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Patented Aug. 1, 1899.

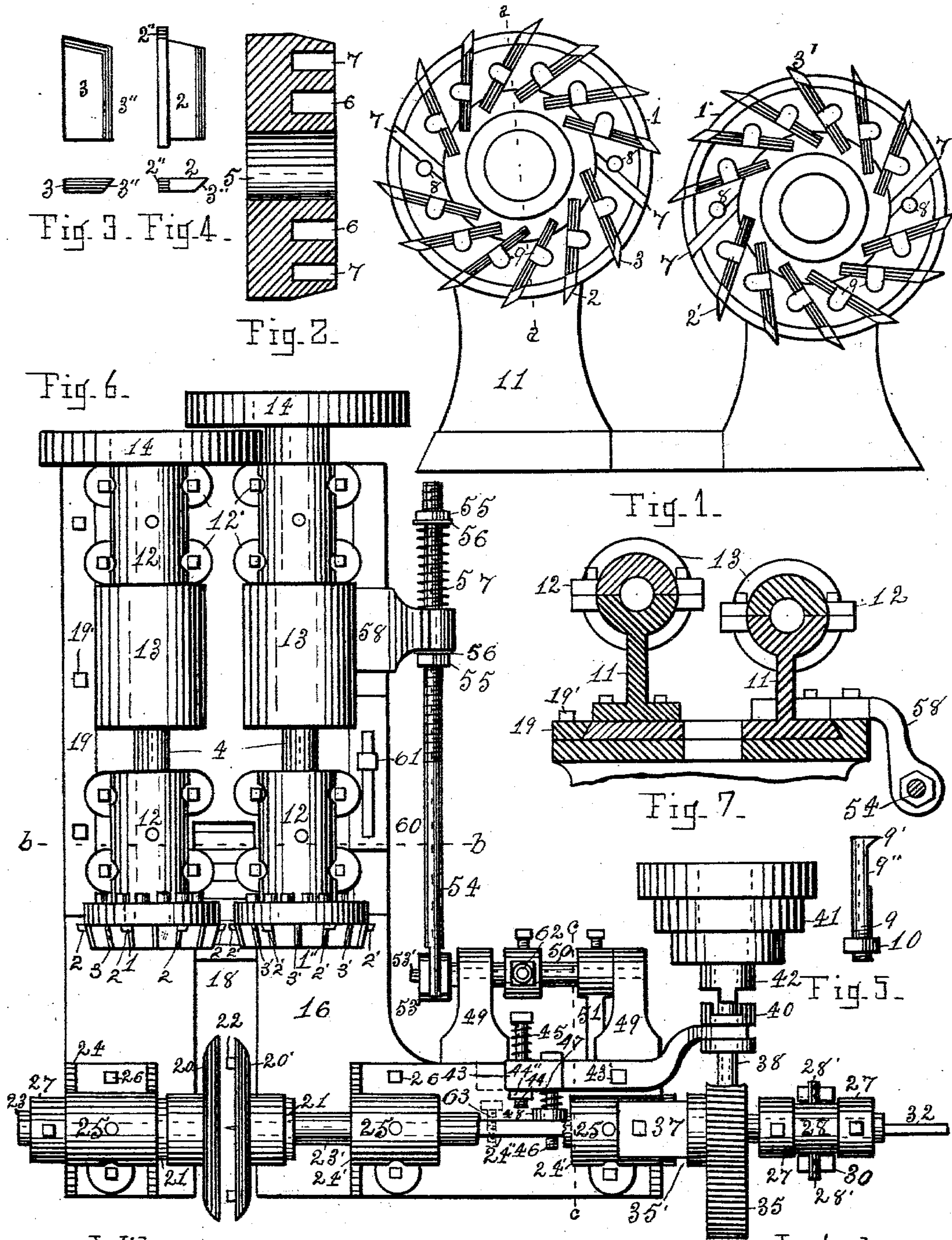
W. L. FIELD & C. A. LAWTON.

HEADING CUTTING MACHINE.

(Application filed Feb. 21, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.
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 G. W. Elliott.

