(No Model.) 2 Sheets—Sheet 1.

J. B. DOUGHERTY.

HOOP MACHINE.

No. 420,903. Patented Feb. 4, 1890.

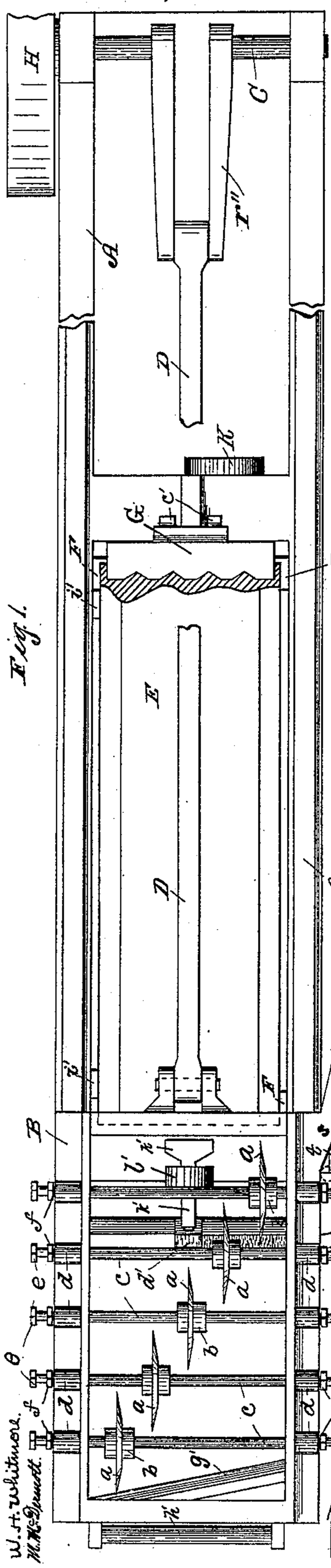

Fig. 1.

