G. R. MERRIMAN & W. C. STEVENS.

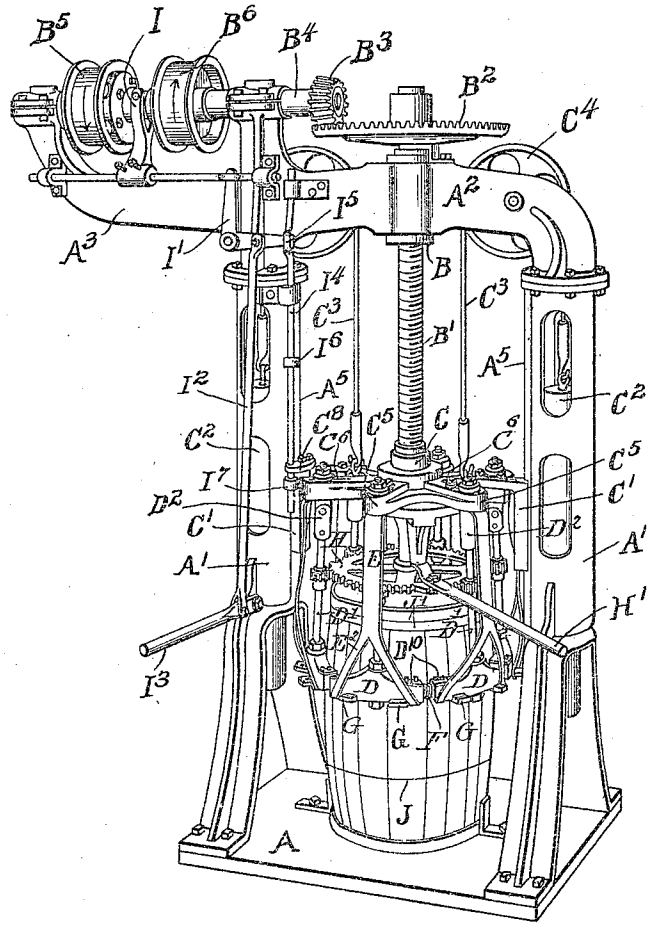
HOOP SETTING MACHINE.

APPLICATION FILED DEC. 5, 1907.

960,365. Patented June 7, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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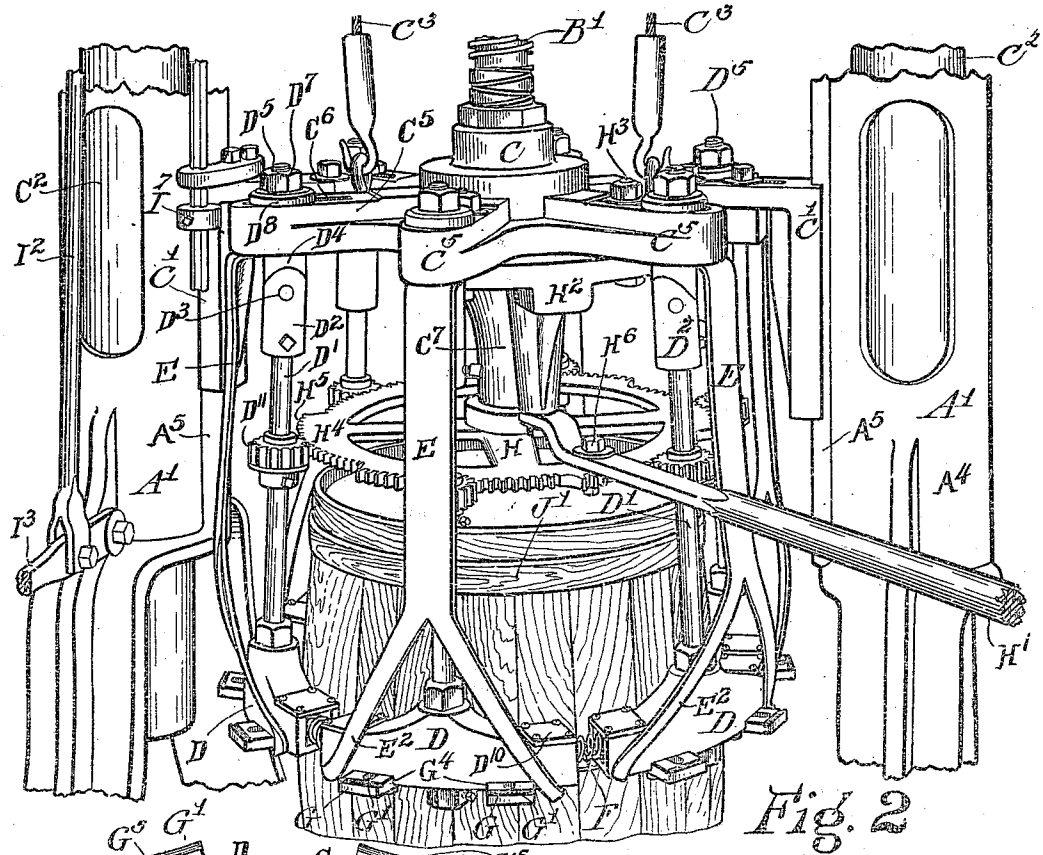