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 By their Atty. G. H. Albee

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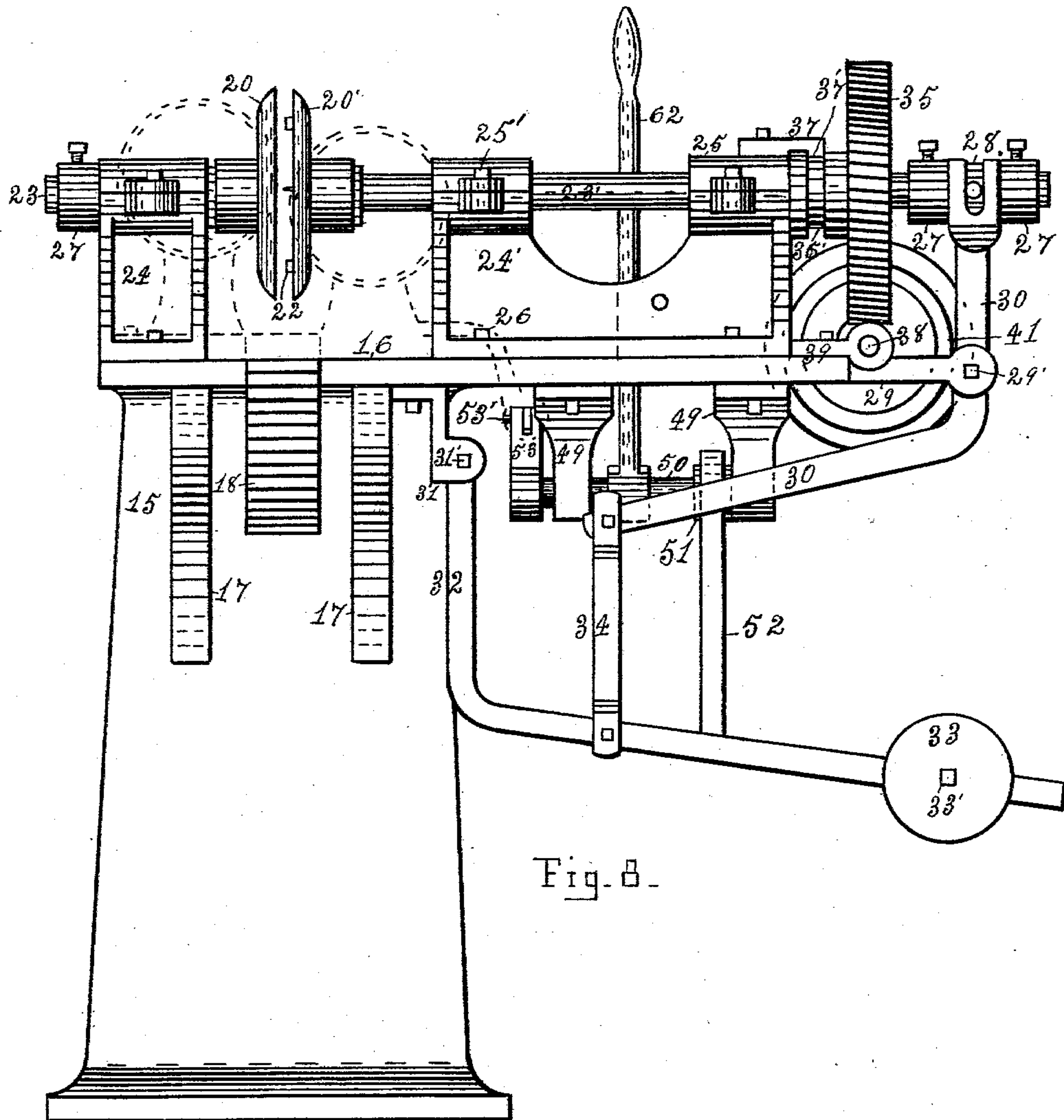


Fig. 8.

