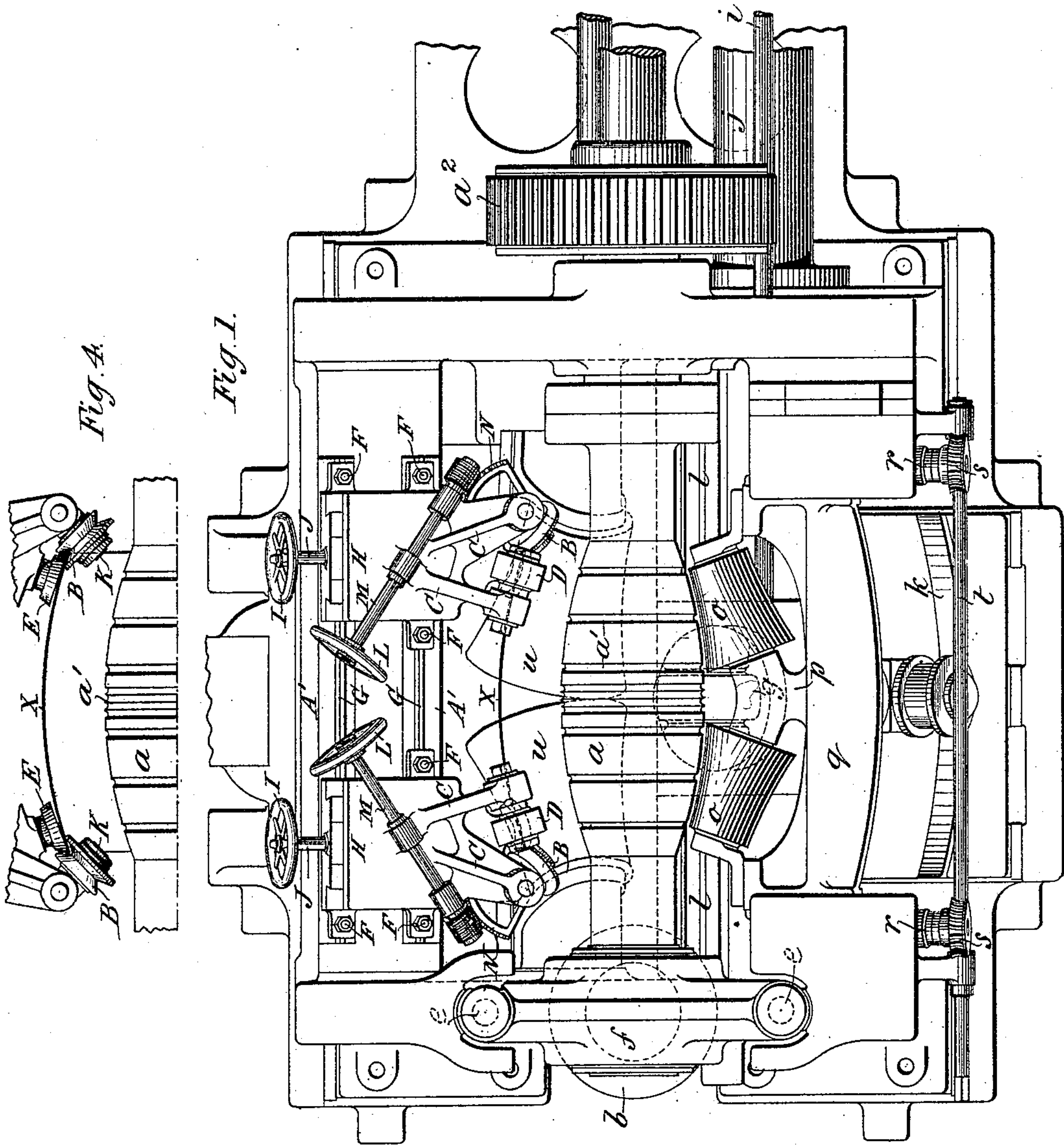


(No Model.)