Fig. 2

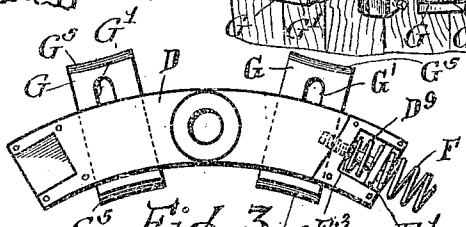

Fig. 3

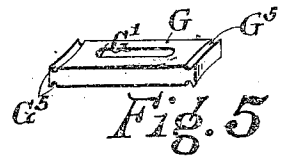

Fig. 5

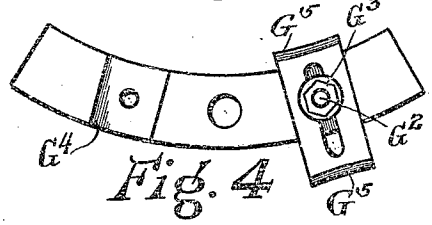

Fig. 4

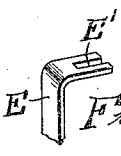

Fig. 7

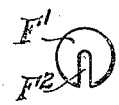

Fig. 6

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UNITED STATES PATENT OFFICE.

GROVE R. MERRIMAN AND WILLIAM C. STEVENS, OF AKRON, OHIO, ASSIGNORS TO PITTSBURGH SPIRAL WIRE HOOP COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HOOP-SETTING MACHINE.

960,365. Specification of Letters Patent. **Patented June 7, 1910.**

Application filed December 5, 1907. Serial No. 405,142.

To all whom it may concern:

Be it known that we, GROVE R. MERRIMAN and WILLIAM C. STEVENS, both citizens of the United States of America, residing in Akron, in the county of Summit, in the State of Ohio, have invented a certain new and useful Improvement in Hoop-Setting Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to machines for driving and setting hoops on barrels, casks, and the like.

The object of the invention is the provision of mechanism simple in construction and powerful and reliable in operation in which the hoop engaging devices can be readily adjusted to work on barrels of different sizes and automatically adjust themselves to the swell of the barrel worked upon and to inequalities in the same, while at the same time the devices are so held against the work that there is practically no chance for them to jump over the hoop in the driving operation.

A further object of the invention is the provision of simple and effective means for moving the hoop engaging devices out from the barrel in the direction transverse to the axis of the latter when necessary, as to clear the end hoops of a barrel in order to move the hoop engaging devices into or out of the position for driving hoops on the barrel located between its ends.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which we have illustrated and described one of the forms in which our invention may be embodied.

In the drawings, Figure 1 is a perspective view of the complete machine. Fig. 2 is a perspective view on a larger scale than Fig. 1, and showing a portion of the machine. Fig. 3 is a plan view of one of the driving shoes, and Fig. 4 is an inverted plan view of the same. Fig. 5 is an elevation of one of the hoop engaging tools. Fig. 6 is an elevation of one of the spring engaging connections, and Fig. 7 is a perspective view of a portion of one of the leaf springs employed.

