Dec. 1, 1925. 1,564,043

E. F. BEUGLER

HEADING HOLDER FOR BARREL MAKING MACHINES

Filed Feb. 16, 1922 4 Sheets-Sheet 1

Fig. 1.

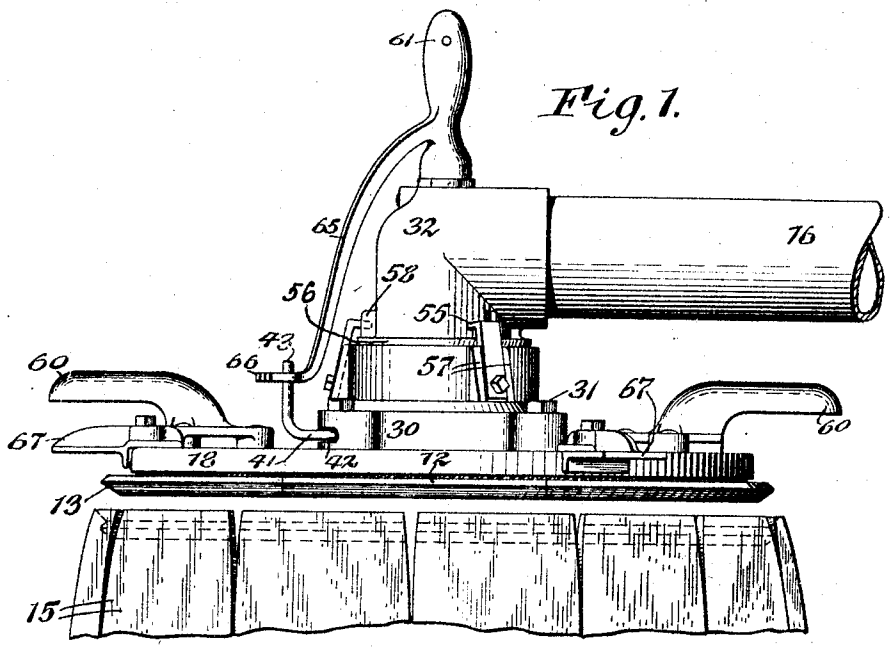
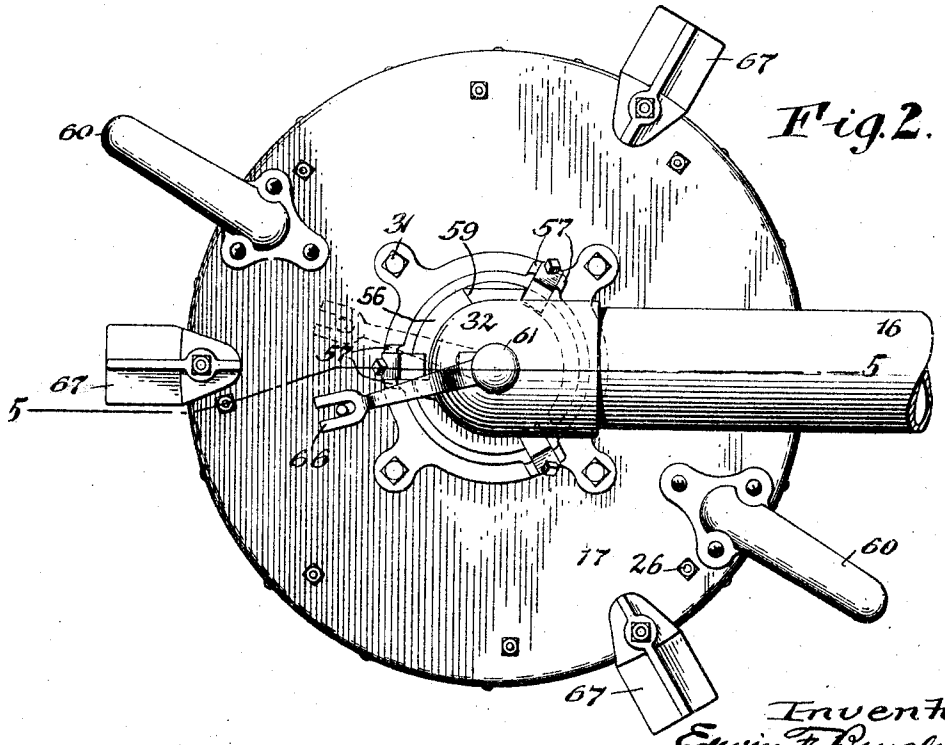


Fig. 2.



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Fig.3.

