W. A. BISHOP.

BARREL HEADING AND HOOP DRIVING MACHINE.

APPLICATION FILED FEB. 15, 1911.

999,199. **Patented Aug. 1, 1911.**

3 SHEETS—SHEET 1.

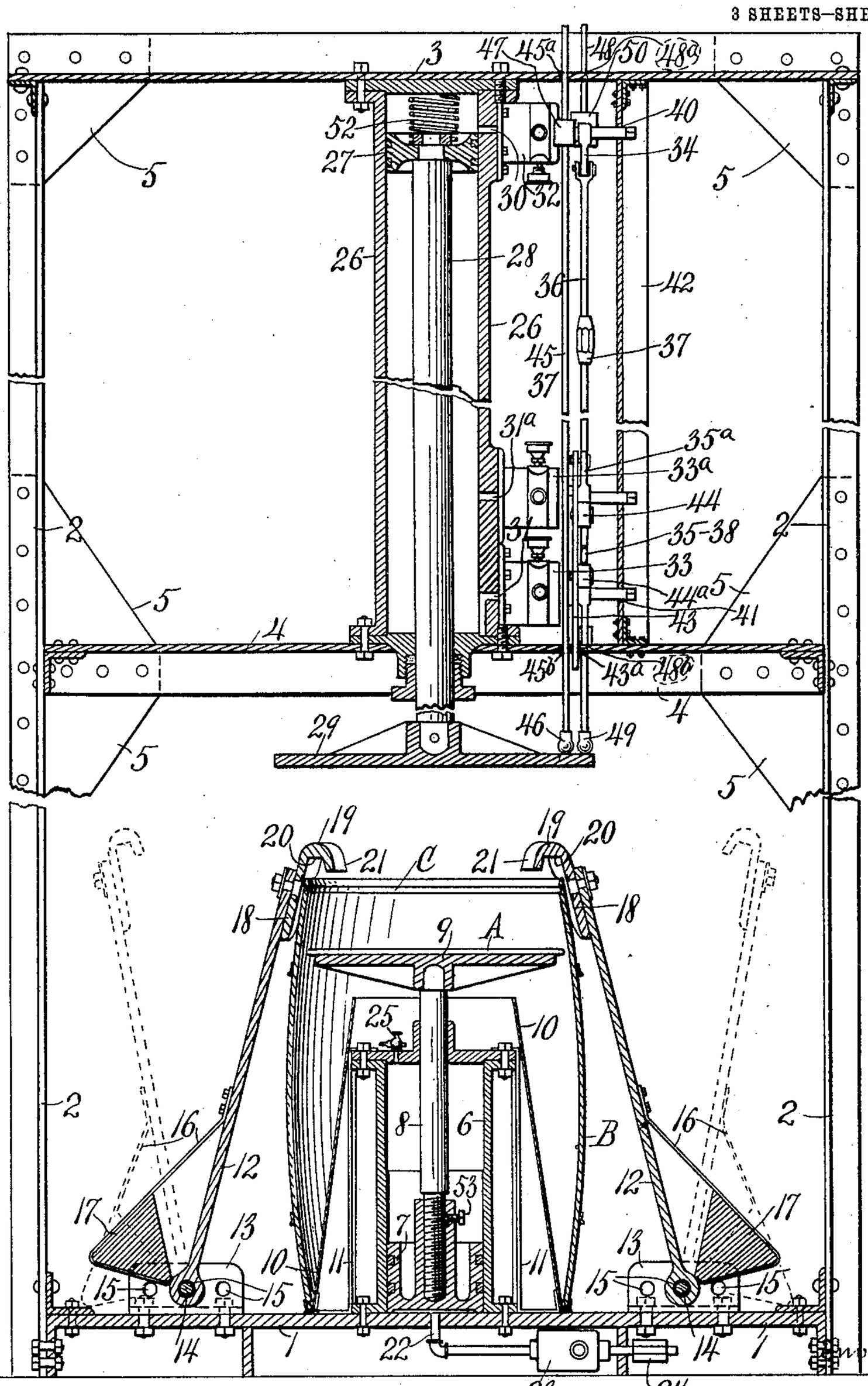

FIG. 1.