The frame of the machine comprises a base A, two side frame members or hollow columns A^1, and a top member A^2, the latter being provided with an extension A^3 for supporting the driving pulleys and clutch mechanism. The top member A^2 has secured to it a nut B, through which is threaded the threaded rod B^1 having swiveled to it at its lower end a reciprocating crosshead or driving head C. The driving head C is provided with adjustable diametrically opposed arms C^1 slotted to receive the vertical guide ribs A^5 formed on the inner sides of the columns A^1. The crosshead C and stem B^1 are counterbalanced by weights C^2 located in the hollow columns A^1 and connected to the crosshead by cables C^3, or the like, running over pulleys C^4 journaled in the top frame member A^2.

The crosshead C is provided with a plurality of radially extending arms C^5. In the form shown, there are six of these arms. To each arm C^5 is adjustably secured a driving shoe D. In the form shown, each driving shoe D, which is arc shaped, is swiveled on the end of a rod D^1, the upper end of which is inserted in a tubular member D^2 hinge connected by the pivot D^3 to a member D^4. Each member D^4 has a reduced and threaded extension D^5, which extends up through a slot C^6 in the corresponding arm C^5, and is clamped in place by the nut D^7 and washer D^8, the latter bearing on the upper surface of the arm C^5. Between the upper end of the body portion of the member D^4 and the under side of the corresponding arm C^5 is clamped the upper end of a shoe engaging leaf spring E. Preferably, the spring E has a slot formed in its upper portion, as shown in Fig. 7, the slot receiving the reduced extension D^5 of the member D^4, thus permitting the upper end of the spring to be radially adjusted with the member D^4 and also independently thereof. It will, of course, be understood that the slotted portion of each spring E may rest upon the upper side of the corresponding arm C^5 and between it and the clamping nut and washer. The lower end of each spring E is bifurcated, the forks or branches E^2 bearing

against but preferably not being secured to the ends of the corresponding shoe D. Each spring E is arranged so that it tends to force its shoe D radially inward, and also to hold the shoe concentric with the axis of the barrel, though the shoe is free to turn angularly with respect to the rod D^1 against the action of the spring E.

In each end of each shoe D is formed a pocket or recess D^9, the upper side of which is normally covered by a removable cover D^{10}. The adjacent ends of each adjacent pair of shoes are connected by a helical tension spring F, the ends of which extend into the corresponding recesses D^9. Each end of each spring F is adjustably connected to the corresponding shoe D by a disk or washer F^1 having a slot F^2 which receives one turn of the spring F, and receives also a bolt F^3 threaded into the shoe as shown in Fig. 3. By adjusting the disks F^1 along the length of the spring, and by screwing the bolts F^3 in or out of the shoes, the effective length of each spring F may be varied.

To the under side of each shoe are secured a pair of hoop engaging devices G, one adjacent each end of the shoe. Each shoe engaging device has a slot G^1 through which passes a stud bolt G^2 threaded into the lower end of the shoe. The stud bolt G^2 and nuts G^3 on their lower ends thus form a means for adjustably clamping the various tools in place. Preferably, the tools G are recessed in the shoes D, as indicated at G^4. Each tool G is double faced and double ended, having four hoop engaging surfaces G^5 suitably shaped to properly engage the hoop to be driven. By reversing the sides of each tool and also reversing it end to end the effect of four tools in one is obtained, and the tool need not be reground or retempered until all four surfaces G^5 are worn. The shape of the surfaces G^5 will, of course, depend on the character of the hoop to be driven.