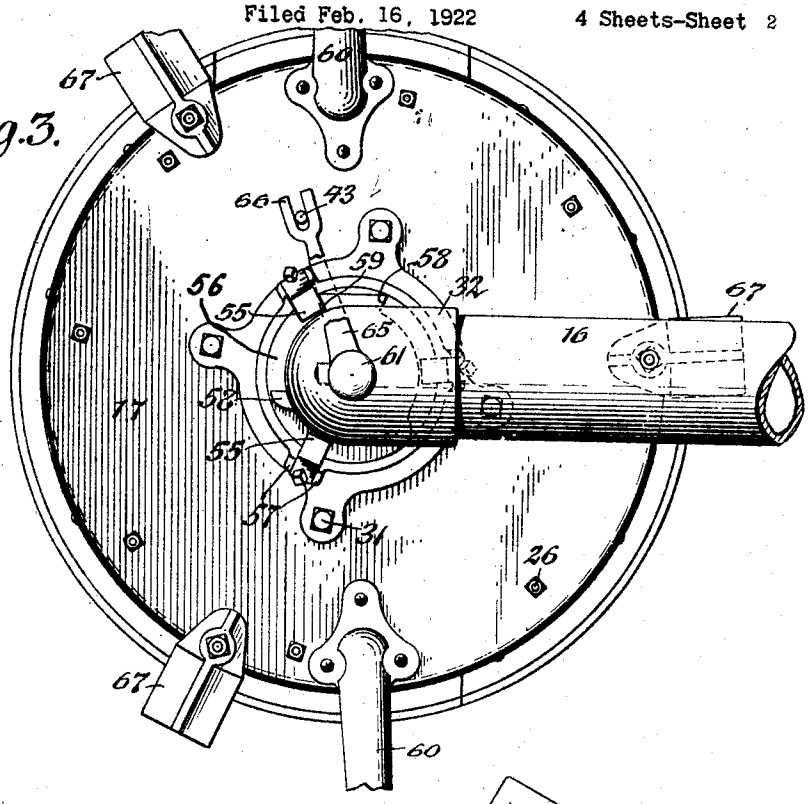
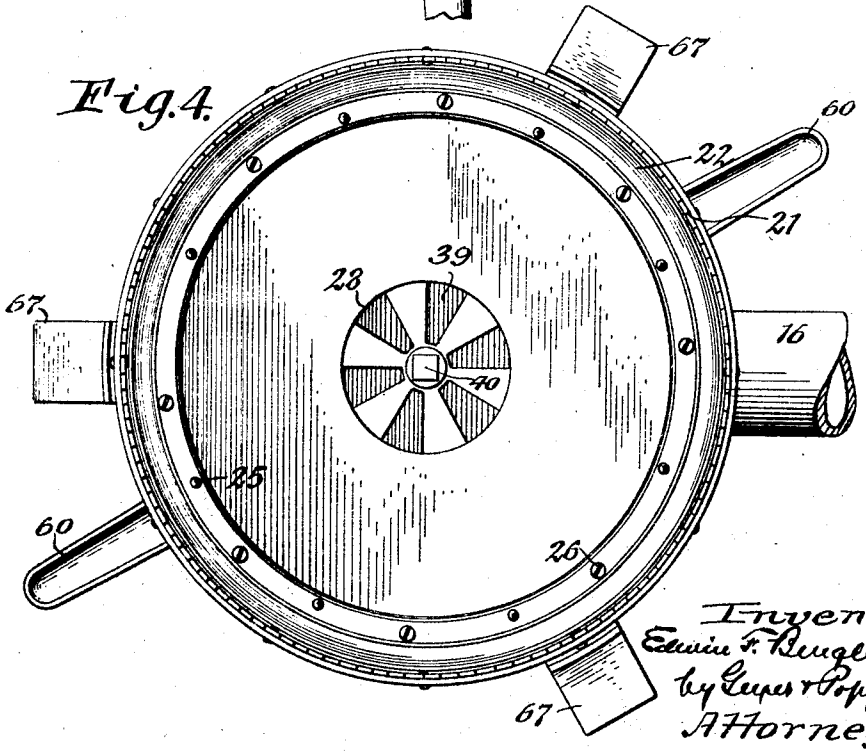


Fig.4.