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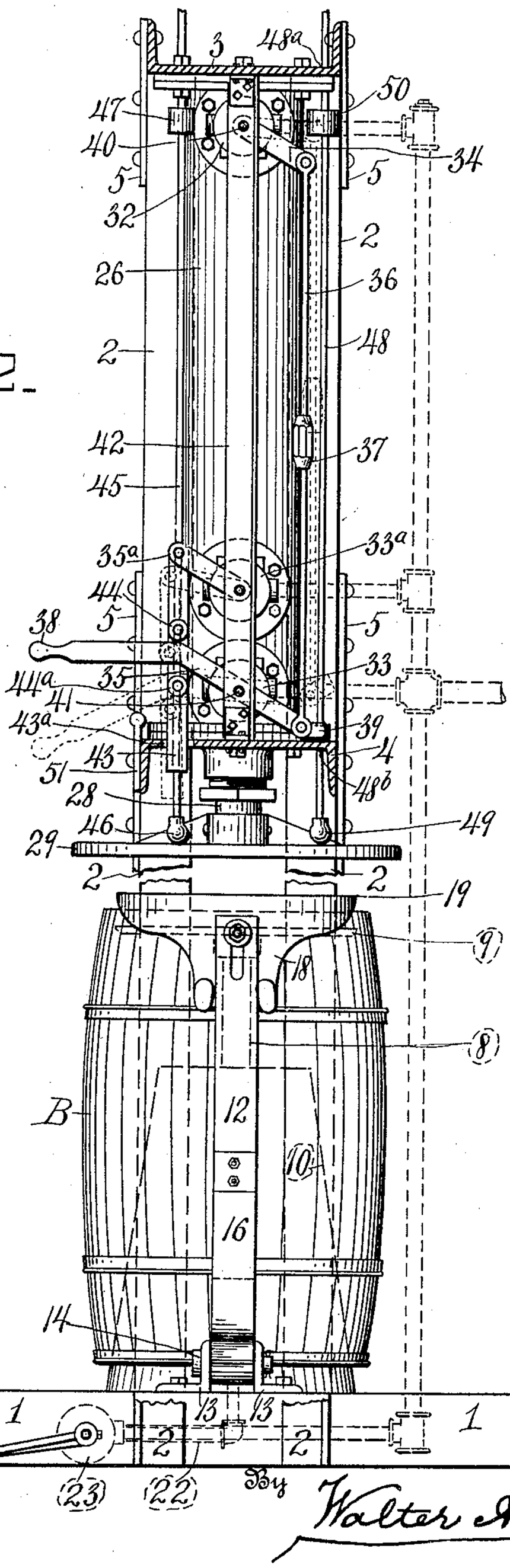
3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

FIG. 3.