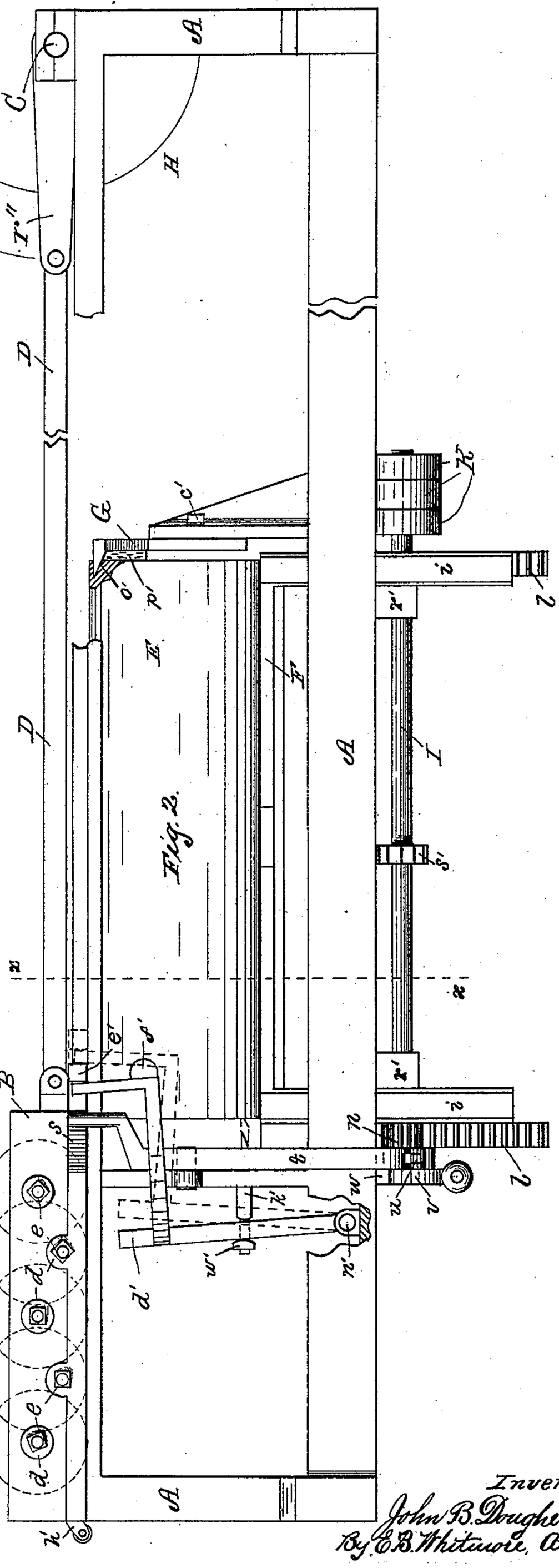

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

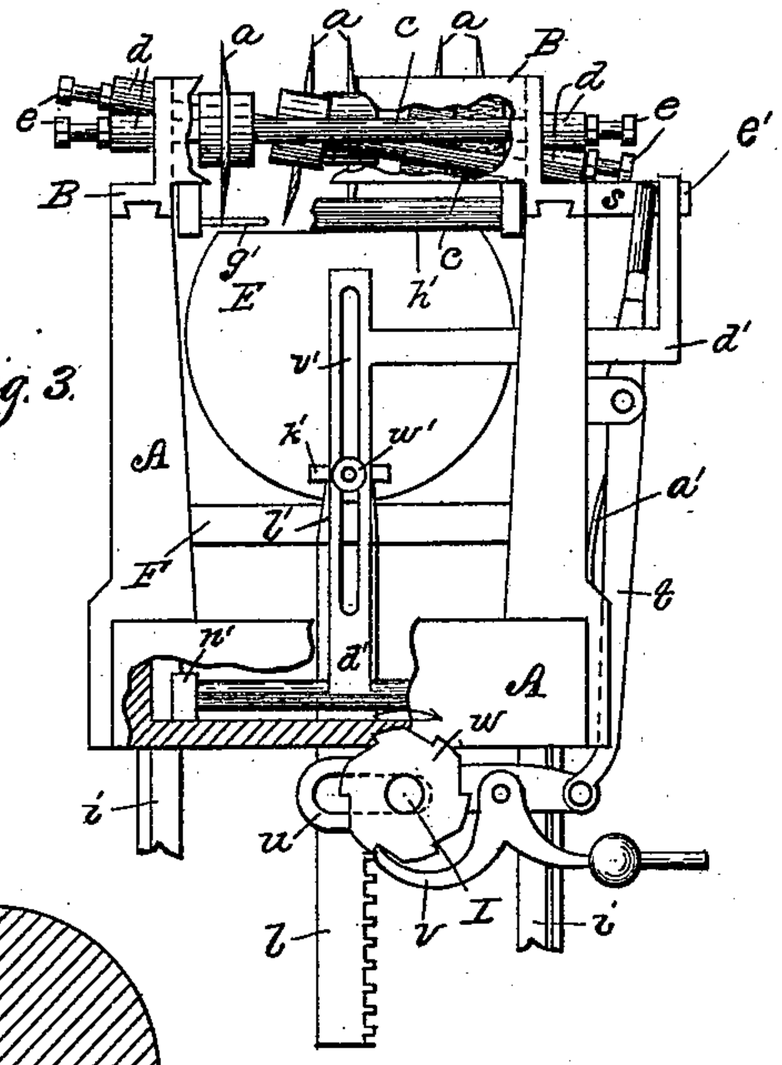


Fig. 7.