3 Sheets—Sheet 1.

T. C. BARRACLOUGH.
MACHINERY FOR SHAPING, FINISHING, AND FLANGING METAL BARRELS, &c.
No. 470,737. Patented Mar. 15, 1892.



WITNESSES:

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INVENTOR:

Thomas Critchley Barraclough.

By his Attorneys:

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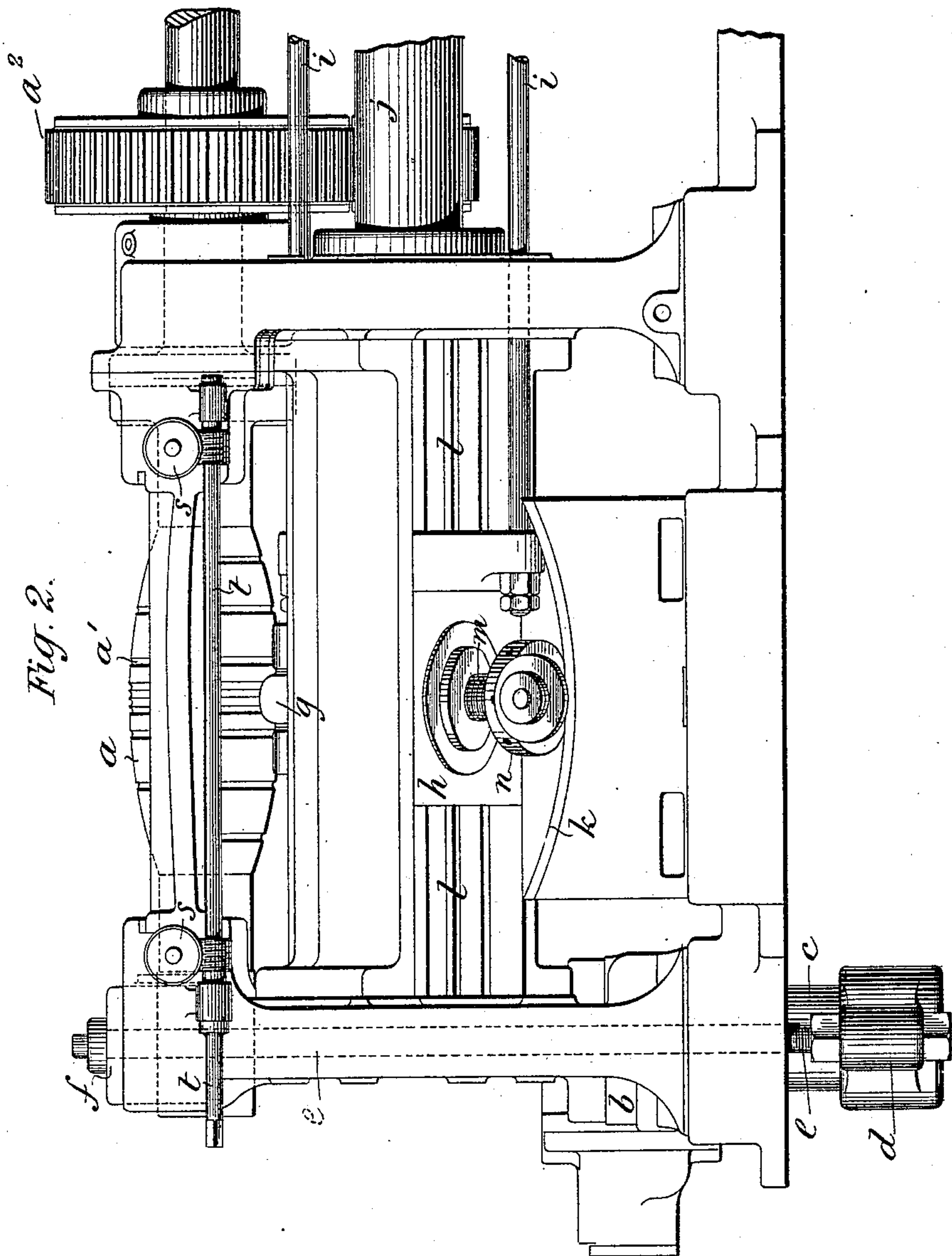
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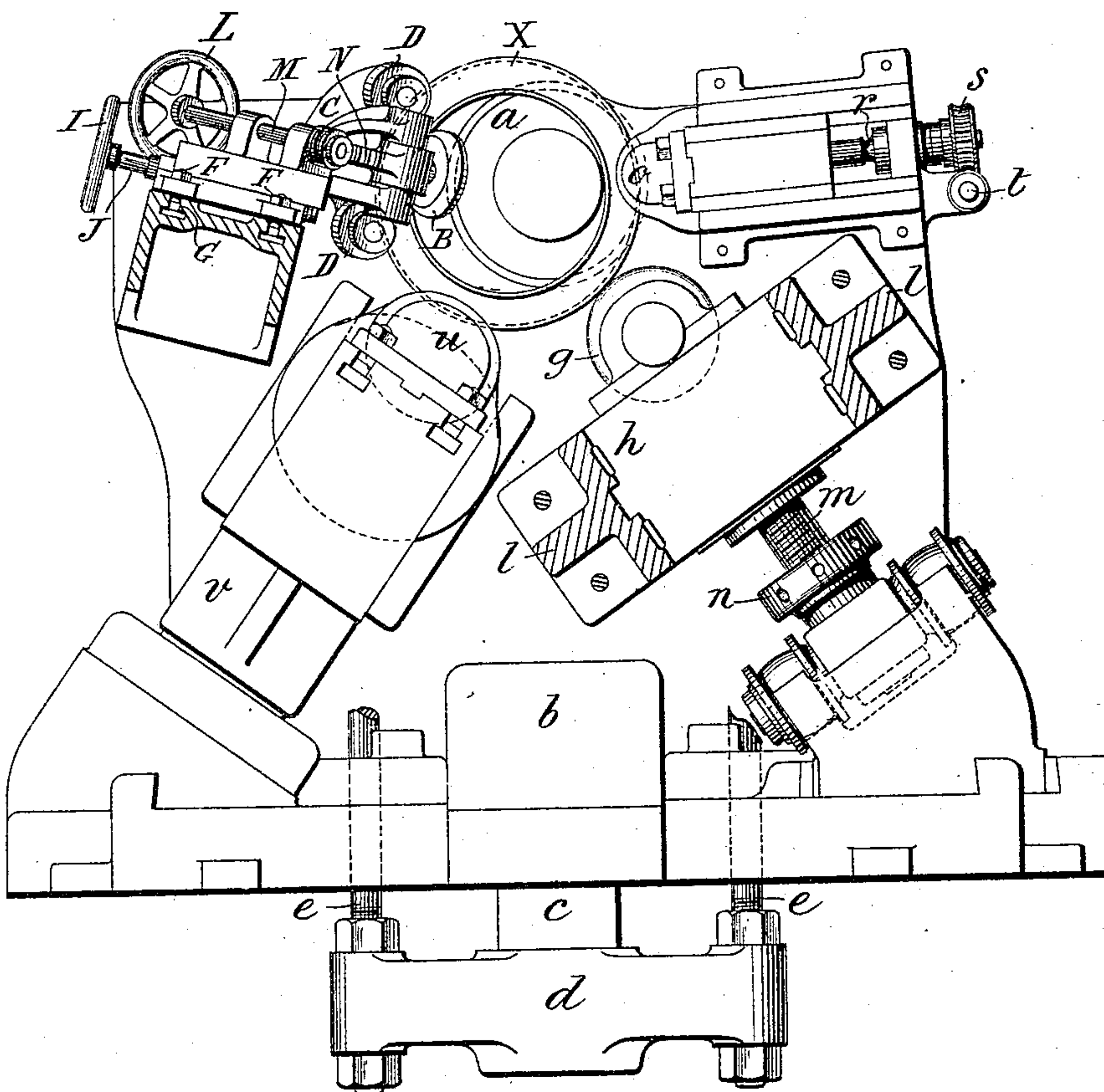
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(No Model.)