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Filed Feb. 16, 1922 4 Sheets-Sheet 3

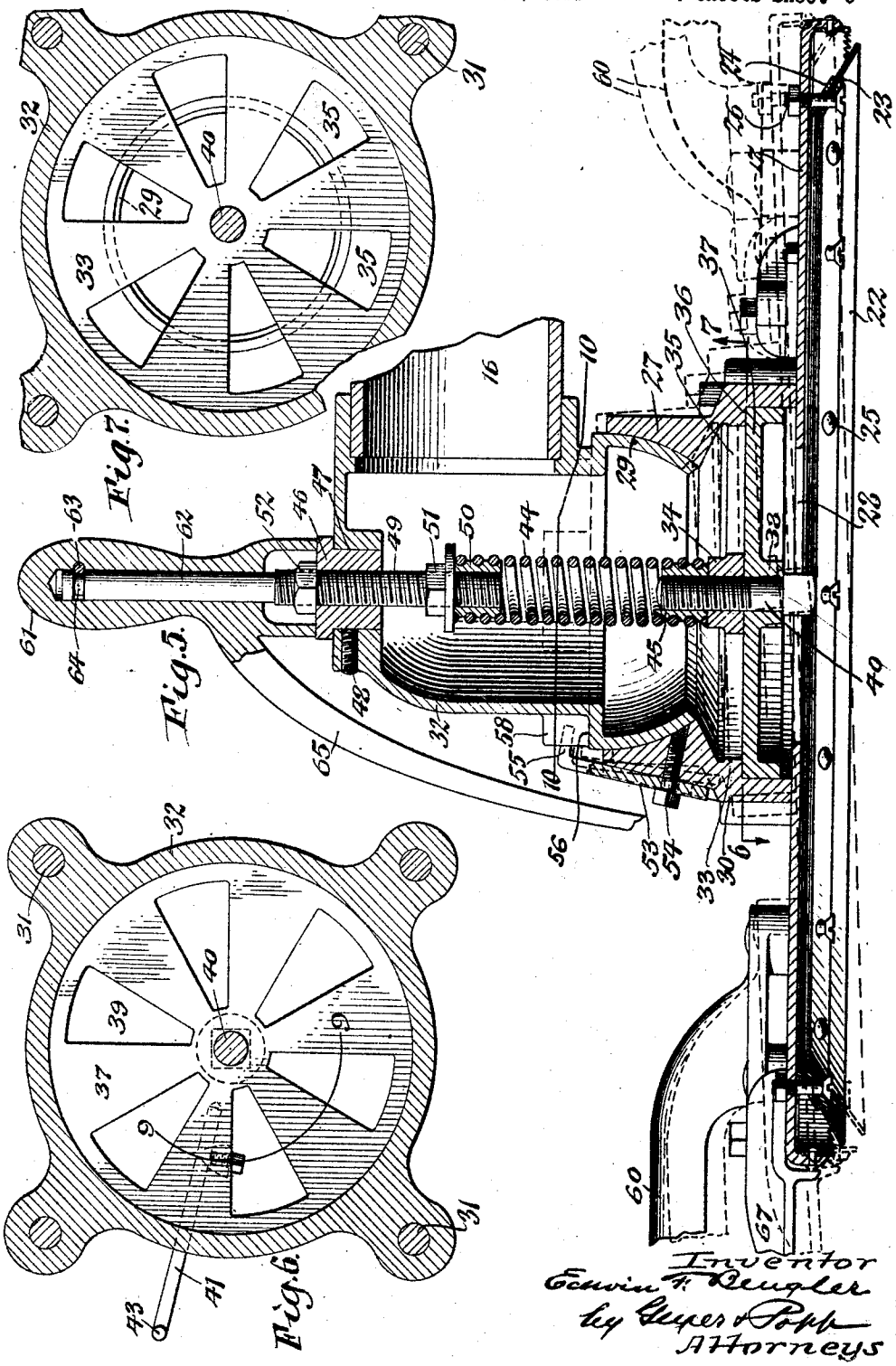


Fig. 7.

Fig. 5.

Fig. 6.

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HEADING HOLDER FOR BARREL MAKING MACHINES

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Fig. 8.

