(No Model.)

# A. T. S. ROEBLING.

## BARREL HOOPING MACHINE.

No. 591,497. Patented Oct. 12, 1897.

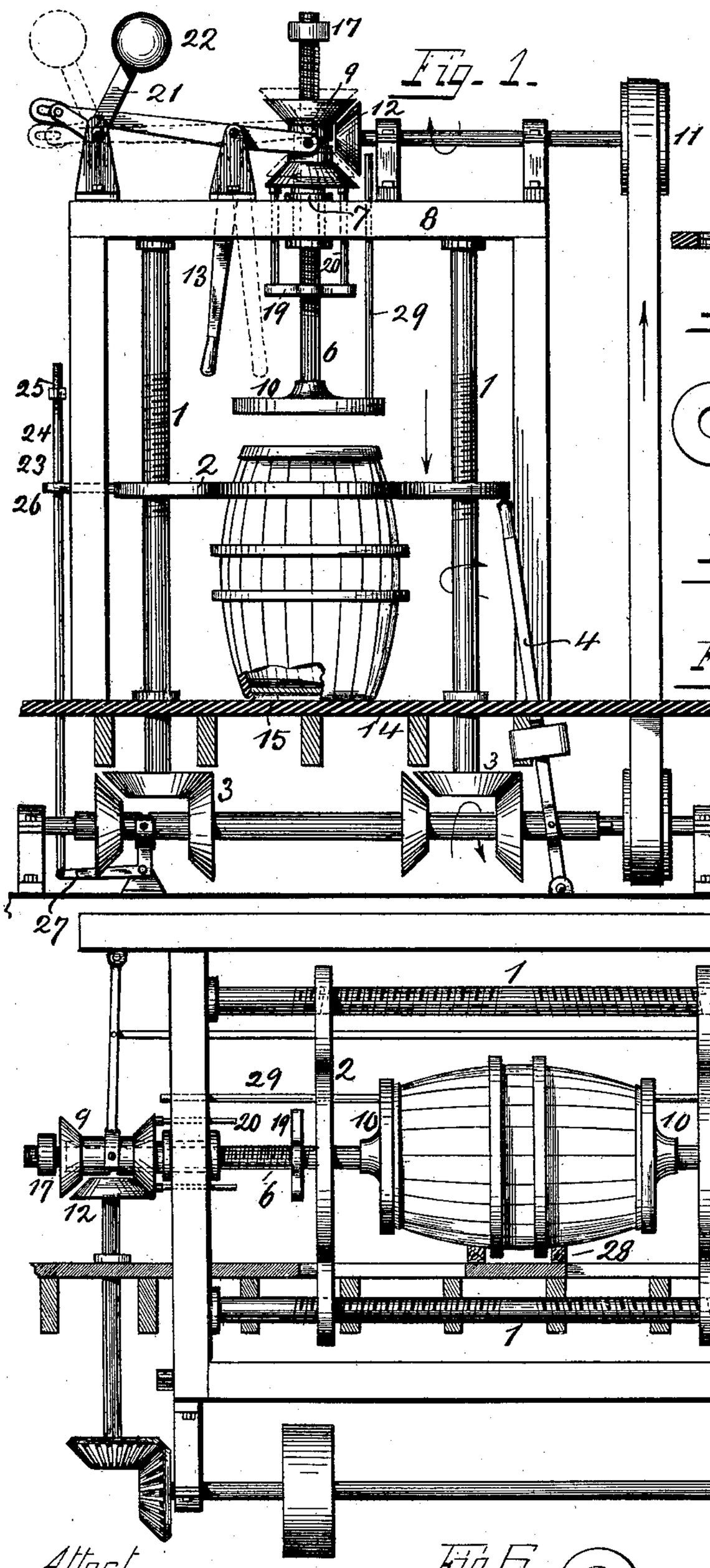



Fig. 1.

Fig. 2.


Fig. 3.