The boss or hub C^7 secured to the under side of the crosshead C and in line with rod B^1 has journaled on it a step gear H. The step gear H may be rotated by means of the lever H^1 pivotally connected to a fulcrum block H^2 secured to a pair of the arms C^5 by bolts H^3 passing through the slots C^6 in said arms. The lever H^1 is formed with a slot receiving the pin or bolt H^6 carried by the step gear H. The step gear H has a plurality of spirally inclined working faces H^4, one for each shoe. Each inclined or spiral face H^4 has gear teeth H^5 on its periphery, meshing with the teeth of a spur gear D^{11} loosely mounted on the corresponding rod D^1. By this arrangement, when the outer end of the handle H^1 is thrown to the left in Fig. 1, the shoes D are allowed to move radially inward under the action of the springs E and F, and when the handle is moved in the opposite direction, they are moved radially outward. We have found the arrangement of spur gears D^{11} and coacting sets of spirally arranged gear teeth H^5 to be highly advantageous. It permits the driving shoes to be moved outward with comparative ease. At the same time, the spurs D^{11} being spring pressed against the gear teeth H^5, the parts unite to form a reliable locking means for holding the step gear and the driving shoes in any position of radial adjustment into which they may have been moved. In consequence, the vibration to which the machine may be subjected does not result under the spring tension in rotating the step gear H to the left to thereby permit the driving shoes to move inward, when for any reason, as in putting a barrel in place or removing it, it is desired that the driving shoes should be maintained in the distended condition.

The shaft B^1 may be rotated in any suitable manner. In the form shown, the nut B has secured to it at its upper end a gear wheel B^2 which meshes with and is driven by a gear wheel B^3 carried by a shaft B^4 journaled in the extension A^3 of the top member A^2. On the shaft B^4 are mounted two pulleys B^5 and B^6, which are continuously rotated in opposite directions as indicated by the arrows. A clutch mechanism I serves when moved to the left to lock together the shaft B^4 and the wheel B^5 so that the driving head is moved downward. Similarly, when the clutch mechanism I is moved to the right, the pulley B^6 and shaft B^4 are locked together, and the crosshead is moved in the other direction. The mechanism I may be actuated through the bell crank I^1, rod I^2, and operating lever I^3. By preference, also, a rod I^4 arranged to engage the bell crank I^1 at I^5, is provided with upper and lower collars I^6 and I^7, which are engaged by an arm C^8 carried by the crosshead as the latter reaches the upper or lower limit of its movement, so that when this occurs the clutch mechanism I is automatically thrown to the intermediate position in which neither pulley B^5 nor B^6 is locked to the shaft B^4.

The machine disclosed is particularly intended for driving the quarter or bilge hoops on barrels or casks which already have the end hoops in place. The mechanism, while suitable for driving any kind of hoop, is especially adapted for driving hoops made of spiral wire, as indicated at J in the drawings. In operation, the barrel is first put in place with the crosshead C raised above the upper end of the barrel. Then, the mechanism having been adjusted for that particular type and size of barrel, the crosshead is lowered, with lever H^1 thrown to the right, so that the shoes and tools carried by them

will clear the end hoops of the barrel. After the shoes pass below the end hoops J^1 of the barrel, the lever H^1 is thrown to the left sufficiently far to allow the tools G to come freely into contact with the periphery of the barrel. The springs F and E so act on the shoes that the latter form in effect an elastic band surrounding the barrel, which not only tends to shape the latter by drawing up the hoop but also tends to draw the barrel into shape by their direct action. The shoes are free to rotate on the rods B^1 to compensate for any inequality in the barrel surface, while at the same time the springs tend to hold the shoes in concentric relation. When the parts are suitably proportioned and arranged and the springs of the proper tension, the machine operates to set the hoops uniformly, accurately, and rapidly. When the hoop is forced down the barrel as far as necessary, the movement of the crosshead is reversed, and the handle is thrown to the right so that the driving tools will clear the end hoops of the barrel. As soon as the tops of the tools pass above the barrel, the latter may be removed and another barrel put in place. It will be understood that in practice the hoops J to be driven by the machine are put on the end of the barrel before the tools move down at the upper end of the barrel, and it is one of the advantages of the construction that the hoop need not be accurately placed on the barrel initially in order for the tools to set it properly and without any liability of one tool jumping over the hoop.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a hoop setting machine, a circularly extending set of driving shoes, a driving head, connections between each shoe and the driving head, said connections being arranged to permit the shoes to adjust themselves to the diameter, and to inequalities in the surface, of the barrel worked upon, and resilient means acting between and tending to draw together each adjacent pair of driving shoes.

2. In a hoop setting machine, a circularly extending set of driving shoes, a driving head, connections between each shoe and the driving head, said connections being arranged to permit the shoes to be adjusted to the diameter, and to inequalities in the surface, of the barrel worked upon, and leaf springs, one for each shoe, each spring having one end secured to the driving head and the other end bearing against the corresponding shoe, and urging it radially inward and at the same time tending to hold the shoe against movement about an axis parallel to the axis of the barrel worked upon.