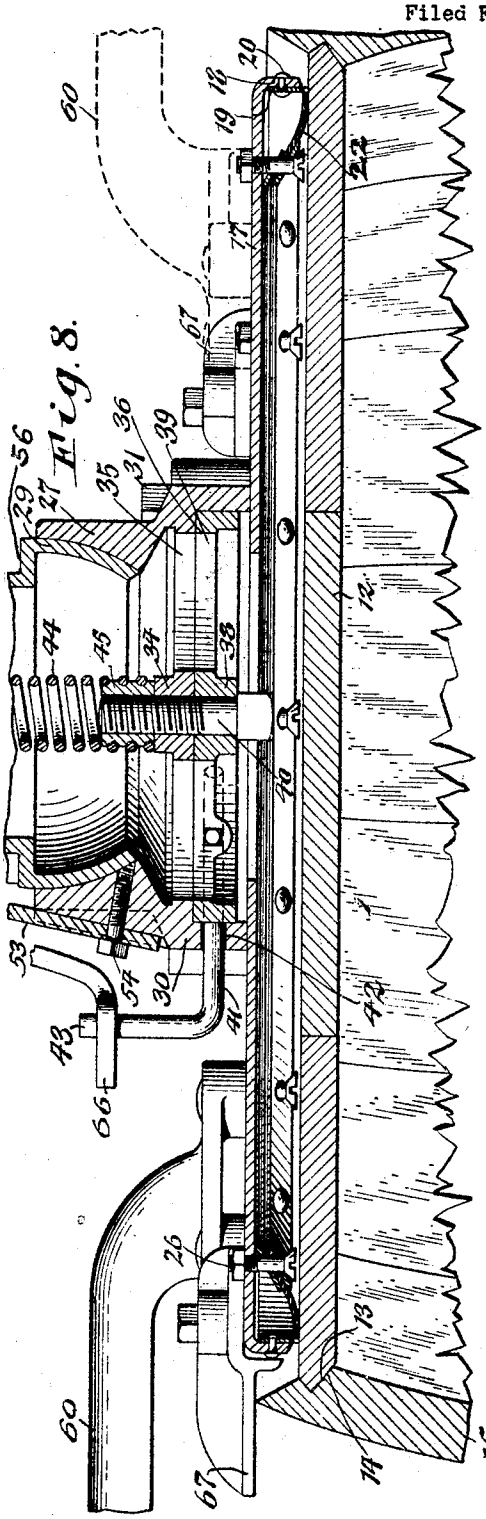


Fig. 10.

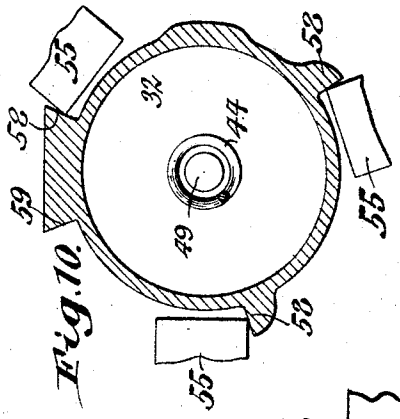


Fig. 11.

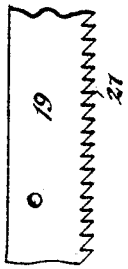
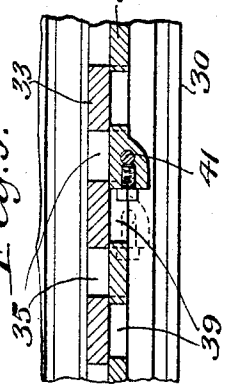


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWIN F. BEUGLER, OF BUFFALO, NEW YORK, ASSIGNOR TO E. & B. HOLMES MACHINERY COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

HEADING HOLDER FOR BARREL-MAKING MACHINES.

Application filed February 16, 1922. Serial No. 537,102.

To all whom it may concern:

Be it known that I, EDWIN F. BEUGLER, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Heading Holders for Barrel-Making Machines, of which the following is a specification.

This invention relates to a pneumatic gripper which is more particularly designed as a head holder or gripper for inserting barrel heads into the chines at opposite ends of the staves thereof which machines are generally known in the trade as "heading up machines" but the same may also be used to advantage for holding or gripping other articles.

It is the object of this invention to provide an apparatus for this purpose which will securely hold an article for example a barrel head and permit of readily, rocking and turning the same so that it will enter the chine of the staves easily, which can be conveniently manipulated with a minimum expenditure of labor and which has a minimum number of parts so organized that they are not liable to get out of order while in use.

In the accompanying drawings:

Figure 1 is a side elevation of my improved gripper or holder adapted for heading up machines showing a barrel head supported thereby preparatory to introducing the same between the ends of the staves at one end of the barrel. Figure 2 is a top plan view of the same with the barrel head and staves omitted and showing the position of the suction chamber while the same is at rest and before being engaged with the barrel head. Figure 3 is a similar view showing the position of the suction head relative to the suction pipe when a barrel head has been gripped and turned about the axis of the suction chamber for causing the same to enter the chines in the staves more easily. Figure 4 is a bottom plan view of the holder or gripper of the heading up machine embodying my invention. Figure 5 is a vertical section of the same, taken on line 5—5, Fig. 2, on an enlarged scale, and showing the position of the parts before the barrel head is gripped by the holder. Figures 6 and 7 are horizontal sections taken on line 6—7, Fig. 5, looking downwardly and upwardly, respectively. Figure 8 is a view similar to Fig. 5 and showing the position of the parts assumed when gripping a barrel head for introducing the latter into the chine of the barrel staves. Figure 9 is a fragmentary section taken on line 9—9, Fig. 6. Figure 10 is a fragmentary horizontal section taken on the correspondingly numbered line in Fig. 5. Figure 11 is a fragmentary elevation of the gripping band or ring of the gripper which is arranged on the suction chamber and adapted to engage the barrel head.