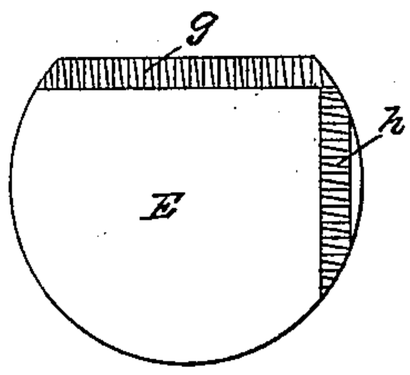
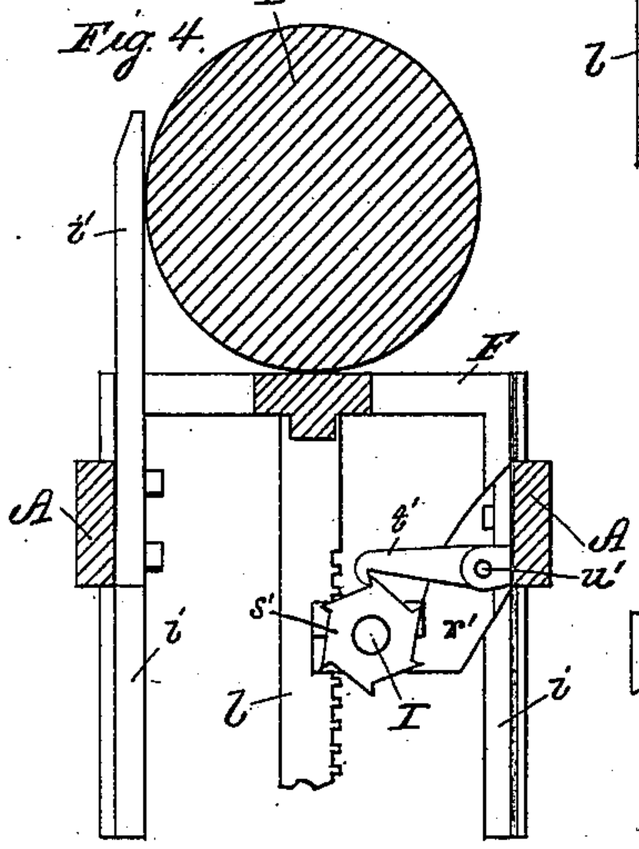


Fig. 4.