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Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS CRITCHLEY BARRACLOUGH, OF LONDON, ENGLAND.

MACHINERY FOR SHAPING, FINISHING, AND FLANGING METAL BARRELS, &c.

SPECIFICATION forming part of Letters Patent No. 470,737, dated March 15, 1892.

Application filed May 11, 1891. Serial No. 392,253. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRITCHLEY BARRACLOUGH, of London, England, have invented certain new and useful Improvements in Machinery for Shaping, Finishing, and Flanging Metal Bodies for Barrels and other Similar Vessels, of which the following is a specification.

My invention has reference to machinery for shaping, finishing, and flanging metal bodies for barrels and other similar vessels, and more particularly when such bodies have internal ribs and have been part formed from a hollow ingot or weldless or a welded tube by rolling on a mandrel and then subsequently expanding into approximately the diameter of a barrel-body. A machine for effecting this expanding operation forms the subject of another application for patent filed May 11, 1891, Serial No. 392,254.

The improvements consist in the combination, with a roller upon which the barrel-body to be operated upon is placed and which has a contour corresponding with that required in the finished body, of a fulling-roller having a reciprocating longitudinal traversing motion for acting upon the barrel-body and imparting to it a contour corresponding with that of the roller which carries it.

The improvements further consist in the combination, with the said roller upon which the barrel-body is placed and with the said fulling-roller, of guide-rollers for the purpose of maintaining the circular shape of the barrel-body.

The improvements also consist in the combination, with the said roller upon which the barrel-body is placed and with the said fulling-roller, of finishing-rollers for removing any roughness or unevenness left on the barrel-body after the action thereon of the fulling-roller.

The improvements also consist in the combination, with the said roller upon which the barrel-body is placed, of apparatus for giving an outwardly-turned flange to each end of the body.

The invention further comprises various subsidiary combinations and improvements, which will be fully understood by the description hereinafter given.

In the accompanying drawings, Figure 1 is

a plan of a machine in which my improvements are embodied. Fig. 2 is a side elevation; Fig. 3, an end elevation, partly sectional; Fig. 4, a detail view showing in elevation the flanging-rollers B B, conical rollers E E, and roller *a*.

I will first describe the shaping and finishing portion of the machine and then the flanging apparatus.

a is a roller, which is shown as convex to correspond with the required swell or belly on the barrel-body; but if the body is to be cylindrical the roller *a* will also be cylindrical. The said roller is shown with circular grooves *a'* for the purpose of completing the formation of a corresponding number of internal ribs in the barrel-body when it has been previously formed with such ribs; but if the barrel-body is plain the grooves *a'* in roller *a* will be dispensed with. It is driven by any suitable engine, the motion from which is transmitted to the toothed wheel *a*² on the roller-shaft.

f is a cap fitting over one of the necks or journals of the roller *a*, and this cap is raised by hydraulic power to enable the barrel-body to be placed upon, and when finished removed from the said roller, and the same power gives the necessary downward pressure when the roller is caused to rotate for the purpose of rolling the barrel-body. The hydraulic power is applied by means of a hydraulic cylinder *b* with piston, the rod *c* of which is cottered on a cross-rail *d*, from which rise two vertical rods *e e*, to which the cap *f* is attached. It will readily be understood that when downward pressure is required for rolling a barrel-body it is obtained by admitting water into the top of the cylinder *b*, and that when the barrel-body is finished and has to be removed from the machine the valves of cylinder *b* are reversed, water being thus admitted to the bottom of cylinder *b*, so that the cap *f* is forced up and the barrel-body can be removed.