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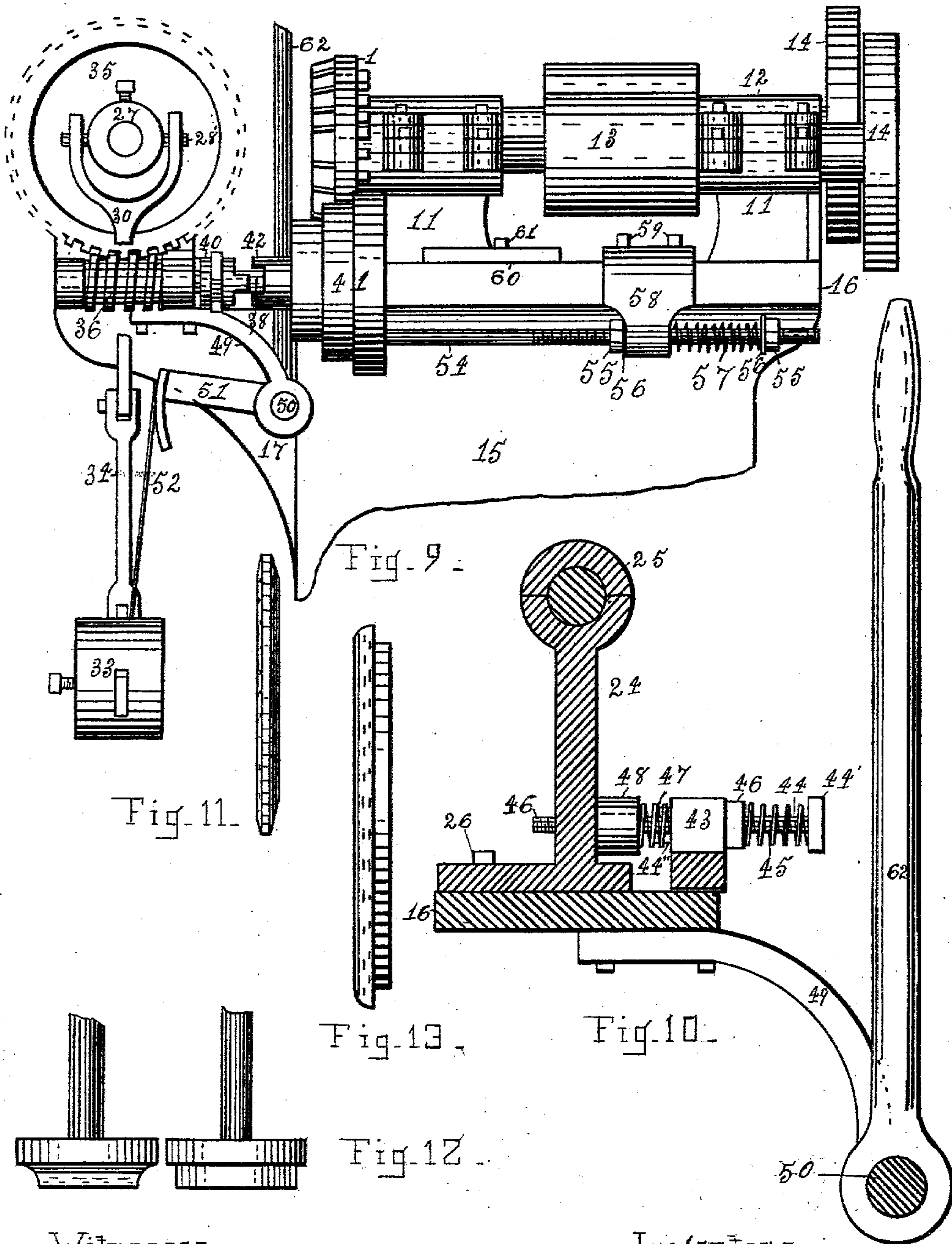
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UNITED STATES PATENT OFFICE.

WALLACE L. FIELD, OF ESCANABA, MICHIGAN, AND CHARLES A. LAWTON,
OF DE PERE, WISCONSIN.

HEADING-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,989, dated August 1, 1899.

Application filed February 21, 1899. Serial No. 706,423. (No model.)

To all whom it may concern:

Be it known that we, WALLACE L. FIELD, residing at Escanaba, in the county of Delta and State of Michigan, and CHARLES A. LAWTON, residing at De Pere, in the county of Brown and State of Wisconsin, citizens of the United States, have invented a new and useful Improvement in Heading - Cutting Machines, of which the following is a specification.