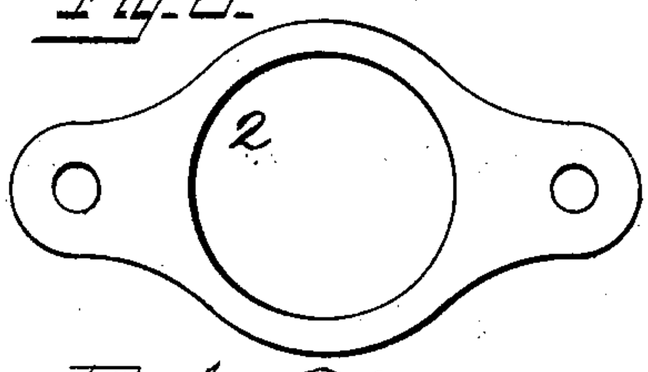



Fig. 4.

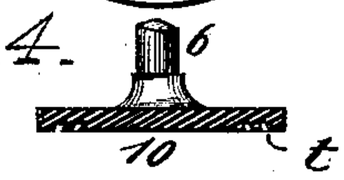



Fig. 5.

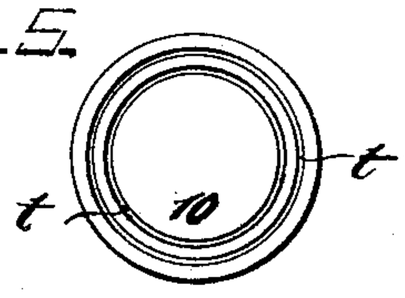
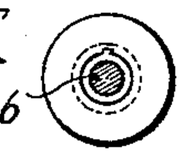



Fig. 7.

Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## BARREL-HOOPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 591,497, dated October 12, 1897.

Application filed November 24, 1896. Serial No. 613,329. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER T. S. ROEBLING, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Improvements in Barrel-Hooping Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, forming a part of this specification.

The improvement is classed with and related to that form of machine intended to place the thin iron chime-hoops upon the ends of wooden barrels. The essential requisites of this class of machine are that it shall compress the staves firmly about the head of the barrel, forcing the head into the croze of the staves, and force the thin iron chime-hoop upon the end of the barrel. This has heretofore been accomplished by compressing the staves about the head of the barrel by means of a device or devices operated by one movement of the mechanism, and then forcing on the chime-hoop by means of another device or devices operated by a second similar movement of the same mechanism, necessitating two reciprocative movements of the same mechanism toward and from the end of the barrel in order to compress the staves and force on the hoop in the desired manner, the mechanism being heretofore interchangeably connected for the alternate operation of each device. This is attended with consequential loss of time and decrease in capacity, and the operation, being performed without means of restraining the barrel or holding the same to place while each device is operated alternately, is without the ease and facility attained in the use of my invention, which consists in a peculiarity and novelty of form, operation, and combination of devices readily understood by those skilled in the art from the following description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of my improved barrel-hooping machine, showing an arrangement of the combination of devices whereby the result designed is obtained in a machine adapted to operate upon one end of the barrel at a time. Fig. 2 is a half-section of the stave-compressing device, which is shown in the form of a solid ring, of desirable thickness and width, having elongated ends provided with female screw for operation upon screws 1 1 of Fig. 1, whereby it may be lowered and raised. Fig. 3 is a top view of the same device. Fig. 4 is a sectional view of the hoop-driving and barrel-restraining device, shown with grooves *t t* to accommodate the edge of the hoop that it may be used for special purposes hereinafter explained. Fig. 5 is an under side view of the same device. Fig. 6 is an end view of one of the screws with nut and friction-cone for operating it. Fig. 7 is a side elevation of a modified form.

My invention is designed to compress the staves about the head of the barrel at each end of the barrel alternately, operating upon one end of the barrel at a time by means of one form of stave-compressing device operated and controlled by means of its own independent motive or actuating mechanism, and while said device remains in position upon the barrel, serving an additional function of holding the barrel firmly to place to force the chime-hoop upon the end of the barrel by means of another form of device operated and controlled by its own separate independent mechanism, and then while the latter device remains in position upon the barrel, with its mechanism at rest, performing its additional function of holding the barrel firmly to place, the stave-compressing device may be reversed by means of its independent motive mechanism and released from its position upon the barrel, the combination securing a great advantage in this that in addition to the functions performed by each device of compressing the staves and driving the hoop, respectively, each device performs the additional important function of a restraining device, and each device alternately holds the barrel firmly to place during the operation of the other without the use of any other obviously necessary means of restraining the barrel to its place than that afforded by the combination of the devices described, which result is obtained by mounting, oper-

ating, and controlling each device separately and independently of the other in the manner herein described.