g is a fulling-roller attached to a carriage *h*, which receives a reciprocating longitudinal traversing motion through the intermediation of rods *i i* and a cross-head (not shown) from the rod of a piston working in a hydraulic cylinder *j*. This fulling-roller begins to act at the middle of the barrel-body and the hy-

draulic piston in *j* has a gradually-increasing stroke imparted to it until the full length of the barrel-body has been traversed. The fulling-roller carriage *h* is kept concentric with the convex roller *a* by means of a copy or templet *k*, having the same curve or radius, and it is guided during its traverse by slides *l*. The fulling-roller *g* can be adjusted in a direction at right angles to the axis of the barrel-body by means of the screw *m* and capstan-nut *n*. This nut is attached to the carriage *h* and enables this carriage to be raised and lowered, as required.

In order that while the fulling-roller *g* is at work the barrel-body, which is of larger diameter than the convex roller *a*, may maintain its circular shape the machine is provided with guide-rollers *o o*. These are carried on a bracket *p*, fixed to a cross-rail *q*, the whole being adjustable by means of the screws *r r*, which are actuated simultaneously by the worm-shaft *t* and worm-wheels *s s*, being under the control of the attendant, a key or hand-wheel being fitted for the purpose on the end of the said shaft. When the fulling-roller has completed its operations, the outer surface of the barrel-body will be more or less rough in the form of a series of faint grooves. To remove this roughness and give a smooth and even finish to the barrel-body, the machine is provided with finishing-rollers *u u*, having their surfaces shaped to correspond with the surface or contour of the roller *a*. They are kept in contact with the barrel-body by the piston-rods of hydraulic cylinders *v*, and can be moved away from the said body when required by admitting water to the opposite end of the said cylinders.

I will now describe the flanging apparatus to which the barrel-body is submitted after having been shaped and finished, as already explained. This flanging apparatus is duplicated, so as to act on the two ends of the body, and is fitted on that side of the machine where the finishing-rollers *u u* are situated. When the flanging apparatus is required to be put into operation, the rollers *u u* are withdrawn from their working position by admitting water to the upper end of the hydraulic cylinders *v*. The flanging apparatus is carried on the cross-rail *A'* and is composed of V-grooved rollers *B B*, in conjunction with which are conical rollers *E E* for forming a sharp corner underneath the flange when this is completed. The rollers *B B* are mounted on studs *K K* and actuated radially by hand-wheels *L L*, worm-shafts *M M*, and worm-sectors *N N*, all of which are carried on brackets or frames *C C*.

Adjustment of the apparatus in the direction which is parallel to the axis of the barrel-body is obtained by means of the bolts *F F*, which when their nuts are slacked are free to be slid along slots *G G* in the rail *A'*. Adjustment in the direction which is at right angles to the axis of the barrel-body is obtained by means of the dovetail slides *H H*,

which can be moved forward or backward by means of the screws *J J* and hand-wheels *I I*.

The guide-rollers *o o* (already described) are set up to the extent necessary to force the barrel-body against the convex roller *a*, the barrel-body being thus made to revolve. As soon as it begins to revolve, other guide-rollers *D D* on the opposite side are set up until they touch it. After this the V-grooved rollers *B B* are brought into action by the attendant by means of the hand-wheels *L L*, worm-shafts *M M*, and sectors *N N*, and the ends of the barrel-body, which is indicated at *X* in Fig. 1, are thereby bent over and pressed against the conical rollers *E E*, the required flange at each end being thus formed.

The machine should be provided with suitable apparatus—such, for example, as a series of jets burning a mixture of gas and air supplied under pressure—for heating the barrel-bodies during the shaping, finishing, and flanging process.

Instead of employing hydraulic power for bringing the necessary downward pressure upon or for lifting the cap *f* and for moving the finishing-rollers *u u* into and out of their working position, it is obvious that other power—such, for example, as screw-power—can be employed; also, that steam or other fluid pressure can be substituted for hydraulic pressure for imparting the reciprocating motion to the fulling-roller carriage *h*.