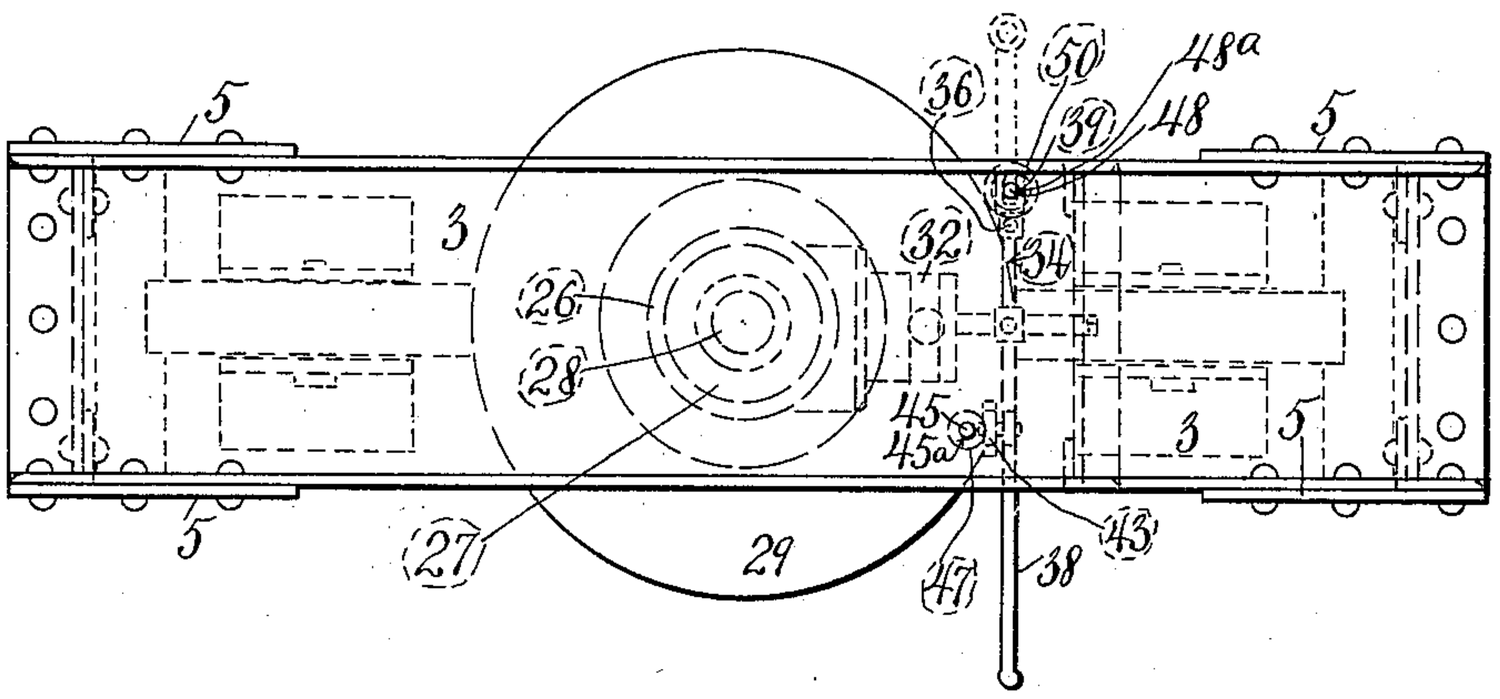
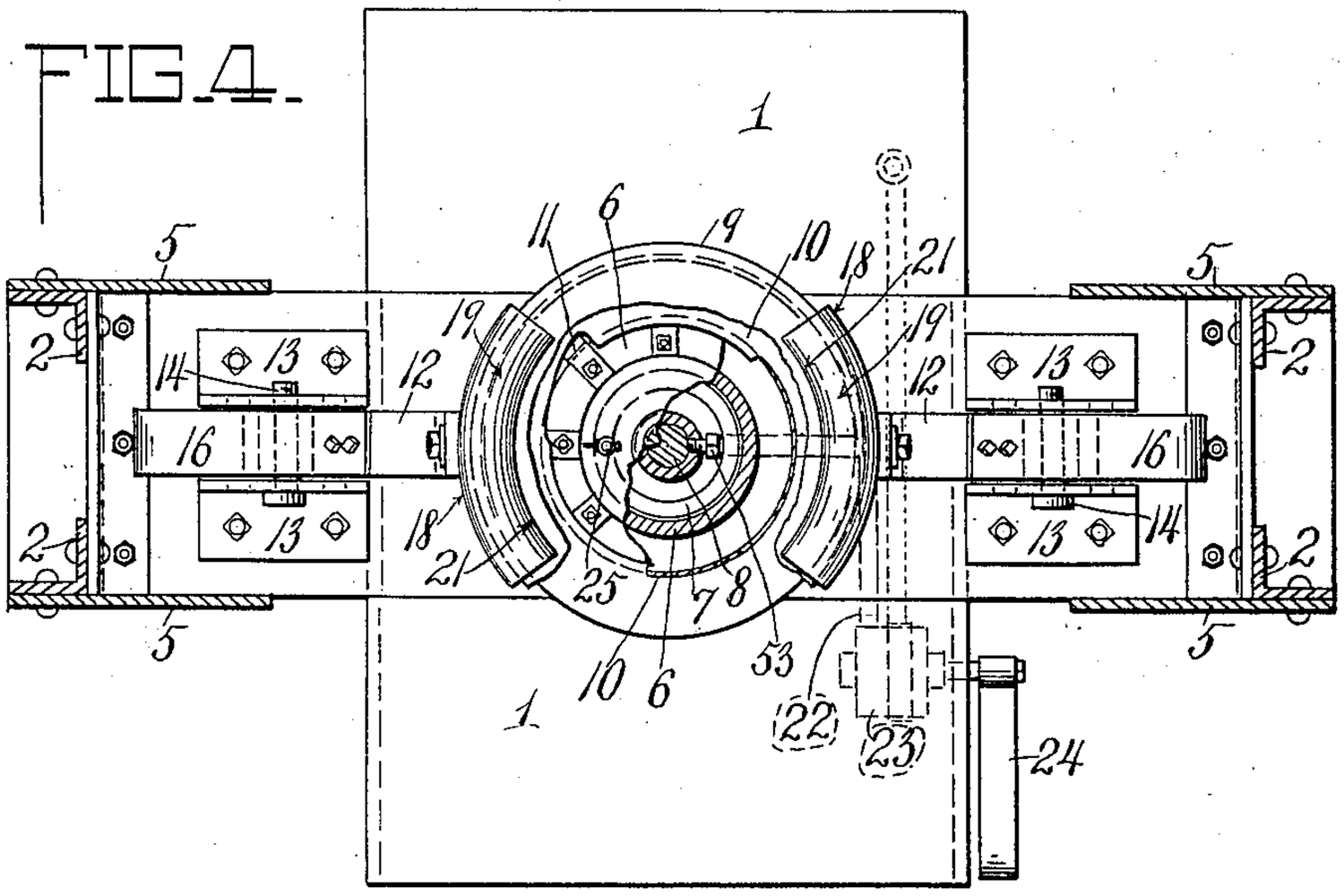