Similar characters of reference refer to like parts throughout the several views.

In the accompanying drawings the gripper forming the subject of this application is shown in connection with a barrel head for inserting the latter into a chine within the staves forming the body of the barrel but it is to be understood that this gripper can be used for holding various articles.

The general purpose of this gripper in a barrel making machine is to grasp the barrel head 12, which is either made in one piece or a plurality of sections, from a pile of such heads and engage the chamfered peripheral edge 13 of this head with the annular chine or groove 14 formed on the inner side of the staves of the barrel at the ends thereof preparatory to drawing these staves together and holding the same firmly in engagement with the head by means of hoops which are driven on to the exterior of the staves in any suitable and approved manner.

In its general organizaiton my improved holder or gripper comprises a suction chamber which is adapted to engage its open underside with the top of the barrel head or other article to be gripped and become attached thereto by vacuum pressure which is produced by exhausting air from the interior of the suction chamber through the medium of a suction pipe which is connected with the suction chamber and with an exhausting device whereby the air is withdrawn from the interior of this chamber, a valve being provided for connecting and disconnecting this suction chamber with the suction pipe and thus permit of either gripping or releasing the barrel head. The suction pipe 16 is mounted in the machine so that the same is capable of rising and fall-

ing and also moving horizontally from a stack of barrel heads to the position where these heads are introduced into the previously assembled staves of the barrels. The means whereby the suction pipe is thus supported and air exhausted therefrom may be of any suitable construction and form no part of the present invention.

In the preferred construction, the suction pipe 16 is arranged horizontally, but if desired, this may be otherwise arranged. The suction chamber is preferably constructed of a sheet of metal so as to form a horizontal top or plate 17 and an annular flange or rim 18 which depends from the margin of this top and is preferably formed integrally therewith by stamping or otherwise. Within this flange or rim is arranged a gripping ring 19 which has its upper part secured to this rim by means of rivets 20 while its lower edge is provided with an annular row of teeth or serrations 21. This gripping ring is preferably constructed of a piece of steel resembling a band saw and each of its teeth has one of its sides arranged abruptly while its opposite side is arranged on an incline, as best shown in Fig. 11. By lowering the suction chamber upon a barrel head these teeth of the gripping ring engage the upper side thereof and obtain a sufficiently firm hold thereon so as to compel the barrel head to turn about a vertical axis and thereby facilitate the introduction of the same into the chine of the barrel staves, this grip being further improved by making one side of the teeth abrupt which enables the same to obtain a better hold on the head and insure turning of the latter when the suction head is moved toward that side of these teeth on which the abrupt sides are arranged, which is the case when turning a barrel head about its axis for causing its chamfered edge to enter the chine of the barrel staves.

In order to cause the barrel head to become firmly attached by vacuum to the suction chamber when air is exhausted from this chamber while the same is applied to a head, sealing means are provided between the marginal portion of the suction head and the barrel head adjacent to the inner side of the gripping ring which sealing means are preferably constructed as follows:

22 is a sealing flap or a gasket of flexible material such as rubber, which is mounted on the underside of the top of the suction chamber and is adapted to bear against the top of the barrel head. This sealing flap is preferably of downwardly flaring conical form when taken as a whole, and has its lower edge arranged adjacent to the teeth of the gripping ring while its upper edge is supported upon the suction chamber top by arranging this upper edge between lower and upper supporting rings 23, 24, of metal which are connected together and secured to opposite sides of the sealing flap or ring by means of rivets 25 and which are supported on the suction chamber together with the sealing ring by means of bolts 26 passing through the supporting rings 23 and 24 and the sealing ring 22 and the top of the suction chamber, as best shown in Figs. 5 and 8. When the head holder or gripper is not in use the lower outer edge portions of the sealing ring or flap is arranged below the lower ends of the gripping teeth on the suction head, as shown in Fig. 5, but when this holder or gripper is applied to the upper side of the barrel head so that its gripping teeth engage therewith, then the outer edge portion of the sealing ring is deflected upwardly to a position flush with the underside of the gripping teeth, as shown in Fig. 8, whereby a practically air tight joint is formed between the suction chamber and the barrel head so that the barrel head will be reliably held in the suction chamber by vacuum due to exhaustion of the air from the interior of the suction chamber. This flexible sealing flap adapts itself to any irregularities on the upperside of the barrel head so that a practically tight joint is produced between the suction chamber and the barrel head, notwithstanding such uneven surfaces, and thus insures a firm hold of the gripper on the head so that the latter can be properly transported and manipulated for inserting the same into the barrel staves. This suction chamber is mounted on the suction pipe 16 so that the same is not only compelled to move bodily therewith between the stack of barrel heads and the place where the barrels are headed up, but the same is also capable of rocking vertically on the suction pipe and also turning about a vertical axis relatively thereto for the purpose of adapting the barrel head to the staves and working the same into the chine thereof.

