(No Model.) 3 Sheets—Sheet 1.

W. T. VALE.

BARREL MAKING MACHINE.

No. 384,730. Patented June 19, 1888.

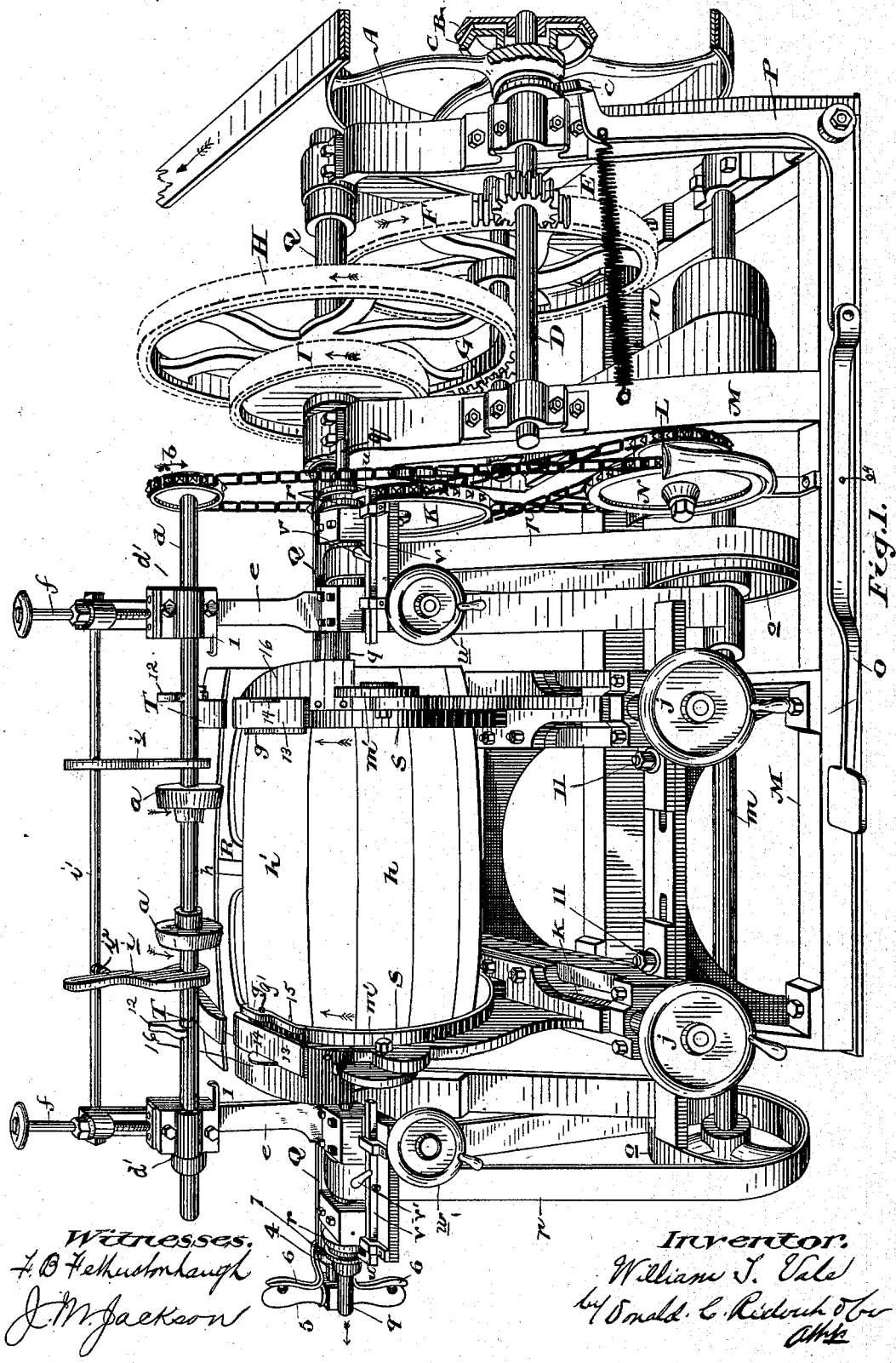

Fig. 1.