3. In a hoop setting machine, a circularly extending set of driving shoes, a driving head and connections between the driving shoes and the driving head, the connection between each shoe and the driving head including a hinged joint arranged to permit movement of the shoe toward and away from the axis of the barrel worked upon, and a pivotal connection arranged to permit the shoe to adjust itself about an axis substantially parallel to the axis of the barrel, and resilient means tending to move the shoes radially inward and to restrict angular adjustment of the shoes about axes parallel to the barrel axis.

4. In a hoop setting machine, a circularly extending set of driving shoes, a driving head and connections between the driving shoes and the driving head, the connection between each shoe and the driving head including a hinged joint arranged to permit movement of the shoe toward and away from the axis of the barrel worked upon, and a pivotal connection arranged to permit the shoe to adjust itself about an axis substantially parallel to the axis of the barrel, resilient means tending to move the shoes radially inward and to restrict angular adjustment of the shoes about axes parallel to the barrel axis, and a pair of spaced apart and radially adjustable hoop engaging tools carried by each driving shoe.

5. In a hoop setting machine, a driving head C, a circularly arranged set of hinge members D^4 adjustably secured to the driving head, a set of members D^1, one hinge connected to each hinge member D^4, a set of driving shoes D, one journaled on each member D^1, and a set of helical springs F, one connecting each adjacent pair of driving shoes D.

6. In a hoop setting machine, a cross head C, a circularly arranged set of hinge members D^4 adjustably secured to the crosshead, a set of members D^1, one hinge connected to each hinge member D^4, a set of driving shoes D, one journaled on each member D^1, and a set of helical springs F, one connecting each adjacent pair of driving shoes D, and means for adjusting the effective length of each spring F.

7. In a hoop setting machine, a crosshead C, a circularly arranged set of hinge members D^4 adjustably secured to the crosshead, a set of members D^1, one hinge connected to each hinge member D^4, a set of driving shoes D, one journaled on each member D^1, and leaf springs E, one for each driving shoe, each spring E having its upper end adjustably secured to the crosshead and its lower end forked with the ends of the forks secured to the corresponding driving shoe D.

8. In a hoop setting machine, a driving head movable toward and away from the end of the barrel to be hooped, a series of driving shoes extending circumferentially about the barrel, a corresponding series of

rods extending generally parallel to the axis of the barrel and each supporting at one end a driving shoe, a hinged connection between the other end of the rod and the crosshead arranged to permit the driving shoes to be moved radially toward and from the axis of the barrel, resilient means tending to move each driving shoe toward the center of the barrel, and means for positively moving the driving shoes away from the barrel, said means including a set of spur gears, one loosely mounted on each rod between the driving shoe and the hinged connections, a spider journaled concentric to the axis of the barrel and provided with a series of spirally inclined toothed portions, each of said toothed portions having teeth adapted to mesh with the corresponding one of said spur gears, and means for oscillating said spider about its pivotal connection.

9. In a hoop setting machine, a circularly extending set of driving shoes, a driving head, connections between the driving head and the driving shoes permitting the latter to move to accommodate themselves, each shoe being formed with a pair of sockets, and resilient means connecting the shoes, said means comprising a set of helical springs arranged one between each adjacent pair of shoes, each spring extending into and secured in the corresponding shoe sockets.

10. In a hoop setting machine, a circularly extending set of driving shoes, a driving head, connections between the driving head and the driving shoes permitting the latter to move to accommodate themselves, each shoe being provided with a pair of sockets, and resilient means connecting the shoes, said means comprising a set of helical springs arranged one between each adjacent pair of shoes, each spring extending into and being adjustably secured in the corresponding shoe sockets.

11. In a hoop setting machine, a driving head, a circularly extending set of driving shoes, arms each pivotally connected at one end to the driving head to swing toward and away from the axis of the barrel worked upon, and having one of said shoes swiveled on its lower end, and resilient means tending to hold each shoe against turning movement relative to the arms supporting it.

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