FIG. 4.



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BARREL-HEADING AND HOOP-DRIVING MACHINE.

999,199. Specification of Letters Patent. Patented Aug. 1, 1911.

Application filed February 15, 1911. Serial No. 608,789.

To all whom it may concern:

Be it known that I, WILLIAM ABELL BISHOP, a citizen of the United States of America, and a resident of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Barrel-Heading and Hoop-Driving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to that class of barrel heading and hoop driving machines which is intended to produce slack barrels, which are barrels made up as a rule with one head in place, the other head being placed in position after the barrel is filled, and the object of my invention is to produce a compressed air, steam, or other fluid operated machine which will receive staves assembled within two or more intermediate hoops and drive or press one head into place and level and drive the two chime hoops into place with accuracy, thereby avoiding accidental pushing of the head beyond the groove made for its reception, damaging the head, pushing one or more staves out of line, driving the hoops askew or beyond the edge of the barrel end or crushing the barrel.

To this end the construction and operation of my improved machine may be described as follows, in connection with the accompanying drawings in which—

Figure 1 is a vertical section of the machine in a position ready to drive a barrel head into place. Fig. 2 is an end view partly in section of the same. Fig. 3 is a top plan of the upper or hoop driving portion of the machine. Fig. 4 is a top plan with parts being broken away of the barrel holding and alining devices, the barrel being omitted.