Our invention relates to a machine for cutting round heading from a square piece of material for barrels, kegs, pails, buckets, &c., and in chamfering its sides for fitting into the croze of the barrel, pail, &c.; and it consists of two clamping-heads between which the square piece of heading is to be held and slowly revolved, two cutting-heads having suitable knives therein for cutting the head to a circle and cutting the desired chamfer upon both of its sides, arranged for a rapid revolution in opposite directions and in a suitable position for action upon said square piece of heading, and in devices made operative by means of a lever in a suitable position for its operation with one hand of the operator for clamping the square heading-piece between said clamping-heads, advancing the cutter-heads toward the heading-piece until its required diameter is reached, revolving the heading-piece a little farther than one revolution, receding the cutter-heads from the finished heading, and releasing the clamping action of the aforesaid clamping-heads, so that the finished heading will drop or can be removed by the operator, said devices being shown in the accompanying drawings, in which—

Figure 1 is a front elevation of two cutter-heads arranged for revolution for cutting off and chamfering the heading, two of the knives in each head being left out and showing their receiving-slots and bolt-holes. Fig. 2 is a section across the heads upon the line *a a* of Fig. 1. Fig. 3 is a plan view of the back and also an end view of the cutting end of its chamfering-knives. Fig. 4 is a plan view of the back and also an end view of the cutting end of its cutting-off knives. Fig. 5 is a side view of a bolt which we use for securing said knives within

the cutter-heads. Fig. 6 is a top view of the entire heading-machine. Fig. 7 is a sectional elevation across the machine at the line *b b* of Fig. 6. Fig. 8 is a front elevation of the machine, the position of the principal parts in the rear being shown in dotted lines. Fig. 9 is a side elevation showing the rear portion of the right-hand side and the right-hand end of the front part, its end lever being broken away. Fig. 10 is a section upon the line *c c* of Fig. 6. Fig. 11 is an edge view of a finished heading of the form the heads and knives herein shown are intended to make. Fig. 12 is a top view of two cutter-heads for this machine which are designed for cutting a pail-cover; and Fig. 13 is an edge view of such cover, the knives and their slots being omitted in Fig. 12. Figs. 1, 2, 3, 4, and 5 are upon a larger scale than the others.

Similar numerals indicate like parts in the several views.

1 1' indicate the cutter-heads at the left and right hand of the sheet; 2 2', the cutting-off knives; 3 3', the chamfering-knives; 3'', the bevel upon the side edges of the knives; 4, the shafts on which the heads are mounted for revolution; 5, the central hole in the heads for receiving the shaft; 6, a circular groove in one end of each head; 7 7', straight knife-slots running from the groove 6 to the circumference of the heads; 8, bolt-holes partially within the plane of the slots 7 7'; 9, a screw-threaded bolt; 9', the head of said bolt, which is beveled upon its under side toward the body of the bolt; 9'', a flattened part of said bolt; 10, a nut for said bolt; 11, the supporting journal-box stands which carry the cutter-head shafts; 12, caps of said journals; 13, cutter-head pulleys; 14, a balance-wheel on shaft 4; 15, the body of the machine-frame; 16, its top; 17, bracket-arms for supporting the machine-top; 18, a recess in the front end of frame for allowing a square piece of heading to be revolved between the cutter-heads; 19, gibs on the frame-top for holding the cutter-head stands and allowing them to slide toward and from the front of the machine; 19', gib-holding bolts; 20 20', clamping-heads; 21, collars back of clamping-heads; 22, spurs in head 20'; 23 23', shafts on which