Witnesses,
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J. M. Jackson

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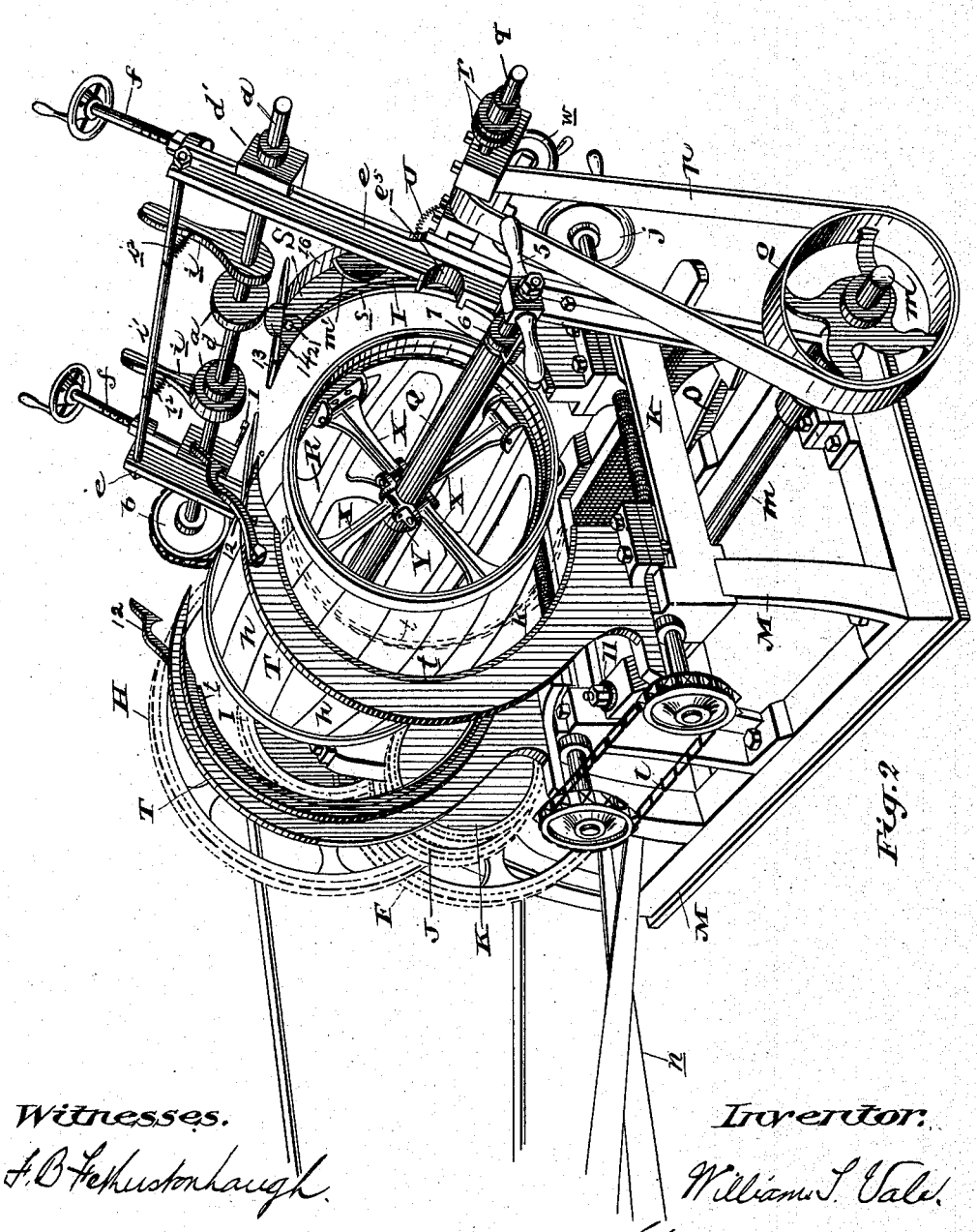

Fig. 2.

Witnesses.

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(No Model.) 3 Sheets—Sheet 3.