For this purpose a hollow ball and socket joint is provided which forms part of the means for connecting the suction chamber with the suction pipe which joint preferably comprises a lower hollow ball socket 27 which communicates at its lower end with the interior of the suction chamber which latter is provided for this purpose with an opening 28 on the central part of its top, and a hollow ball 29 which engages with the ball socket 27, as best shown in Figs. 5 and 8. The ball socket 27 is preferably formed on the upper part of the casing 30 of a valve which controls the communication between the interior of the suction chamber and the ball socket and which will be described more fully later on, this valve casing engaging the upper side of the central part of the suction chamber top 17 and secured thereto by means of bolts 31 and

communicating at its lower end with the interior of the suction chamber through the medium of the opening 28 of the latter. The ball 29 of the ball and socket joint is preferably arranged at the lower end of the hollow dome 32, which latter communicates on one side of its upper part with the exhaust pipe 16 with which it is connected in any suitable manner.

By means of this joint the suction chamber is capable of rocking vertically as well as turning horizontally in order to work the barrel head carried thereby, into the chine of the staves before contracting the latter and holding the same in place by means of the usual barrel hoops. Within the valve casing 30 the same is provided with a horizontal partition 33 which is provided with a central hub 34 and an annular row of air ports 35 arranged around this hub. On its underside this partition is provided with a valve seat 36 which is engaged by a rotary valve 37 of disk form having a central hub 38 and a plurality of ports 39 which are arranged in an annular row so that when this disk valve is turned into a position in which its ports register with those of the valve casing, as shown in Fig. 8, communication will be established between the suction pipe and the interior of the suction chamber, so that a vacuum will be produced in the latter and a barrel head which is engaged by the suction chamber will be firmly gripped thereby, while upon turning this disk valve into such position that its ports are not in register with those of the valve casing, as shown in Fig. 5, then the suction of the pipe 16 will be cut off from the interior of the suction chamber, thereby releasing the grip of the latter on the barrel head and permitting the same to be separated after the barrel head has been inserted within the chine of the staves. The valve disk is rotatably supported for this purpose by means of a bolt which passes with its shank 40 through the hub of the disk valve and engages its threaded upper end with the hub 34 of the valve casing while its head bears against the underside of the hub 38 of the disk valve, as best shown in Figs. 5 and 8. The rotation of this disk valve is preferably effected by means of a handle having a horizontal portion 41 extending through a circumferential slot 42 formed in the wall of the valve casing and secured at its inner end to the disk valve while its outer end is provided with an upwardly turned finger piece 43.

Spring means are provided with are preferably so organized that they serve the function of holding the ball and socket members of the joint firmly in engagement with each other, also serve to hold the suction head yieldingly in its normal horizontal position so that the same may be rocked vertically for adapting the head to the staves, but return the suction head to its normal position, and also permit the suction head to be turned forwardly about a vertical axis for working the edge of the barrel head by a screw action into the chine of the staves and then return the head to its normal position.

In the preferred organization of this mechanism, a helical spring 44 is employed which is arranged vertically within the valve chamber, dome and the hollow ball and socket and has its lower end secured to a screw nut 45 which is secured to the upper threaded end of the pivot bolt 40 while its upper end is preferably adjustably connected with the top of the dome so that the tension of this spring may be adjusted in order to obtain the required longitudinal pull and also the torsional action and the lateral resisting effect necessary to accomplish the several purposes just described. In the preferred form of this spring adjusting device, the same comprises an upright sleeve 46 which has its periphery journaled in a bearing 47 in the top of the dome 32, so that this sleeve may be turned therein into different positions, a set screw 48 arranged in the adjacent part of the dome and adapted to engage the periphery of the adjusting sleeve 46, a tension rod 49 having an intermediate screw threaded portion which engages with the threaded bore of the sleeve 46, an attaching screw nut 50 arranged on the lower part of this screw 49 and connected with the upper end of the spring 44, a clamping nut 51 arranged on the lower part of the screw 49 and engaging with the upper end of the attaching nut 50 and a clamping screw nut 52 arranged on the upper part of the adjusting screw and engaging with the upper end of the adjusting sleeve 46. By turning the screw 49 in the sleeve 46, the spring 44 may be stretched lengthwise until the required tension is produced in the same for holding the socket 27 in proper engagement with the ball 29 of this joint, after which the upper clamping nut 52 may be tightened for preventing this screw from turning within the sleeve 46. Thereafter this sleeve may be turned within its bearing 47 in order to produce the required torsional action of the same which will tend to turn the suction head backwardly on a vertical axis after the same has been turned forwardly during the operation of inserting a head in the staves of a barrel and after such torsional adjustment of this spring has been effected, the sleeve is again held in place by means of said set screw 48. The stock from which the spring 44 is made should be sufficiently strong and resilient so that the lower part of this spring may be deflected laterally in any direction and possess sufficient resilience

to return the suction head to its normal central horizontal position after such deflection.