In the drawings illustrative of my invention I have shown a form of mechanism suitable for the operation of the combination of devices, a description of which is a follows, to wit:

1 1 represent screws for lowering and raising the stave-compressing device 2, operated by friction-cones 3, the movement of the screws 1 1 being readily controlled by the operator through lever 4. Power is applied to the machine by belting from line-shaft or otherwise, and a movement of the lever 4 in one direction will cause contact between the cones 3, whereby the screws 1 1 will operate to lower the stave-compressor 2 upon the barrel, and a reverse movement of the lever 4 will cause the screws 1 1 to operate reversely and raise the stave-compressor 2 off the barrel.

6 represents a screw passing through nut 7, fitted to cross-bar 8, the nut being threaded inside to accommodate the screw 6 and provided with movable friction-cone 9, whereby the screw 6 may be operated and adapted to lower and raise the hoop-driver and barrel-restraining device 10, which is provided with rod 29, passing upward through cross-bar 8 to prevent the tendency of the screw 6 to turn with the nut 7, the screw 6 being operated similarly to the screws 1 1 by means of pulley 11 and friction-cones 9 and 12, and is also controlled by the operator through lever 13, a movement of which in one direction will cause contact between cone 9 and cone 12, and the device 10 will thereby be lowered upon the end of the barrel, and a reverse movement of the lever 13 will cause it to be raised from contact therewith. It is readily seen that in the operation of the devices I need not and I do not confine myself to the use of screws for moving these devices toward and from the barrel, and they are only shown as a means of illustration and for the purpose of showing the result obtained by the combination of said devices. Any form of mechanism may be used such as would be most convenient and any desired motive power may be employed.

The operation of placing these thin iron chime-hoops upon the ends of barrels is described as follows as performed by my machine: Upon a solid platform 14 rests a preferably circular plate 15, of such diameter as will support the barrel at its chime inside of and not touching the chime-hoop, of a height suitable to prevent contact between the edge of the chime-hoop and the floor of platform 14 for the purpose of avoiding undesired pressure upon the chime-hoop after it is driven home to the extent desired by hoop-driver 10. This result may also be accomplished by having this bottom plate 15 provided with a groove, as shown in Fig. 5, which groove would accommodate the projecting edge of the hoop in those cases where the hoop is not driven completely home when first driven on the barrel, for the purpose and in the manner hereinafter explained, and the edge of the hoop accommodated by the groove of the plate would be relieved of pressure upon that part and would be prevented from being driven completely home when the opposite end of the barrel was operated upon. Bottom plates with grooves for this purpose are not new, nor are bottom plates fitting the chime of the barrel for the purpose of raising it above the floor new, and neither is claimed by me except in combination with the devices and for the purposes described. The barrel is ordinarily brought to this class of machine held together by means of the ordinary truss-hoops or otherwise, with the heads loosely inserted, and is placed end up upon platform 14, with its chime resting upon the supporting-plate 15. The stave-compressor 2 is then lowered upon the barrel by means of its independent mechanism in the manner described, thereby compressing the staves about the head as securely as desired, and it is then permitted to remain upon the barrel, holding the same firmly to place, while a chime-hoop 16 is introduced upon the end of the barrel, and the hoop-driving device 10 is lowered by the operator by means of its independent mechanism, in the manner described, whereby the hoop is driven upon the barrel by independent mechanism while the barrel is held to place by the stave-compressor 2, then wholly at rest, together with its mechanism, and acting as such restraining device. The hoop-driver 10 is then permitted to remain in its position upon the end of the barrel and rigidly holds the barrel to place, while the stave-compressor 2 is moved reversely and is released from contact with the barrel, when the device 10 is also reversed and independently raised from its contact. The barrel is then turned and the hooped end rested upon the platform 14, with its chime supported by plate 15, and the unhooped end operated upon in the manner just described, when both chime-hoops will have been placed upon both ends of the barrel.