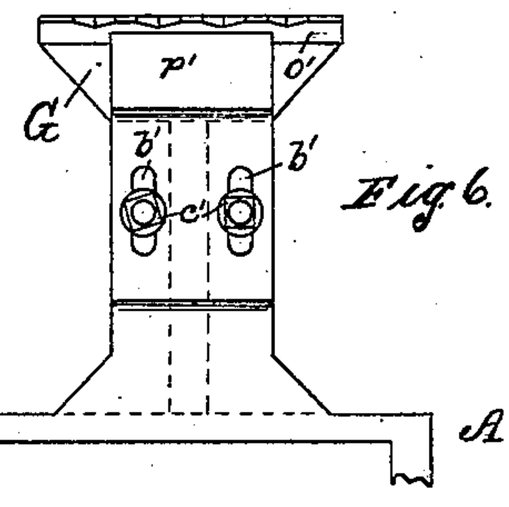
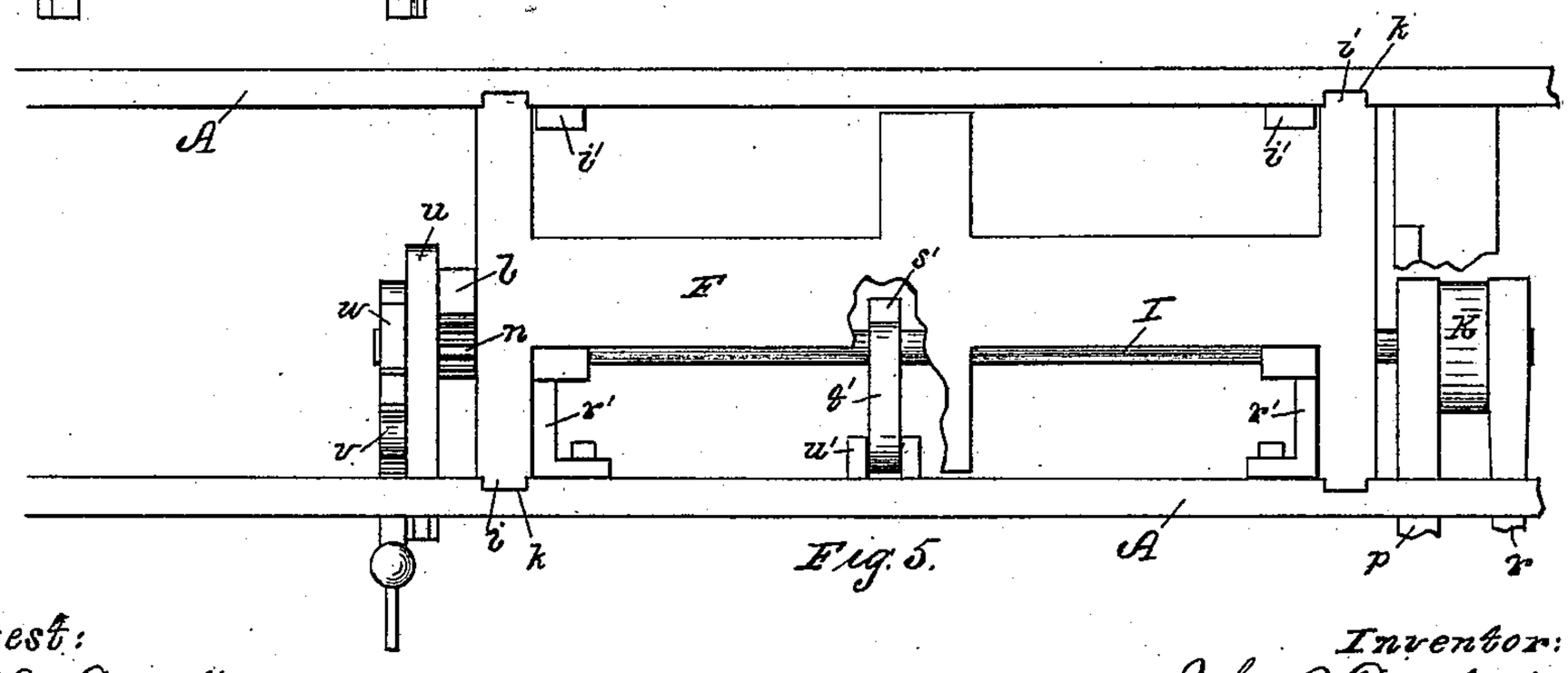


Fig. 6.

Fig. 5.



Attest:
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Inventor:
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UNITED STATES PATENT OFFICE.

JOHN B. DOUGHERTY, OF WYOMING, ASSIGNOR TO ALFRED WADSWORTH, OF WARSAW, NEW YORK.

HOOP-MACHINE.

SPECIFICATION forming part of Letters Patent No. 420,903, dated February 4, 1890.

Application filed May 23, 1889. Serial No. 311,845. (No model.)

To all whom it may concern:

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

In my present application I show a machine having a gang of rolling cutters and a straight rigid under knife or blade to co-operate with the rolling cutters, the design being to cut the whole width of the log at each forward movement of the cutters, forming simultaneously as many hoops as the width of the log will admit of.

My present invention consists in the construction and disposition of the various cutters, in the manner of automatically undogging and dogging up the log at each operation of the machine, in the construction used for automatically lifting the log for each new cut, and in various other novel constructions, all hereinafter fully described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a plan of my improved hoop-machine condensed as to length, with parts broken away; Fig. 2, a side elevation of the machine, seen as indicated by arrow 2 in Fig. 1; Fig. 3, an end elevation, seen as indicated by arrow 3 in Fig. 1, parts being broken away and sectioned; Fig. 4, a cross-section of the frame, taken on the dotted line *x x* in Fig. 2 and seen in the direction in which Fig. 3 is seen; Fig. 5, a plan of the carriage for holding the log with associated parts; Fig. 6, a front elevation of the main holding-dog, seen in the direction in which Fig. 3 is seen; and Fig. 7, a view at the end of the log, showing the manner in which the cuts are taken therefrom.

Referring to the parts, A is the frame of the machine; B, a sliding head for holding the cutters; C, a crank-shaft, and D a connecting-rod for the crank r'' and sliding head.