heads 20 and 20' are mounted; 24 24', the journal-box stand carrying said shafts; 24'', the longitudinal rib of the stand 24'; 25, caps of the stands; 25', bolts in caps 25, the bolts 5 25' being inserted in the caps 25 upon but one side of the shaft 23 or 23', as will be hereinafter explained; 26, bolts for securing the journal-box stands to the frame-top 16; 27, set-collars upon the outer ends of the shafts 10 23 23'; 28, a pivoted collar near the outer end of shaft 23'; 29, bracket-arms at end of frame-top; 29', a pivot-bolt in arms 29; 30, a lever pivoted on bolt 29' midway its ends; 31, a bracket-arm depending from the frame-top; 15 31', a bolt in the arm 31; 32, a lever, one end of which is pivoted on the bolt 31'; 33, a weight upon the lever 32; 33', a bolt for securing the weight in the desired position; 34, a link connecting levers 30 and 32; 35, a worm-wheel; 36, the worm engaging the wheel 35; 37, the worm-wheel holder; 38, the worm-shaft; 39, arms extending out from the frame-top in which the worm-shaft is journaled; 40, a sliding clutch member; 41, cone-pulleys; 25 42, a clutch member on the pulleys; 43, the clutch-operating lever; 43', a bolt on which the clutch-lever swings; 44, a bolt in the free end of the clutch-lever; 44', the head of bolt 44; 45, a spring upon the bolt 44; 46, a bolt 30 connecting the clutch-lever and the web 24'' of the box-stand 24'; 47, a spring around said bolt; 48, a short piece of pipe around the bolt 46; 49, bracket-arms extending from the frame-top and carrying the rock-shaft 50; 51, 35 an arm upon the rock-shaft; 52, a flexible connection from the arm 51 to the lever 32; 53, a crank-arm upon the end of the rock-shaft; 54, a screw-threaded rod connecting with the crank-arm; 55, adjusting-nuts upon 40 the rod; 56, washers upon said rod; 57, a spring upon the rod 54; 58, a bracket-arm which is bolted upon the sliding stand 11; 59, bolts therein; 60, a movable stop; 61', a bolt in the frame-top for securing the stop 60; 62, 45 the operating lever or handle; 63, a clutch-lever stop-screw.

The machine-frame top 16 is L-shaped and is supported upon a suitable column 15 at the desired height. Upon the rear portion of 50 said top the cutter-head stands 11 are arranged to slide between the gibs 19. The base for supporting both cutter-head stands is cast in one piece, and the left-hand stand is separate from the base and secured there- 55 on with bolts for the purpose of permitting the distance between the cutter-heads to be varied to suit the work in hand. Two shafts 12 are arranged parallel with each other, and each one is provided with a pulley 13, a bal- 60 ance-wheel 14, and a cutter-head. The cutter-heads are made "right and left" for running in opposite directions.

As the cutting-off knives in each head must cut a little more than one-half of the distance 65 between the heads in order to sever the wood and complete the round head, the shaft carrying one head is placed in a higher plane

than the other, so that the cutting-point of said knives will not infringe on the path of those in the other head.

The cutter-heads can be of any desired 70 form and be provided with knives suited in form for producing the desired shape to the article to be made—as, for instance, instead of heads and knives, as shown in Figs. 1, 2, 3, 75 4, and 6, for making a pail-bottom, as shown in Fig. 11, the heads may be of the form of Fig. 12 and be provided with knives for making a pail-cover, as shown in Fig. 13, or it can be of any form for which such cutter- 80 heads are usually intended. They may be of any of the usual styles in common use and be provided with four or six knives secured therein by the usual method; but the kind 85 herein shown is preferable by reason of the large number of knives that can be secured in one head.

The advantages of using our improved head are that with a definite rate of speed with 90 the large number of knives in one head a greater number of knives are made to cut in the same length of time than with the usual head having four or at most six knives, and consequently the surface of the wood will be 95 left smoother, and especially upon cross-grained stock will its superior work be made apparent. This head can be of any diameter and thickness that its purpose demands; but for the purpose here shown a circular 100 piece of metal about two inches thick is used and fitted to a shaft, a portion of its periphery being beveled off for forming the desired chamfer upon the heading. A circular groove is formed around its central bore of a depth 105 equal to the width of the knives to be used. A circle is then to be marked upon the end of the head outside of this groove 6 of a suitable diameter for the location of the knife-holding bolts and divided into as many equal 110 spaces as there are to be knives, there being in the present case fourteen. Holes are then to be bored at each of the fourteen points of a diameter suited for the easy entrance of its bolts. Straight slots 77' are then cut—one for 115 each bolt—from the groove 6 to the circumference of the head, all of which in each head are tangents of the same circle. The slots in each of the two heads are the same, excepting that in one they are arranged for its revolution in one direction and in the other for the oppo- 120 site direction. The slots should be of a depth corresponding with the width of its knives and of a width suited for their easy entrance, and the wall against which their face side is to bear should be distant from its bolt-hole 125 less than the thickness of said knife, whereby each bolt-hole will lie partially within the path of its adjoining slot.