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for rolling, thinning, and shaping tubular metal bodies open at both ends for barrels and other similar tubular vessels, the combination, with a receiving-roller upon which the barrel-body to be operated upon is loosely placed, which passes through and is of a less diameter than said body and which has a longitudinal contour corresponding with that required in the finished body, of a fulling-roller constructed to roll the barrel-body between its periphery and that of said receiving-roller and simultaneously to roll said body thinner and into the contour of the receiving-roller constructed to come in contact with the barrel-body and act on it first at its center and then to act against it alternately at the sides of its center to a gradually-increasing extent, said roller having a gradually-increasing reciprocating longitudinal traversing motion from the center toward the two ends alternately of said barrel-body, whereby the body is rolled, thinned, and shaped first at its middle and then in gradually-increasing extent to its ends and during such treatment is rerolled at its middle with each move of the fulling-roller, and a screw and nut or equivalent mechanical device arranged to adjust and set up said fulling-roller to its work on starting and to rigidly maintain it at its work without further adjustment until the fulling process is completed, and means for imparting motion to said fulling-roller, whereby said fulling-

roller imparts to said barrel-body a contour corresponding with that of the roller which carries it and the distortion of any part of the body during the rolling of another part is prevented, substantially as set forth.

2. In a machine for shaping metal bodies for barrels and other similar vessels, the combination, with a roller upon which the barrel-body to be operated upon is placed and a fulling-roller adapted to come in contact with the barrel-body and having a reciprocating longitudinal traversing motion during which it acts upon said barrel-body, of guide-rollers adapted to come in contact with said barrel-body, whereby its circular form is maintained during the shaping operation, substantially as set forth.

3. In a machine for shaping and finishing metal bodies for barrels and other similar vessels, the combination, with a roller upon which the barrel-body to be operated upon is placed and a fulling-roller adapted to come in contact with the barrel-body and having a reciprocating longitudinal traversing motion during which it acts upon said barrel-body, of finishing-rollers adapted to come in contact with said barrel-body, whereby any roughness or unevenness left on the barrel-body after the action thereon of said fulling-roller is removed, substantially as set forth.

4. In a machine for shaping and flanging metal bodies for barrels and other similar vessels, the combination, with a roller upon which the barrel-body to be operated upon is placed and a fulling-roller adapted to come in contact with the barrel-body and having a reciprocating longitudinal traversing motion during which it acts upon said barrel-body, of flanging-rollers adapted to come in contact with the ends of said body and flange the same, substantially as set forth.

5. In a machine for shaping and flanging metal bodies for barrels and other similar vessels, the combination, with a roller upon which the barrel-body to be operated upon is placed, a fulling-roller adapted to come in contact with the barrel-body and having a reciprocating longitudinal traversing motion during which it acts upon said barrel-body, and flanging-rollers adapted to come in contact with the ends of said body and flange the same, of conical rollers working in conjunction with said flanging-rollers and adapted to enter the corner formed underneath each flange, whereby said corner is sharpened, substantially as set forth.

6. In a machine for shaping, finishing, and flanging metal bodies for barrels and other similar vessels, the combination of the following rollers, substantially as set forth and shown, viz: a roller upon which the barrel-body to be operated upon is placed, a fulling-roller adapted to come in contact with the barrel-body and having a reciprocating longitudinal traversing motion during which it acts upon said barrel-body, guide-rollers adapted to come in contact with said barrel-

body and to maintain its circular form, finishing-rollers adapted to come in contact with said barrel-body and to remove any roughness or unevenness left thereon after the action of said fulling-roller, and flanging-rollers adapted to come in contact with the ends of said body and to flange the same.