E is the log from which the hoops are cut, and F the carriage for holding the log.

G is the main holding-dog, which receives the end-thrust of the log caused by the action of the cutters.

k' is the minor dog at the opposite end of the log, and I a shaft held in bearings r' rigid with the frame for raising the carriage and log. The sliding head is reciprocated by a crank r'', the crank-shaft being turned by any convenient means, as a driving-belt upon the pulley H.

In the machine herewith shown hoops are cut only when the sliding head is moving in a direction toward the crank-shaft.

The rolling cutters *a* are circular disks with hubs *b*. These cutters are rigid on cross-shafts *c*, resting in bearings *d* in the sides of the sliding head. Some of these shafts are horizontal and others inclined, as shown in Fig. 3, the horizontal shafts and inclined shafts being alternated. These shafts are each provided with adjusting-screws *e* at their respective ends, each screw being provided with a set-nut *f* to hold it in place. These screws bear against the ends of the respective shafts, and by means of them the shafts are adjusted endwise for the purpose of spreading the cutters, or bringing them nearer together, in cutting hoops of different thicknesses. The shafts are inclined so that the cutters held by them will give to the hoops a transverse taper, this being shown at *g* and *h*, Fig. 7.

It is designed to have a sufficient number of cutters to cover the width of the log, so that the whole slab or section of the log will be reduced to hoops at each operation of the machine, the log being raised after each cut to the amount of the width of a hoop.

The carriage is formed with slides *i*, fitted in vertical way *k* in the inner faces of the sides of the frame. Rigid with the carriage, at its opposite ends, are vertical racks *l*, which are engaged by pinions *n*, rigid with the lifting-shaft I. At one end of the shaft I provide three pulleys K, the two outer ones being loose and the middle one rigid with the shaft. Upon the loose pulleys are placed, respectively, a straight belt *p* and a cross-belt *r*, by means of which the carriage may be run down to receive the log, and then run upward to the cutters, by throwing first one and then the other belt upon the tight pulley in a manner common in such machines, as iron-planers, for instance. When the machine is operating, these belts are allowed to remain on the loose pulleys, the carriage being auto-

matically raised for each cut in a manner as follows: Upon the side of the sliding head is formed a cam *s*, Figs. 1, 2, and 3, which, as the head moves back, actuates a lever *t*, pivoted to the side of the frame. To the lower end of the lever is pivoted a slotted bar or pawl-carrier *u*, held to straddle the shaft I.

v is a weighted pawl pivoted to the pawl-carrier, which engages the teeth of a ratchet *w*, rigid with the shaft I. Now, it will be seen that when the sliding head moves back, the cam will throw the lower end of the lever toward the shaft I, causing the pawl to turn the shaft in the direction indicated by the arrow to the amount of one tooth, which is proportional, so as to raise the carriage just to the amount of the width of a hoop. When the sliding head starts forward on its way to take a cut from the log, the lever is thrown back to its normal position by a spring *a'*, ready to be again acted upon by the cam *s*, when the sliding head comes back.

The main dog G is held in position to catch the log about one-eighth of an inch below the plane of the lower edges of the cutters, this dog being held rigid to the frame to receive the thrust of the gang of cutters as they are forced through the timber by the crank-shaft. This dog is formed with vertical slots *b'*, Fig. 6, and held by clamping-bolts *c'*, so as to be vertically adjustable. In cutting hoops of different widths, this dog has to be raised or lowered accordingly.