The rocking motion of the suction head and the parts connected therewith is limited by a stop device which preferably consists of a plurality of stop plates 53 arranged in an annular row and in spaced relation around the periphery of the ball socket and secured at their lower ends thereto by means of bolts 54 while their upper ends are provided with inwardly projecting lugs 55 which overhang a stop ledge 56 on the top of the ball and thus serve to limit the rocking motion of the suction head. To prevent displacement of these stop plates and hold the same in an upright position, the lower part of each of these is arranged between two retaining lugs 57 arranged on the adjacent part of the ball socket, as best shown in Figs. 1, 2 and 3. The backward rotation of the suction head under the resilience of the spring 44 is limited by engagement of the stop lugs 55 with a plurality of stop lugs 58 arranged in a circumferential row on the adjacent parts of the exterior of the dome 32 and the hollow ball 29. The forward turning movement of the suction chamber during which the operator works the barrel head with a screw action into the chine of the staves and increases the torsional tension upon the spring 44 is limited by engagement of one of the stop lugs 55 with a stop face 59 on the exterior of the dome 32 and ball 29, as shown in Fig. 3, thereby preventing undue straining of this spring which otherwise might injure the same and cause its failure to return the suction chamber back into its normal position. The turning of this suction head for working the barrel head into the chine of the staves is preferably effected by means of handles 60 secured to the upper side of the right and left hand portions of the suction chamber as indicated in Figs. 1, 2, 5 and 8. One of the hands may manipulate the air controlling valve and also the position of the suction pipe 16 with reference to the stack of barrel heads and the heading up position. In order to permit one of the hands to operate the air valve and also shift the gripper or holder conveniently into its various positions, a handle 61 is provided which is operatively connected with the dome 32 and also with the air valve. In the preferred construction shown in the drawings, this handle is rotatably mounted on an upward extension 62 of the screw 49 so that this handle is capable of turning about a vertical axis, this handle being preferably retained on this extension or spindle by means of a pin or key 63 passing through the same and into engagement with a circumferential groove 64 in the periphery of the stem 62. The coupling of this handle 61 with the air valve is preferably effected by providing this handle on one side with a laterally and downwardly extending arm 65, the lower end of which is constructed in the form of a fork 66 which straddles the finger piece 43 of the handle whereby the air valve is operated, as best shown in Figs. 1, 2, 3 and 8. By grasping the handle 61 the operator can raise or lower the gripper as a whole, for adapting the same to the stack of barrel heads and also to the staves of the barrel into which the same are to be inserted, and by turning the handle 61 this movement may be transmitted to the valve disk 37 so as to turn the air suction on to the suction head and cause the latter to grip the barrel head as well as to close this valve for cutting off this suction and permitting the suction chamber to release its grip upon the barrel head.

In order to enable the operator to depress the suction head the proper distance within the staves of the barrel for the purpose of bringing the barrel head into alinement with the chine of the staves, a plurality of gage lugs 67 are provided which are secured to the upper side of the suction chamber and project laterally therefrom, at different points of the periphery thereof, so that these gage lugs engage with the upper edges of the barrel staves, as shown for example in Fig. 8.

In the use of this head holder or gripper for barrel making machines, the operator moves the suction chamber toward the stack of barrel heads while the air valve is closed, during which time the operator directs the movement of the head holder by grasping the handle 61. As the holder reaches the position over the heading stack the operator depresses the holder upon the upper side of the uppermost head of the stack whereby the serrated edge of the suction chamber engages the heading and the flexible sealing flap or gasket is deflected upwardly from the position shown by full lines in Fig. 5 to the position shown by full lines in Fig. 8. After the holder has been thus engaged with the heading, the operator turns the air valve by means of the handle 61 which is coupled with the handle of the air valve, so that this valve is opened and the exhausting action through the pipe 16 produces a vacuum within the suction chamber and causes the uppermost heading of the stack to adhere to the holder. The latter is now moved away from the stack together with the heading which is pneumatically gripped thereby and then the holder is lowered into the staves of the barrel while the upper ends of the latter are still separated, this downward movement of the holder being arrested by engagement of the gages 67 with the upper edges of the staves. If the heading which is gripped by the holder does not pass downwardly

freely between the staves and enter the chine, such engagement of the heading to the staves is effected by rocking the same vertically, or turning the heading about a vertical axis or by a combination of these movements, as best suits the particular heading which is being manipulated. After the heading has been placed within the barrel staves and in line with the chine thereof, the staves are contracted in the usual and well known manner and held against the head by driving a hoop around the same.