Two forms of knives are used alternately, 130 Figs. 3 and 4, the former being a chamfering-knife and the latter a cutting-off one. The latter knife is preferably made in two parts, the cutting part 2'' being a rectangular piece of steel and the flat body adjoining having

its outer edge beveled off for use in holding the part 2". The chamfering-knives and the two parts of the cutting-off knives are of substantially the same width and have their outer side edges beveled off upon the back of the knife, as shown in Figs. 3 and 4, Fig. 4 showing the projecting finger which does the cutting off, the cutting edges of both being beveled in the usual manner.

The bolt 9 for holding the knives is provided with a flat head 9', which projects from one side only, its extreme end being chisel-pointed and beveled upon its under side back to the body of the bolt to correspond with the bevel upon the outer edge of its knife. The body of the bolt is flattened from under its head a distance equal to the width of the unbeveled portion of the back of the knives and sufficiently deep for allowing the knives after the bolt has been inserted into one of said holes to enter its slot between its front wall and said flattened portion of the bolt. A knife being inserted, upon the screwing up of its nut 10 the knife will be drawn toward the face side and bottom of its slot and firmly held by its bolt.

It may be observed that in the cutting action of the knives the strength required for holding them in the cutter-head rests mostly in its bolt instead of being entirely in the metal of the head between the knives.

Two clamping-heads 20 20' are arranged to revolve upon separate shafts 23 23', which lie in a horizontal plane midway between the horizontal planes of the axial lines of the cutter-heads. The shaft 23 is arranged to revolve freely in its journal-box stand 24 and the shaft 23' in the stand 24'. The bore of the heads is threaded and screwed upon the ends of the shaft upon which it belongs, the heads being changeable for others of different size from about four to sixteen inches in diameter, as the sizes of the heading to be cut may require. The head 20' is provided with spurs 22 for piercing the heading-piece and causing it to revolve whenever the shaft 23' is revolved.

As the machine is designed for cutting heading as small as six inches in diameter, the cutter-heads must approach to within less than three inches of the center of the shafts 23 23', so that there is not room for the ears of the caps 25 upon but one side of said shafts, and consequently the holding-down bolts for said caps (of which there may be one or more in each cap) can be upon but one side of the shaft; but in a machine designed for as large as eight or nine inch heading there will be ample room for bolting said caps upon both sides of their shafts.

Near the outer end of the shaft 23' a worm-wheel 35 is arranged to revolve with said shaft by means of a spline, while the shaft is allowed to slide through it, the worm-wheel being held from sliding with the shaft by means of the holder 37, the holder being bolted to the cap 25 and being provided with

a lip 37', which engages with the groove 35' in the worm-wheel hub.

Outside of the worm-wheel, between two set-collars 27 upon the shaft 23', a pivot-collar 28 is mounted, the collar being provided with pivots 28'. A lever 30 is pivoted upon the bolt 29', which engages with said pivots. Under the frame-top a bracket 31 depends, it carrying a bolt 31', upon which a lever 32 is pivoted, the lever carrying a weight 33, which is movable thereon and may be secured in the desired position with the bolt 33'. A link 34 connects the levers 30 and 32, and the weight acts upon said levers and upon the pivot-collar, causing a continual pressure of the head 20' toward the head 20 for holding the heading-piece between said heads.