7. In a machine for shaping metal bodies for barrels and other similar vessels, the combination, with the roller *a*, upon which the barrel-body to be operated upon is placed, of the movable cap *f*, fitting over one of the necks or journals of said roller, the rods *e e*, attached to said cap and the hydraulic cylinder *b*, the piston of which is connected with said rods, whereby said rods and said cap can be raised or lowered as required and downward pressure can be brought upon the roller *a*, substantially as set forth.

8. In a machine for shaping tubular metal bodies open at both ends for barrels and other similar vessels, the combination, with a roller upon which the barrel-body to be operated upon is loosely placed, which passes through said body and which has a longitudinal contour corresponding with that required in the finished body, of a fulling-roller adapted to come in contact with the barrel-body, a carriage and carriage-slides for said fulling-roller, a hydraulic cylinder, piston, and piston-rod connected with said carriage and adapted to give to said carriage and said fulling-roller a reciprocating longitudinal traversing motion commencing at the center of said barrel-body and working right and left alternately toward the ends with a gradually-increasing stroke, and a screw and nut or equivalent mechanical device arranged to adjust and set up said fulling-roller to its work on starting and to rigidly maintain it at its work without further adjustment until the fulling process is completed, all substantially as set forth.

9. In a machine for shaping tubular metal bodies open at both ends for barrels and other similar vessels, the combination, with the roller *a*, upon which the barrel-body to be operated upon is loosely placed, which passes through said body and which has a longitudinal contour corresponding with that required in the finished body, and the fulling-roller *g*, mounted on an axis substantially parallel with that of said roller *a*, the carriage *h* for said roller *g*, and carriage-slides *l*, said fulling-roller being adapted to come in contact with said barrel-body and to act thereon with a reciprocating longitudinal traversing motion, of the copy or templet *k*, having a curve corresponding with the longitudinal curve or belly of said roller *a*, whereby said fulling-roller is caused to follow the same curve during its reciprocating longitudinal traversing motion and thereby to produce a corresponding curve or belly of the barrel-body, substantially as set forth.

10. In a machine for shaping metal bodies for barrels and other similar vessels, the combination, with the reciprocating longitudinal

traversing fulling-roller *g*, of the guide-rollers *o o*, bracket *p*, and cross-rail *q*, carrying said guide-rollers, screws *r r* for adjusting said cross-rail, and worm-wheels *s s* and worm-shaft *t* for actuating said screws, substantially as set forth.

11. In a machine for shaping and finishing metal bodies for barrels and other similar vessels, the combination, with the reciprocating longitudinal traversing fulling-roller *g*, of the finishing-rollers *u u*, hydraulic cylinders *v*, the piston-rods of said cylinders being connected to the bearings of said finishing-rollers, whereby these rollers can be moved into contact or away from the barrel-body as required, substantially as set forth.

12. In a machine for shaping and flanging metal bodies for barrels and other similar vessels, a roller upon which the barrel-body to be operated upon is supported, in combination with the flanging-rollers *B B*, the worm-shafts *M M*, and worm-sectors *N N*, whereby said rollers *B B* can be moved radially, substantially as set forth.

13. In a machine for shaping and flanging metal bodies for barrels and other similar vessels, the combination, with the flanging-roll-

ers *B B*, adapted to be moved radially, of the slotted cross-rail *A'*, along which said rollers can be adjusted in the direction which is parallel to the axis of the barrel-body, slides *H H*, adapted to move with said flanging-rollers in the direction at right angles to the axis of the barrel-body, and screws *J J* for moving said slides, substantially as set forth.

14. In a machine for shaping and flanging metal bodies for barrels and other similar vessels, the combination, with the flanging-rollers *B B*, adapted to be moved radially toward the barrel-body, of the guide-rollers *o o*, adapted to be set up against the barrel-body, and the guide-rollers *D D*, also adapted to be set up against the barrel-body, whereby said guide-rollers may guide the barrel-body while said flanging-rollers act thereon, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS CRITCHLEY BARRACLOUGH.

Witnesses:

FREDERICK DAVEY,
GEORGE C. BACON.