In the lower part of a frame comprising a base 1, standards 2, top piece 3, intermediate piece 4, and braces 5, and mounted on said base 1, is a cylinder 6, inclosing a piston head 7, of a vertical piston rod 8, supporting on its upper end a circular plate or table 9, adapted to support and raise into place a barrel head A. Surrounding the cylinder 6, is a frusto-conical boxing or guide 10, adapted to center a partly made barrel B deposited on it and supported on the base, the boxing 10 being secured and braced by strips 11 secured to it and to the cylinder, and being open at the top to allow for oiling and for manipulation of the air vent.

On diametrically opposite sides and at a suitable distance from the barrel centering device, are trunnioned a pair of pivoted arms 12, on angular supporting and alining plates 13, bolted to the base 1, the pivots 14, passing through the enlarged lower ends of the arms 12 and through paired holes 15, in the angular supporting and alining plates 13, several pairs of holes being provided in each pair of plates, so that adjustment toward and from the barrel centering device may be easily effected by withdrawing the pivots from place, moving the enlarged ends of the arms opposite a nearer or farther pair of holes and reinserting the pivots which may be secured in place by a cotter pin or other fastening. This adjustability allows for operation on barrels of different heights and diameter within a limited range.

To the rear side of the arms 12 are secured brackets 16, supporting counterweights 17, and to the upper ends of the arms 12 are adjustably secured hook ends 18, the hook ends being comparatively narrow where they are secured to the arms 12 and rapidly widening to form wide hooks 19, which are circular or segmental in form and may be narrower or wider as desired up to a half circle, than the hook illustrated. The hook ends being easily removed may be readily replaced by hook ends having hooks of different width or made on a different radius. The hooks have flat under faces 20, and downturned edges 21, the wide flat under faces 20 catching the upper edges of the barrel staves and preventing their upward movement at the time of the application of the barrel head, which, on being raised, contacts with the downturned edges 21, just as the barrel staves, which have been pushed slightly upward by incidental pressure of the head against the inner surface of the barrel just below the croze, are stopped by touching the wide under faces 20, the distance between the faces 20 and the

edges 21, corresponding to the distance between the ends of the staves or barrel and the outer side of the barrel head in the headed barrel. The head is thus brought opposite the groove intended for the reception of its edge, is prevented from rising too high, and is sprung into the croze all around at the same instant. When pivoted in any but the outermost pair of bracket holes, the hook arms may be held in position by slipping a short bar through the next adjacent pair of holes under the counterweights. Usually however the arms are held manually and fall back on being released.

Leading through the base 1 into the cylinder 6 at the bottom thereof, is a pipe 22 communicating with a source of compressed air, steam, or other fluid under pressure and controlled by a valve 23 operated by a lever 24, preferably a foot lever. An air cock 25 at the upper end of the cylinder 6 is provided for partial relief of pressure above the piston head 7.

Mounted between and bolted to the top piece 3 and the intermediate piece 4, which in this instance are shown as large channel beams bolted or bracketed to the standards 2, is a cylinder 26 in which operates a piston head 27 and piston rod or plunger rod 28 carrying at its lower end a presser head or plate 29. Opening into the cylinder 26 is an upper port 30 and two lower ports 31 and 31[a], each connecting with a source of compressed air, steam, or other fluid under pressure, the upper port 30 being controlled by a valve 32 and the two lower ports being controlled by valves 33 and 33[a] respectively, the valve 32 being controlled by a lever 34 and the valves 33 and 33[a] being controlled by levers 35 and 35[a] respectively. The levers 34 and 35 are connected by a rod 36 made in two pieces joined together by a turnbuckle or other adjustable connection 37 and are adapted to operate in unison, the lever 34 and valve 32 being positioned or adjusted to cut off the pressure when the lever 35 and valve 33 are positioned or adjusted to let on the pressure, both levers being influenced by the handle extension 38 on the lever 35, to cause the piston head to ascend or descend, and both levers being influenced by the projection 39 at the opposite end of the lever 35 to cause the piston head to ascend.