I have shown the stave-compressor 2 in the form of a ring, preferably made of iron, of sufficient thickness suitable to the size of the barrel, it being obvious that a small barrel or keg would not require the device to be of the same thickness of iron or width of contact with the staves as larger barrels or casks.

I do not confine myself to the use of a stave-compressor device in any particular form, and as it is not new to compress the staves of a barrel about the head with rings of this form or with a compressor formed of two or more segments I do not claim this broadly, but only in connection with the described combination of devices and suitable operative mechanism whereby a stave-com-

pressor and a hoop-driver are mounted, operated, and controlled separately and independently of each other.

The feature of restraining the barrel through the hoop-driving device 10 is of high importance, as it has been necessary heretofore to form a stave-compressor of segments, which are necessarily unwieldy and cumbersome, in order that the compressor might be released from its contact with the barrel without the barrel being raised from the platform in so doing; and it has been found necessary where a solid ring is used, as shown in Fig. 3, to release the ring from its strained contact with the barrel by means of a blow from a hammer, or provide otherwise obviously necessary means of securing the barrel to place firmly during its removal. For this purpose the device 10 is shown in the form of a plate of sufficient diameter to strike the hoop at its outer circumference; but it is obvious that the device may be made smaller, whereby it would strike the end of the barrel inside of the chime-hoop, and thereby serve its purpose as a restraining device, and in that case this device 10 would not be used for driving the hoop; but if the hoop were not thus driven by it, as shown in the drawings, still it is clear that the hoop would be forced home by the downward pressure of the stave-compressor 2 after the barrel was up-ended and its unhooped end operated upon by the stave-compressor, and it would in that case be necessary to turn the barrel twice instead of once, as preferably shown and described, the stave-compressor 2 acting in such case both as a hoop-driver and a stave-compressor, and the device 10, fitting upon the barrel inside of the chime-hoop, be used simply as a restraining device and holding the barrel firmly to place during the operation of the stave-compressor 2. It is not necessary that the hoop-driver 10 be operated by power, although so shown, but it could be operated by hand, or by permitting it to rest upon the stave-compressor, be raised and lowered by it and its mechanism, or be lowered by hand and raised by the stave-compressor or otherwise, and be provided with suitable devices to prevent its movement until desired. I have shown the hoop-driver 10 provided with grooves in Fig. 5, but I do not confine myself to that form. The groove might be used in some cases to accommodate an edge of the hoop, and would prevent it from any tendency to crimp or bend, as might be the case where the diameter of the hoop is large, but for smaller and ordinary work I have shown and preferably use a hoop-driving device in the form of a disk, a circular plate either solid or ring-shaped, or in any form adapted to strike the hoop at its outer circumference, or to strike the end of the barrel in any such described manner without driving the chime-hoop for the purpose of a restraining device, as shown and described.

The additional function of restraining the barrel to place performed by the stave-compressor 2 is of evident importance in that it serves to hold the barrel firmly to place during the operation of the hoop-driver 10, a function not heretofore performed by it for the reason that the mechanism has been heretofore interchangeably connected for the operation of each device, and it is seen that the stave-compressor in itself when disconnected from its operative mechanism would not in any way operate to restrain the barrel, and it is seen that this feature is made possible by reason of the independent operative mechanism attached to each device. This becomes of highest importance when the hoop-driver 10 is grooved, as shown in Fig. 5, because in that case it would be of paramount importance in the rapid operation of the hoop-driver 10 to avoid the upper edge of the hoop missing the groove in such cases provided in device 10, and it being apparent that the construction of my machine will admit of almost perfect alinement it is possible to avoid probability of this occurrence, which would ruin the hoop and nevertheless permit of accurate and rapid operation of the hoop-driving device 10.