Below the worm-wheel a shaft 38 is arranged to revolve in the bracket-arms 39, said shaft carrying a worm 36, which engages with the worm-wheel. A clutch member 40 and a loose cone-pulley 41, having a companion clutch member 42, are mounted upon said shaft. Upon the frame-top a clutch-operating lever 43 is pivoted upon the bolt 43'. The free end of this lever is thickened and has two bolts which pass through this thickened part, the bolt 44 passing through it loosely and having a head 44', which is arranged in the path of the operating-lever or handle 62. This bolt is provided with a nut 44'', and a spring 45 is arranged between its head and the end of the lever 43. A bolt 46 is tapped into the web 24'' of the stand 24' and has a head 46', a spring 47, and a short piece of pipe 48, the spring and pipe being located between the lever 43 and web 24''. This pipe serves as a stop for limiting the throw of the lever 43 however hard the operating-handle may be pressed against it. A like result could be obtained by means of a bolt 63, tapped into the web 24'' and projecting toward the lever 43, against which it could be arranged to strike, the clutch-lever being lengthened, if required, so as to be stopped by said bolt.

A rock-shaft 50 is arranged in the two rearward-depending arms 49, having an arm 51, the outer end of which is connected to the lever 32 with a flexible strap 52. By rocking the shaft 50 backward from a perpendicular position of its operating-handle sufficiently the arm 51 will lift the weighted lever and withdraw the head 20' from pressure toward the other for the release of one piece of heading or the insertion of another. Upon the inner end of the rock-shaft a crank-arm 53 is mounted, its crank-pin 53' being connected with the sliding rod 54.

An arm 58 is bolted upon the base of the journal-box stand 11 with bolts 56, through the outer end of which the rod 54 is arranged to pass loosely. This rod is threaded and is provided with nuts 55 and washers 56. A spring 57 is mounted upon the rod outside of the arm 58, its tension being adjusted by means of its adjusting-nut 55. A movable

stop 60 is secured upon the frame-top with the bolt 61. The operating-handle 62 is secured upon the rock-shaft, its normal position being perpendicular.

5 After belting up the pulleys 13 and 41, applying power thereto, and adjusting the position of the cutter-heads for cutting the desired diameter of heading by means of the nuts 55 and stop 60, the operating-handle being in its normal position, the heads 20 20' will be clamped together for holding a heading-piece. When moving the operating-handle backward, the cutter-heads will recede about one inch before the levers which operate to open the clamping-heads will come into action. As the operating-handle is swung farther backward the cutters will continue to recede until the heads 20 20' are opened to their greatest limit. Upon reversing the direction of movement of the operating-handle a square piece of heading can be placed between the clamping-heads, preferably with its grain in a vertical position, and clamped between said heads. Continuing the forward movement of said handle, through the action of the rod 54 the cutter-heads will be advanced until the arm 58 strikes the stop 60 and the limit of the diameter of the heading to be cut is reached, the cutters meanwhile having cut their way into the heading-piece. Continuing the forward movement of the operating-handle, which is permitted by reason of the compression of the spring 57, said handle will strike the head of the bolt 44 of the clutch-lever, compress the spring 45, and throw the clutch members together, the still further forward swing of the operating-handle compressing the spring 47 until its progress is arrested by the pipe 48. The clutch members having been engaged, the stop 48 will arrest the further sliding movement of the member 40 however long the operating-handle may be held against the clutch-lever. Upon reversing the movement of the operating-handle the spring 47, having greater resiliency than the spring 45, will throw the clutch members out of engagement and the revolution of the clamping-heads will immediately cease before the operating-handle has reached a perpendicular position. Continuing the backward movement of the operating-handle, the cutter-heads will recede and the clamping-heads open for the dropping or removal of the finished heading and the placing of another in position.

It may be observed that the diameter of the article to be cut within the limits of the machine can be changed when required without removing its belts or stopping the running of the shafts which they drive.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination in a heading-cutting machine, of two cutter-heads having suitable knives secured therein for forming heading of the desired circle and chamfer, said cutter-

