carrying the point-cutter shaft D, and its slide-rod has on its projecting end two cams $r r'$. (See Fig. 2.) These two pairs of cams are acted upon by the log-carriage in its back-and-forth movement to automatically adjust these two cutter-heads in accordance with the previously-described order of operation, as follows:

The carriage G, Fig. 5, has at one end a bent arm s' , projecting downwardly and bearing on its horizontal end a standing stud s , which (see Fig. 2) is designed to act upon the cams $r r'$ and slide the cutter-shaft D in and out. At the other end of the carriage (see Fig. 5) there is a longitudinal screw-shaft T, with hand-wheel T', which screw-shaft passes through a block carrying an angular plate t^4 and adjusts it longitudinally between guides. This plate has on its lower side, pivoted to a bolt t' , a shoe t , with a slot at t^2 moving over pin t^3 on plate t^4 to limit its oscillation. This shoe t is designed to pass between the cams $o o'$ and operate the lap-planer e , as seen in Fig. 4. To avoid interference between stud s and shoe t and insure their proper individual action on their respective cams $r r'$ and $o o'$, the stud s and cams $r r'$ are in a lower plane than the shoe t and cams $o o'$.

The action of the carriage upon the cams $r r'$ and $o o'$ is as follows, reference being had to Fig. 2: When the log-carriage is moving to the left and approaching the saw S and the front edge of the log nears the pointing-cutter shaft D, the stud s strikes first the cam r' and pulls the cutter-shaft out, as shown by the dotted arrow, and the pointing-cutter head advances to the log and cuts deep V-shaped grooves in the log, which after the saw takes off its slice forms the pointed ends

of the hoop. Immediately after the advance of the pointer-shaft D the stud *s* strikes the cam *r* and forces back the cutter-shaft D, so that it no longer acts on the log. It will be
 5 seen that when pin *s* strikes the rounded end of cam *r'* it instantly pulls out the cutter-head its full distance and immediately allows it to drop back gradually. This is necessary in pointing the hoops to enable the pointing-
 10 cutters to enter the extreme forward end of the log their full depth at once and then gradually withdraw from the log to make the tapering point. The lap-planer does not act until the rear (right-hand) end of the log
 15 comes opposite the planer. When the carriage G is moving to the left in Fig. 2 and the right-hand end of the carriage and log nears the cams *o* and *o'*, the shoe *t* first strikes cam *o'* and pulls the planer-shaft E forward
 20 to make the bevel cut on the end of the log for the lap and on the return movement pressing against cam *o* forces it back out of the way again. This forward movement of the lap-planer is very gradual, because the
 25 planer starts to cut into the log between its ends or in advance of its rear end and starts in with a feather-edge cut and cuts gradually and continually deeper on the forward movement until the rear end of the log is reached.
 30 By means of screw-shaft T the shoe *t* may be adjusted longitudinally to the carriage to suit the varying length of logs.

With this construction of machine it will also be seen that there are a number of ver-
 35 tical and rapidly-running cutter-head shafts, and as they have cutter edges that must register nicely one with the other it is important that their cutters do not get out of horizontal alinement—*i. e.*, that one shall not move up
 40 or down in relation to the other, as is liable to occur from unequal wear at the box. To prevent this, I make all the bearings of the vertical shafts as in Fig. 10, in which all the shafts have rigid collars *v* formed on them
 45 and all the boxes have multiple grooved boxes *v'* corresponding to and receiving said collars. This by giving a multiplicity of bearings to resist vertical longitudinal movement of the shaft holds the latter against vertical loose-
 50 ness and also forms a bearing which better retains the lubricating-oil.

In illustrating my invention I have not shown any particular means for reversing the feed of the carriage for running it back and
 55 forth. For this purpose I employ the usual friction-disk feed interposed in the train of driving mechanism for the carriage and which, being old and well-known, requires no illustration. For the same reason I have omitted
 60 the log feeding mechanism on the carriage for adjusting the log sidewise to a new cut after each slice of hoops is taken off.

I do not confine my invention to the making of hoops, as some of its features are ap-
 65 plicable to making various articles of a similar shape direct from the log.

Having thus described my invention, what

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

1. A hoop-machine having a log-carriage, a 70 vertical slicing-saw, and in front of it a series of vertical cutter-heads, two of said cutter-heads being made laterally adjustable one of them having V-shaped cutting edges to point the hoops and the other having a straight- 75 edge cutter to lap-plane the other ends on the log before being sliced off by the saw, substantially as described.

2. In a hoop-machine, the combination with the vertical or slicing saw; of a series of five 80 vertical cutter-heads arranged in front of the saw, one set A B C having relatively stationary bearings and provided with horizontal saws and molding-cutter blades to form the hoops on the log, and the other set D and E 85 having respectively blades with V-shaped cutting edges and plain blades, and means for giving them an automatic motion to and from the log to form pointed ends and bevel-faces on the opposite ends of the log substan- 90 tially as and for the purpose described.

3. In a hoop-machine, the combination with the vertical or slicing saw; of a series of vertical cutter-heads arranged in front of the saw, one set having relatively stationary bear- 95 ings and provided with horizontal saws and molding-cutter blades to form the hoops on the log, a cutter-head with straight-edge cutter arranged in movable bearings, a cutter-head with V-shaped hoop-pointing cutting 100 edges also arranged in movable bearings, means for advancing them, and a log-carriage having devices at one end to operate upon one of these cutter-heads to point the hoops, and means at the other end to operate upon 105 the other cutter-head to lap-plane the ends substantially as and for the purpose described.

4. In a hoop-machine the combination with a vertical or slicing saw; of a series of ver- 110 tical cutter-heads arranged in front of the slicing-saw, the first having a series of horizontal saws and being relatively stationary, the second being a straight-edge lap-planer and being automatically adjustable in and 115 out, the third and fourth having molding-cutters and relatively stationary, and the fifth having V-shaped pointing cutting edges and adjustable in and out, a series of pulleys on the tops of said shafts, a horizontal drive- 120 shaft with corresponding pulleys and belts connecting them to the cutter-head pulleys, and a log-carriage with means for automatically adjusting the lap-planer and pointing cutter-head substantially as shown and de- 125 scribed.

5. In a hoop-machine, the combination of a vertical slicing-saw, a series of vertical cut- 130 ter-heads, arranged in front thereof, two of them being automatically adjustable and provided respectively with a straight cutting edge, and V-shaped cutting edges, sliding frames carrying the same, horizontal slide-rods attached to the lower part of said frames

and carrying at their outer end double cams
o o', and p p' respectively; and a log-carriage
having one bearing fitting between the cams
o o' and operating one slide-rod, and another
5 bearing at its other end fitting between the
other cams p p' and operating the other slide-
rod, said bearings being at opposite ends of
the carriage and in different planes substan-
tially as and for the purpose described.
10 6. In a hoop-machine, the combination with
the slicing-saw S; of the hoop-guide plate T,

the drawing-rolls U U' geared together as de-
scribed and the frame K carrying the draw-
ing-rolls pivoted at the back end and pro-
vided with a stay-brace K' and a binding- 15
screw k² substantially as and for the purpose
described.

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