In case it would be desired to manufacture barrels and store them away for future use it would not be advisable to drive the chime-hoops wholly home up to the ends of the barrel-staves when first made, and it is desirable to permit a small edge of the hoop to project, so that any cracks appearing when desired for use may be readily closed up simply by driving completely home the permitted projecting edge of the chime-hoop. In such cases the hoop-driving device 10 may be provided with grooves, as shown in Fig. 5; but where a flat-surfaced plate is used for driving the hoops the device must necessarily be arrested before the hoop has been entirely driven home either by moving the lever 13 at the proper time and disengaging friction-cones 9 and 12 or an automatic device 17 may be used, as shown in drawings, which, as shown, is arranged to automatically disengage friction-cones 9 and 12 and arrest further descent of the hoop-driver when the same has descended to a predetermined point. This device is shown in simple form, being composed of movable and adjustable nut 17, placed upon the end of screw 6, and may readily be lowered or raised upon said screw 6, so as to permit it to descend to any desired depth suitable to the height of the barrels being operated upon, and as barrels of a certain class are ordinarily of the same height it is seen that this device may be successfully employed as a means of automatically performing this function, and when barrels of shorter height are to be operated upon the automatic device 17 may readily be adjusted accordingly. It is obvious, however, that the machine may be operated without its use or any other form of automatic stop may be used, as found most convenient.

An automatic device is also employed for the purpose of automatically arresting the upward movement of the hoop-driving device 10 when the same is raised from contact with the barrel. This, as shown, consists of nut 19, placed on the under side of the cross-bar 8 upon the screw 6, and may be readily adjusted to arrest the upward movement of the screw 6 at any predetermined point. It is adapted to strike pins 20, which are loosely inserted through the cross-bar 8 and are shown unattached to the nut 19, although they may be so attached, but in order that the nut 19 may be readily adjusted it would not be preferable. The screw having ascended to the predetermined point, the nut 19 striking pins 20 causes the same to raise the friction-cone 9 out of contact with cone 12 and instantly arrest its upward movement. This device may not necessarily be employed, and it may be of any other convenient form, because the effect designed and attained by the combination of devices shown may be obtained through an application of hydraulic, pneumatic, steam, or any other motive power, or by the use of other forms of mechanism wherein the automatic devices shown would not admit of application, and they are shown more as a means of illustration.

In those cases where a projecting edge of the hoop is left when the barrels are first made the machine may be very readily adjusted for driving the hoops completely home by adjusting the automatic stop devices so as to permit of further descent of the hoop-driver. The bottom plate 15 would be removed, and by lowering the stave-compressor 2 so as to center the barrel the hoop-driving device 10 would be lowered upon the end of the barrel and the hoop driven completely home. Where a grooved hoop-driver is used, then the barrel would require to be twice turned in order to drive home the projecting edges, which would rest upon the flat surface of platform 14.

Fig. 7 is a side elevation showing a combination of the devices described effecting the same result, but both ends of the barrel are operated upon simultaneously and differ from Fig. 1 only in the application of the additional stave-compressor 2, hoop-driver 10, screw 6, and right and left screws 1 1, whereby both ends of the barrel may be operated upon simultaneously instead of singly, as in Fig. 1. The devices are operated in a manner similar to that of Fig. 1, however, by means of gearing, friction-cones, and other means of operation, the movements of which are readily controlled by levers.