At the opposite end of the log the minor dog *k'* pierces the log near the lower side thereof. (Shown in Fig. 2.) This dog is designed to be withdrawn from the log automatically each time the sliding head moves back and before the log is raised, as above stated. The dog is fitted to slide endwise through an opening in an extended part *l'* of the rack *l*, and it is operated by means of a connecting bar or lever *d'*, actuated by a projection *e'* of the sliding head, and the arrangement of the parts is such that the dog is moved back slightly in advance of the action of the cam upon the lever *t* to raise the log, as above described, to the end that the dog may be withdrawn from the log before the latter is raised. The lever *d'* is pivoted to the frame at *n'*, and is provided with an overhanging weight *f'*, Fig. 2, so that when released by the sliding head it will swing forward from gravity to cause the dog to press against the log. The lever, as shown, is formed with a vertical slot, through which the rear end of the dog freely passes, the latter being provided with a collar *w'* on the outside of the lever to prevent pulling through the slot. The main dog G is formed with an inclined under surface *o'*, so that when the log is raised, as stated, it will slide slightly endwise, sufficient to cause it to clear the dog. When the cutters encounter the opposite end of the log, they force the latter against the dog G, the minor dog being caused to follow up by the action of the weighted lever *d'*. A stop *p'*, forming a part of the dog G, prevents the latter being forced too far into the end of the log.

The sliding head is provided with a shear knife or blade *g'*, to strip the hoops from the log after they have been separated by the rolling cutters. This knife is rigid with the frame and horizontal, the plane of its cutting-edge being tangent to the peripheries of the rolling cutters. Back of the knife I provide a guard-roller *h'*, for the purpose of relieving the edge of the blade of pressure when the sliding head is moving backward over the log. When the log is worked down to a slab, it springs under the pressure of the cutters, and in consequence slightly bows upward at the middle after the cutters have passed. On this account the knife would drag upon the surface of the log and become dulled or otherwise injured. The guard-roller has its axis parallel with the plane of the knife, and it is set so as to have its lower surface just a shade below the plane of the edge of the knife. When thus arranged, the guard-roller acts to spring the log downward as it passes over the log, thus acting to prevent the dragging of the knife upon the log.

When the machine is cutting hoops, the ends of the latter, on account of the inclination of the upper surface of the blade, shoot over the roller and are gathered by an attendant or by any simple mechanical means desirable. Stops *i'*, bolted rigidly to the frame back of the log, receive the latter and hold it against the lateral thrust of the blade *g'*.

When the log is large in diameter, I take cuts off at one side until the width exceeds the distance between the outside rolling cutters, when I turn the log one-fourth over, bringing the flat side against the stop *i'*, and then cut from the edge of the log. These cuts are indicated in Fig. 7.

I provide the shaft I with a ratchet *s'* and pawl *t'*, the latter being joined to the frame at *u'*, Fig. 5. This ratchet and pawl serve to prevent the shaft I from turning backward from the weight of the log after it has been raised by the pawl *v*, as above stated. The teeth of the ratchet are so spaced as to allow the pawl *t'* to catch the shaft as quick as it is turned up by the pawl *v*.

What I claim as my invention is—

1. A machine for cutting hoops, provided with a sliding head holding a series of rolling cutters mounted on shafts, a part of said shafts being horizontal and a part inclined to a horizontal, the horizontal shafts and inclined shafts being alternated, substantially as shown.

2. A machine for cutting hoops, having a sliding head carrying a series of rolling cutters, the shafts of a part of the cutters being horizontal and the remainder of the shafts being inclined, the horizontal shafts and in-

clined shafts being alternated, and adjusting-screws for said shafts, substantially as shown and described.

3. A hoop-machine having a sliding head holding a series of rolling cutters, in combination with a rigid blade or knife held by said sliding head, the plane of the edge of said knife being tangent to the peripheries of the rolling cutters, substantially as and for the purpose set forth.

4. A hoop-machine having a sliding head provided with cutters, in combination with a cam on said sliding head, a lever *t*, moved by said cam, a carriage having toothed racks, a lifting-shaft and pinion for said racks, a pawl-carrier and pawl, and ratchet on said lifting-shaft, substantially as described.

5. In a hoop-machine, a sliding head having a series of rolling cutters and a rigid blade secured to the sliding head, in combination with a guard-roller held by the sliding head having its axis parallel with the plane of the blade, substantially as shown, and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 13th day of May, 1889, in the presence of two subscribing witnesses.

JOHN B. DOUGHERTY.

Witnesses:
E. B. WHITMORE,
M. L. MCDERMOTT.