The pivotal points of the levers 34 and 35 are at 40 and 41 respectively in the bar 42, extending between and bolted or bracketed to the top piece 3 and the intermediate piece 4, and downward movement of the handle extension 38 is intended to cause a downward movement of the piston or plunger 28. Lever 35[a] carries a pendant 43 having thereon lugs 44 and 44[a] which are preferably provided with anti-friction rings or rollers and which are adapted to contact with lever 35, the lower end of the pendant being steadied by being passed through a hole 43[a] in the intermediate piece 4. Lever 35[a] is influenced by the movement of lever 35 when it contacts with either lug 44 or lug 44[a] and is also influenced by a vertical sliding rod 45, which, passing through perforation 45[a] in the top piece 3, and perforation 45[b] in intermediate piece 4, carries at its lower end a head 46 adapted to contact with the upper side of plate 29 as it rises and falls and carrying in an intermediate position an adjustable combined weight and limit stop 47, adapted to abut against the pendant 43, move it downward and cause the valve 33[a] to admit an additional quantity of fluid under pressure a few inches before the end of the stroke and after the piston head has passed port 31[a], which act causes an acceleration of the piston head's speed, and a more powerful and effective blow to be struck by the plate 29. A vertical sliding rod 48, carrying at its lower end a head 49 also adapted to contact with the upper side of the plate 29 as it rises and falls, and carrying in an intermediate position an adjustable combined weight and limit stop 50 adapted to abut against the projection 39 on the lever 35, move it downward and cause the reversal of the movement of the piston head 27 after its attached piston rod and plate has descended any predetermined distance, passes through a perforation 48[a] in the top piece 3, and through a perforation 48[b] in the intermediate piece 4, and follows the movement of the plate 29. The adjustable stop 51 limits the downward movement of the lever handle extension 38 thus limiting the movement of all the levers and valves in one direction. The coiled spring 52 attached to the upper side of the piston head 27 prevents the piston head from rising too high and uncovering the port 30 of the upper valve 32, thus preventing the escape of air while the machine is at rest with the piston head raised. It also softens the end of the upstroke.

In operation the barrel (without heads) is placed over the table 9 and centers itself on the base by means of the boxing or guide 10; a head is then placed on the table 9; the arms 12 are brought over the edge of the barrel; compressed air, steam, or other fluid under pressure, is admitted through pipe 22 by opening valve 23, by pressing foot lever 24; the piston head 7, piston rod 8, table 9, and head A are lifted, the head A pushing the barrel into touch with the wide flat under faces 20 of the hooks 19 and itself being pushed into the groove or croze C; the hooks 19 and arms 12 preventing the barrel from rising too far and also preventing the head from being pressed beyond

the croze. During this operation air is compressed slightly in the upper part of the cylinder 6. This acts as a cushion to prevent too severe a movement of the piston and also tends to quickly return the rising parts to their normal position, the amount of the compression being regulated by the air or pet cock 25. After the head has been pressed into place the pressure on the lever 24 is removed allowing the valve to exhaust and the table to drop. The arms 12 automatically fall away on account of the counterweights. A hoop is fitted on the upper, and now headed, end of the barrel, and a downward movement of the handle extension 38 on the lever 35, causes compressed air, steam, or other fluid under pressure to be admitted above piston head 27 driving the piston or plunger 28 and the plate 29 downward, leveling the barrel and driving the hoop and also, if desired, another hoop placed over the opposite or lower end of the barrel, into place. Rods 45 and 48 follow the plate 29 in its downward movement.