The operation of the machine shown in Fig. 7 is described as follows: The stave-compressors 2 2 are moved upon the ends of the barrel simultaneously by means of right and left screws, securely compressing the staves about each head in the desired manner, and are permitted to remain in that position while a chime-hoop is introduced upon each end of the barrel, when the hoop-drivers 10 10 are brought to bear upon the outer edges of each hoop by means of the screws 6 6, and thereby drive the hoops upon the barrel the required distance and to the point desired by the operator, either completely, so as to be flush with the end of the staves, or but partially, so as to permit an edge to project for the purpose hereinbefore described. The hoop-drivers then remain in position while the stave-compressors are reversed and retracted from the barrel, when the hoop-drivers are also reversed and both devices return to their original position, when the barrel is removed and another placed in the machine and the operation repeated. It is seen that the operation of driving the hoops admits of such control as to meet the exigencies of the case in this, that the hoop-driver bears upon the outer edge of the hoop in driving same, and is also of such form as is adapted to strike the end of the barrel after the hoop is driven for the purpose of restraining the barrel to place during the removal of the stave-compressor, so that the hoops may be driven flush with the ends of the staves, or if it is desired that an edge project the device may be arrested at the desired point by means of an automatic device or by operating the lever controlling the operative mechanism, and if it is desired, that an edge of the hoop project and also desired that the hoop-driver strike the end of the barrel such result can be accomplished when the hoop-driver is grooved so as to accommodate the edge of the hoop to the extent it is desired to project, so that the driver may be made to strike the end of the barrel when the hoop is driven completely flush by using a flat-surface plate, or when but partially driven by using a grooved plate, it being obvious that the operation of the machine may be so controlled as that it may be made to strike the end of the barrel after the hoop is driven, and may not, at the will of the operator; and when used in the combination of devices described and shown it is my intention to describe and claim the separate features, first, of driving the hoop by bearing upon its outer edge, and, second, that of its form, so adapted as to strike the end of the barrel when the hoop is driven for the purpose of restraining it during the retraction of the compressor, so as to leave the option with the operator to drive the hoops by means of a flat-surface plate, a grooved plate, or a device of any other form bearing upon its outer edge, and to so select and operate the device as that it may drive the hoop partially or flush and with or without striking the end of the barrel, but with its form admitting of this latter feature, thereby enabling the operator to perform as many different functions with one form of device as it is possible, and thus meet exigencies not warranting the removal of the form of device then in operation, and the selection of the form particularly adapted to

meet such exigency from the various styles and classes of hoop-drivers of the described forms that he may have ready at hand, and which may be attached and removed as the class of work may demand and the volume warrant.

The distinguishing features between the machine shown in Fig. 1 and that shown in Fig. 7 are mainly structural, the former being of upright and the latter of horizontal form; but it will be seen that there are advantages found in one not common to the other, and the selection of form will depend upon the variety, class, and volume of work, the machine shown in Fig. 1 being more desirable where floor-space is limited and the variety of work large, and in such case, and especially where the machine is provided with several classes of hoop-drivers arranged to be interchanged or removed and attached as the variety of work may demand, is the upright form desirable, and it will also be observed that where the hoop-driver is of such form as to strike the barrel inside of the chime-hoop Fig. 1 is peculiarly adapted for its operation in that manner, because in Fig. 7 no bottom plate 15 can be used, but instead thereof a small cradle 28 is used to support the barrel, and it is only where a bottom plate 15 or a grooved bottom plate resting on a platform is used that the hoop can be driven by means of a device bearing upon the end of the barred inside the hoop, because such plate in bearing upon the end of the barrel forces the barrel into the hoop resting on the platform underneath either completely, as would be the case where no plate was used, or so as to leave an edge projecting if plate 15 or a grooved plate were used. Beyond this variation in the manner of usage the difference is but structural and the application and combination of the devices is common to both forms.

Having thus described my invention, what I claim as new and of my invention is—

1. The combination in a barrel-hooping machine of an independently-mounted stave-compressing device, operated by independent motive mechanism adapted to lower and raise the same independently, of a form adapted to encircle the outside of the barrel and uniformly compress the staves about the head in downward movement upon the barrel, and an independently-mounted hoop-driving device operated by independent motive mechanism, adapted to lower and raise the same independently of and separately from the stave-compressor or its motive mechanism, of a form adapted to bear upon the outer edge of the hoop in driving same, and strike the end of the barrel after the hoop is driven, for the purpose of holding the barrel to place during the retractive movement of the stave-compressor without displacing the hoop, together with suitable mechanism for such independent operation of each device, suitable framework for support and means for operating the mechanism, substantially in the manner and as and for the purpose as shown and described.