Thereafter the operator turns the air valve in the direction in which the vacuum in the suction chamber is broken by cutting off communication between this chamber and the suction pipe and slightly tilting this chamber whereby the same may be removed from the head within the barrel and carried to the stack of heading preparatory to beginning another cycle of operations.

This holder or gripper is very flexible in its operation and permits of conveniently handling and inserting heading within the staves of a barrel easily and expeditiously thereby materially reducing the cost of manufacturing barrels of this character.

I claim as my invention:

1. A pneumatic gripper comprising a suction chamber which is adapted to be connected with an air exhausting device and which is provided on its margin with a depending flange, and an annular ring having its upper part secured to said flange and provided at its lower edge with serrations adapted to engage with the article to be gripped.

2. A pneumatic gripper comprising a suction chamber which is adapted to be connected with an air exhausting device and which is provided on its margin with an annular row of serrations adapted to engage the article to be gripped, each tooth of said serrations being abrupt on one side and inclined on the other side.

3. A pneumatic gripper comprising a suction chamber adapted to be engaged with and rotate the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a hollow ball socket secured to the top of said chamber, a hollow ball secured to said pipe and engaging with said socket, and means for limiting the rotary movement of said ball and socket relatively to each other about the axis of said chamber.

4. A pneumatic gripper comprising a suction chamber adapted to be engaged with and rotate the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a hollow ball socket secured to the top of said chamber, a hollow ball secured to said pipe and engaging with said socket, and means for limiting the rocking movement and the rotary movement of said ball and socket relatively to each other about the axis of the chamber.

5. A pneumatic gripper comprising a suction chamber adapted to be engaged with, rotate and rock the article to be gripped, a suction pipe adapted to be connected with an exhaust device ,a hollow ball socket secured to the top of said chamber, a hollow ball secured to said pipe and engaging with said socket, and means for limiting the rocking movement and the rotary movement of said ball and socket relatively to each other about the axis of the chamber comprising a plurality of stop lugs arranged at intervals circumferentially on the exterior of said ball, an annular ledge arranged on the exterior of the ball, and a plurality of plates secured at their lower ends to the exterior of the socket at intervals circumferentially thereof and provided at their upper ends with inwardly projecting stop lugs which are adapted to engage the stop lugs on said ball and with said ledge.

6. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, and a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case.

7. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, and a helical spring having a fixed end and connected at its opposite free end to said disk valve and adapted to have its free end deflected and also adapted to be subjected to a torque action.

8. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, a hollow ball socked arranged above said valve case, a hollow ball engaging with said socket and connected with said pipe, and a spring for yielding holding said valve against said seat, also holding said socket against said ball and also yieldingly holding said socket against rocking and turning on said ball.

9. A pneumatic gripper comprising a suc-

tion chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, and a handle projecting laterally from said valve through said casing.

10. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, a hollow ball socket arranged above said valve case, a hollow dome connected on its upper part with said pipe and provided on its lower part with a hollow ball engaging with said socket, and a helical spring arranged within the valve case, socket, ball and dome and connected at its lower end with said valve and at its upper end with said dome.

11. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, a hollow ball socket arranged above said valve case, a hollow dome connected on its upper part with said pipe and provided on its lower part with a hollow ball engaging with said socket, a helical spring arranged within the valve case, socket, ball and dome and connected at its lower end with said valve, and means for adjustably connecting the upper end of said spring with said dome.

12. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, a hollow ball socket arranged above said valve case, a hollow dome connected on its upper part with said pipe and provided on its lower part with a hollow ball engaging with said socket, a helical spring arranged within the valve case, socket, ball and dome and connected at its lower end with said valve, and means for adjustably connecting the upper end of said spring with said dome comprising a sleeve rotatably mounted in the top of the dome, a set screw on the dome engaging with said sleeve, an adjusting screw engaging a thread in the bore of said sleeve and connected with the upper end of said spring, and a clamping nut arranged on said adjusting screw and engaging the upper end of said sleeve.

13. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, and a rotary handle operatively connected with said pipe and said valve.

14. A pneumatic gripper comprising a suction chamber adapted to engage the article to be gripped, a suction pipe adapted to be connected with an exhaust device, a valve case secured to the top of said chamber and provided with ports and a valve seat below said ports, a rotary disk valve engaging said seat and having ports adapted to move into and out of register with the ports in said case, a hollow ball socket arranged above the valve case, a hollow dome connected with said pipe and having a hollow ball engaging with said socket, a handle projecting laterally from said valve through said case, and a handle pivotally mounted on said dome and having an arm which is coupled with the valve handle.

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