During the downward stroke of the piston head the lower valve 33 is opened to exhaust to the atmosphere while the upper valve 32 is admitting compressed air, steam, or other fluid under pressure to drive the piston head. An upward movement of the lever reverses the position of these valves, the lower valve 33 admitting compressed air, steam, or other fluid under pressure under the piston head and causing the plate 29 to rise, the upper valve 32 exhausting at the same time. This movement can be automatically controlled by the adjustable limit stop 50 coming in contact with and moving the projection 39 on the lever 35. The downward movement of the lever 35 sets valves 32 and 33 in position for the downward stroke. At any predetermined point in the stroke, the stop 50 can be made to strike the projection 39, reversing the position of the valves and causing the piston head to rise to its original position. The value of this arrangement is in the fact that the machine can be regulated to strike a soft or cushion blow and can be made to return instantly from any point in the stroke, as the reversing of the valves places a fluid cushion under the piston head causing it to rebound and rise at once as the pressure is being relieved on the upper side at the same time that it is being increased on the lower side of the piston head.

When the extension lever 38 of the lever 35 is moved downward to produce the downward stroke it engages the lower lug 44[a] and moves it downward causing the lever 35[a] to open the exhaust port in the valve 33[a] and at the same time with the aid of the rod 36 setting the upper and lower valves 32 and 33 for the down stroke (this position being shown in dotted lines in Fig. 2). The valves are now arranged so that the upper valve 32 is admitting the operating fluid and both lower valves 33 and 33[a] are exhausting to the atmosphere. The rod 45 falling with the plate 29, on reaching a point where the piston head passes the port 31[a] of the valve 33[a], causes the adjustable limit stop 47 on the rod 45 to engage the pendant 43 causing the lever 35[a] to move the valve 33[a] still farther. This farther movement of the valve 33[a] first closes its exhaust and then admits fluid to the cylinder through port 31[a]. The object of this arrangement is to admit an additional quantity of fluid just before the end of the stroke and after the piston head has passed valve 33[a], valve 33 still being open to exhaust. This gives a stroke which is even and comparatively slow through the upper portion of the piston head's travel and the added quantity of fluid through the valve 33[a] gives a quick and powerful finish blow. An upward movement of the lever handle 38 engages the upper lug 44 and returns all three valves to their original position. The lower lug 44[a] acts as a stop to limit the movement of the valve 33[a] and the pendant 43 is guided and steadied by its lower end passing through the intermediate piece 4.

Owing to the construction of the valves they may be adjusted with relation to their various levers so that with the same lever movement, they may be made to admit a greater or less quantity of air up to the capacity of the supply pipe. They are adjusted by loosening a clamp which holds the operating levers to the spindle and then rotating them into the desired position by applying a wrench to the squared head of the spindle.

The arms 12 are only held in position over the barrel until it has begun to rise. At that time the hook shape of the upper ends of the arms causes them to hook to the staves the result being that owing to their shape they assist in spreading the staves for the reception of the barrel head in the croze.

It is to be noted that by inserting the barrel head from the inside of the barrel danger of crushing the barrel and the barrel head is avoided and a barrel head of several pieces of material can be placed as easily and successfully as a barrel head of one piece, and that from the manner in which the barrel is secured while heading and hooping there is no wabbling or skewing. By means of the thumb nut or screw bolt 53 the table may be secured in a higher or lower plane, the piston rod being screwed up or down in the piston head and the said screw bolt 53 being again tightened. The valves 32, 33 and 33[a] are also adjustable in relation to their operating levers and may be set to admit more or less air or other fluid

under pressure with the same lever movement. The exhausts may be similarly adjusted.

Having thus described my invention the following is what I claim as new therein and desire to secure by Letters Patent:

1. A barrel heading machine comprising a barrel support, a cylinder mounted upon the barrel support, a piston head working in the cylinder and having a piston rod, a table mounted upon the piston rod for carrying a barrel head, means for conveying fluid under pressure to the piston head, a valve for controlling the fluid conveying means and means for holding the barrel down against the table.