2. In a barrel-hooping machine the combination of stave-compressing device 2, in the form of a solid ring of suitable diameter, width, and thickness, mounted in a manner adapted for reciprocation with suitable mechanism for the independent operation thereof reciprocatively, for the purpose of compressing the staves about the head of the barrel in downward movement, and hoop-driving device 10, in the form of a plate or platen of sufficient diameter to bear upon the outer edges of the hoop in driving same, and adapted to strike the end of the barrel after the hoop is driven, for the purpose of holding the barrel while the stave-compressor is withdrawn, without displacing the hoop, mounted in a manner adapted for reciprocation, with suitable mechanism for the independent operation thereof reciprocatively, together with suitable framework for supporting each device and its mechanism, and suitable means of operation for the independent mechanism attached to each form of device, substantially as shown and described.

3. In a barrel-hooping machine, the combination of stave-compressor 2, mounted in a manner adapted for reciprocative movement upon screws 1, 1, of a form adapted to uniformly compress the staves about the head by its downward movement for the purpose of driving a hoop upon the end of the barrel, while so compressed, and hoop-driver 10, mounted in a manner adapted for reciprocative movement upon screw 6, of a form adapted to drive the hoop by bearing upon its outer edge and strike the end of the barrel when the hoop is driven, for the purpose of holding the barrel without displacing the hoop during removal of stave-compressor, together with means for operating the screws attached to each form of device, suitable framework for support thereof respectively, and suitable mechanism for the operation of each device independently of the other, for the purpose and in the manner substantially as shown and described.

4. In a barrel-hooping machine, the combination of stave-compressor 2, of a form adapted to encircle the outside of the barrel and compress the staves uniformly about the head in downward movement, mounted for reciprocative movement upon screws 1, 1, together with cones 3 with means for the operation and control thereof, and hoop-driver 10, of a form adapted to drive the hoop by bearing upon the outer edge thereof, and strike the end of the barrel after the hoop is driven, mounted for reciprocative movement upon screw 6, provided with nut 7, and rod 29 passing through cross-bar 8, stop-nut 17 adapted to disengage cones 9 and 12 at a predetermined point in descent, and stop-nut 19 adapted to strike pins 20 and disengage said cones 9 and 12 at a predetermined point in

ascent of said hoop-driver, means for the operation and control thereof, suitable framework for support, and suitable mechanism for the operation and control of stave-compressor 2 reciprocatively and independently of the hoop-driver, and for the operation reciprocatively, and control of the hoop-driver independently of the stave-compressor, for the purpose of operating each device singly, or both simultaneously, in one direction, or both devices simultaneously in opposite directions, at the will of the operator, substantially in the manner described and shown.

5. In a barrel-hooping machine, the combination of a barrel-centering device mounted in a manner adapted for independent reciprocation, of a form adapted to encircle the outer diameter of the barrel, for the purpose of centering same for driving the hoops, in downward movement, and an independently-operated hoop-driving device, mounted in a manner adapted for reciprocation, of a form adapted to drive the hoop by bearing upon the outer edge thereof, and strike the end of the barrel after the hoop is driven, for the purpose of holding the barrel to place without displacing the hoop, during the retraction of the centering device, together with suitable framework for support, suitable operative mechanism attached to each form of device, and suitable means for operating the mechanism independently, substantially for the purpose as shown and described.

6. In a barrel-hooping machine, the combination of a stave-compressing device mounted in a manner adapted for reciprocation, of a form adapted to encircle the outside of the barrel and uniformly compress the staves about the head thereof in downward movement, together with suitable mechanism for the independent operation thereof reciprocatively, and a barrel-restraining device of a form adapted to bear upon the end of the barrel after the staves are compressed, for the purpose of restraining the same during the removal of the stave-compressor, mounted in a manner adapted for reciprocative movement, together with suitable mechanism for such reciprocative and independent movement, suitable means for operating the mechanism, and suitable framework for support.

In testimony whereof I have hereunto set my signature in the presence of two witnesses.

ALEXANDER T. S. ROEBLING.

Witnesses:
ARTHUR KLINE,
C. SPENGEL.