heads being arranged for revolution, one upon each of two parallel shafts, one of said shafts being in a higher horizontal plane than the other, and both being arranged for a simultaneous endwise movement, two clamping-heads mounted for revolution in the same axial line upon the adjoining ends of two shafts, and being arranged for receiving and holding a four-sided heading-piece between them for the action thereon of said cutter-heads, one of said shafts being provided near its outer end with a lever arranged for moving it lengthwise and its clamping-head having a plurality of spurs, a weight arranged for acting upon said lever for normally holding the clamping-head pressing toward its companion head, a worm-wheel slidably mounted on said shaft, means for holding said wheel in the desired position, a worm arranged for engaging and revolving said wheel, the shaft carrying said worm having a clutch-pulley and its companion sliding clutch member, a rock-shaft mounted for operation in a suitable position and carrying an operating-lever handle whose normal position is vertical, an arm extending outward from said rock-shaft, a flexible connection from said arm to the weighted lever aforesaid, a crank-arm on said rock-shaft, a rod arranged for a sliding movement, its inner end being connected with the crank-pin of said crank-arm and its outer end being threaded, a bracket-arm extending outward from the base of the aforesaid cutter-head stands and carrying the outer end of said rod, an adjusting-nut upon said rod in front of said arm, a spring and adjusting-nut on said rod in the rear of said arm, an adjustable stop secured to the frame of the machine for limiting the forward movement of said cutter-heads, a clutch-lever arranged for throwing the clutch member into and out of engagement, the free end of said clutch-lever lying in the path of said operating-lever, and a spring arranged for normally holding said clutch members out of engagement, said parts being arranged for operation, whereby the movement of said operating-lever handle in one direction from its normal position will act to recede the cutter-heads and open the clamping-heads for receiving a square piece of heading and its return movement then act to clamp said piece between the clamping-heads, advance the cutter-heads until they have cut into said heading-piece to its desired diameter, then to revolve the heading-piece until it is formed into a completed heading, when the reverse movement of the operating-handle will cause the cutter-heads to recede, the revolution of the heading to stop, and the clamping-heads to open for the release of the finished heading, substantially as set forth.

2. In a heading-cutting machine, the combination with a suitable supporting-frame of the cutter-heads 1, 1', mounted for revolution with the shafts 4 upon the supporting-stands 11, said cutter-heads having the groove 6,

knife-slots 7, 7', cutting-off knives 2, 2', cham-
fering-knives 3, 3', bolt-holes 8, located in the
path of the rear wall of the knife-slots, bolts
9, nuts 10, pulleys 13, gibs 19, clamping-heads
5 20, 20', spurs 22, shafts 23, 23', journal-box
stands 24, 24', set-collars 27, pivot-collar 28
having pivots 28', arms 29, belt 29', lever 30,
arm 31, belt 31', lever 32, weight 33, link 34,
worm-wheel 35, mounted upon the shaft 23',
10 and having means for retaining its position
lengthwise of said shaft but permitting its
rotation therewith, worm 36, worm-shaft 38,
bracket-arms 39, clutch-collar 40, loose pulley
41, the clutch member 42, clutch-lever 43,
15 bolt 43', bolt 44, bolt 46 forming a connection
between the clutch-lever and a fixed part of
the machine, springs 45, 47, and a stop for
limiting the throw of said clutch-lever, the
bracket-arms 49, the rock-shaft 50, the arm
20 51, a flexible strap 52, the crank-arm 53,
screw-rod 54, nuts 55, the spring 57, an arm
depending from the base of the journal-box
stand 11, stop 60, bolt 61 and operating-lever
handle 62, substantially as described.

25 3. In a heading-cutter, the combination of
two clamping-heads arranged, one upon one
end of separate shafts for holding a heading-
piece between them and for being slowly re-
volved, one of said shafts having upon its op-
30 posite end a worm-wheel, two cutter-heads

arranged to be rapidly revolved and to slide
toward and from said heading-piece and to
act upon opposite sides thereof, a shaft car-
rying a worm for engaging said worm-wheel
and revolving the same, two clutch members 35
upon said shaft, a clutch-lever pivoted mid-
way its ends upon the heading-cutter frame
for engaging and disengaging said clutch
members, an operating-lever arranged for
throwing said clutch members into engage- 40
ment by the forward movement of said oper-
ating-lever toward said clutch-lever, the bolt
44, secured in said clutch-lever in the path of
the operating-lever and having a suitable
head, the spring 45 upon said bolt, the bolt 45
46 having a suitable head and loosely con-
necting said clutch-lever with a fixed portion
of the heading-machine frame, the spring 47
mounted upon said bolt and a stop for limit-
ing the engagement throw of said clutch- 50
lever, substantially as described.

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