2. A barrel heading machine comprising a barrel support, a cylinder mounted upon the barrel support, a piston head working in the cylinder and having a piston rod adjustably secured to the piston head, a table mounted upon the piston rod for carrying a barrel head, means for conveying fluid under pressure to the piston head, a valve for controlling the fluid conveying means and means for holding the barrel down against the table.

3. A barrel heading machine comprising a barrel support, a cylinder having a head provided with an air-relief cock and mounted upon the barrel support, a piston head working in the cylinder and having a piston rod working through the cylinder head, a table mounted upon the piston rod for carrying a barrel head, means for conveying fluid under pressure to the piston head, a valve for controlling the fluid conveying means and means for holding the barrel down against the table.

4. A barrel heading machine comprising a barrel support, a cylinder mounted upon the barrel support, a barrel guide surrounding the cylinder, a piston head working in the cylinder and having a piston rod, a table mounted upon the piston rod for carrying a barrel head, means for conveying fluid under pressure to the piston head, a valve for controlling the fluid conveying means and means for holding the barrel down against the table.

5. A barrel heading machine comprising a barrel support, a cylinder mounted upon the barrel support, a barrel guide surrounding the cylinder, bracing strips secured to the cylinder and to the barrel guide, a piston head working in the cylinder and having a piston rod, a table mounted upon the piston rod for carrying a barrel head, means for conveying fluid under pressure to the piston head, a valve for controlling the fluid conveying means and means for holding the barrel down against the table.

6. A barrel heading machine comprising a barrel support, a table for carrying a barrel head, means for reciprocating the table, and means for holding the barrel down against the table consisting of a pair of pivoted arms each having a hook end provided with a hook formed with a flat under surface and a downturned edge.

7. A barrel heading machine comprising a barrel support, a table for carrying a barrel head, means for reciprocating the table, and means for holding the barrel down against the table consisting of a pair of pivoted arms each having an adjustable hook end provided with a hook formed with a flat under surface and a downturned edge.

8. A barrel heading machine comprising a barrel support, a table for carrying a barrel head, means for reciprocating the table, means for holding the barrel down against the table consisting of a pair of pivoted arms each having a hook end provided with a hook formed with a flat under surface and a downturned edge and brackets secured to the barrel support in which the arms are adjustably mounted.

9. A barrel heading machine comprising a barrel support, a cylinder, a piston head working in the cylinder and having a plunger, a plate carried by the plunger for seating the end hoops upon the barrel, means for conveying fluid under pressure to the ends of the cylinder and to a point intermediate of the ends of the cylinder, end and intermediate valves for controlling the fluid conveying means having levers for controlling the valves, means for connecting the levers of the end valves together so as to work together in unison, and a pendant, carried by the lever of the intermediate valve, having lugs adapted to contact with the lever of the lower valve.

10. A barrel heading machine comprising a barrel support, a cylinder, a piston head working in the cylinder and having a plunger, a plate carried by the plunger for seating the end hoops upon the barrel, means for conveying fluid under pressure to the ends of the cylinder and to a point intermediate of the ends of the cylinder, end and intermediate valves for controlling the fluid conveying means having levers for controlling the valves, means for connecting the levers of the end valves together so as to work together in unison, a pendant, carried by the lever of the intermediate valve, having lugs adapted to contact with the lever of the lower valve, a sliding vertical rod having a head adapted to contact with the plunger plate, and a combined weight and limit stop carried by the vertical rod and adapted to abut against the pendant.

11. A barrel heading machine comprising a barrel support, a cylinder, a piston head working in the cylinder and having a plunger, a plate carried by the plunger for seating the end hoops upon the barrel, means for conveying fluid under pressure to the ends of the cylinder and to a point intermediate of

the ends of the cylinder, end and intermediate valves for controlling the fluid conveying means having levers for controlling the valves, means for connecting the levers of the end valves together so as to work together in unison, a pendant, carried by the lever of the intermediate valve having lugs adapted to contact with the lever of the lower valve, and an adjustable stop limiting the downward movement of the lever of the lower valve.

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