W. T. VALE.

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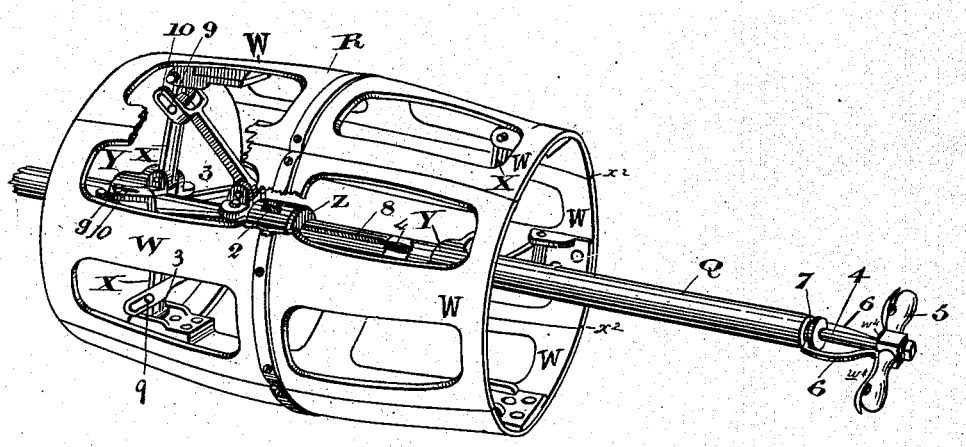

Fig. 3.

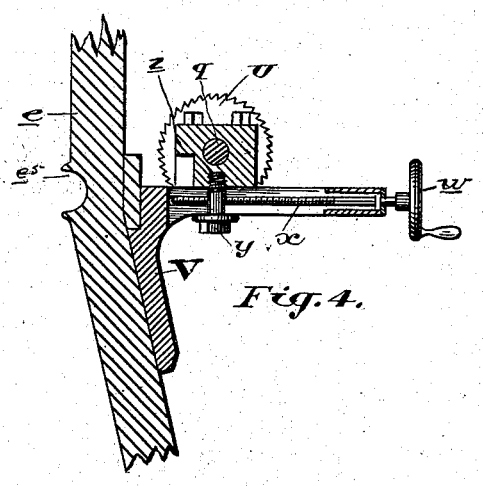

Fig. 4.

Witnesses.
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J. W. Jackson

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM T. VALE, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO JOSHUA GEORGE BEARD, OF SAME PLACE.

BARREL-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,730, dated June 19, 1888.

Application filed July 29, 1886. Serial No. 209,463. (No model.) Patented in Canada August 23, 1886, No. 24,799; in England October 5, 1886, No. 12,658, and in France February 9, 1887, No. 178,932.

To all whom it may concern:

Be it known that I, WILLIAM THOMAS VALE, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Barrel-Making Machines, (for which I have obtained Letters Patent in Canada, August 23, 1886, No. 24,799; in Great Britain, October 5, 1886, No. 12,658, and in France, February 9, 1887, No. 178,932,) of which the following is a specification.

The object of the invention is to design a machine which can be readily adapted to the manufacturing of barrels of various sizes and by which end hoops may be placed on the barrel.

It consists in the peculiar combinations and the novel construction, arrangement, and adaptation of parts, all as more fully hereinafter described and claimed.

Figure 1 is a perspective side view of my barrel-machine. Fig. 2 is a perspective end view showing the rings expanded and the standard and its accessories thrown back ready for the removal of the barrel. Fig. 3 is a detail of the barrel-former. Fig. 4 is a detail showing the means for adjusting the cutter.

In the drawings, like letters of reference indicate corresponding parts.

A is the main driving-pulley, which revolves loosely on the shaft D when the machine is standing. The pulley A communicates motion by means of the friction-clutches B and C when engaged to the shaft D; thence, by a series of gear pinions and wheels, E, F, G, H, I, and J, to the sprocket-wheel K on the same shaft as the gear-wheel J. The sprocket-wheel K is connected by a sprocket-chain to the sprocket L on a stud on the main frame M of the machine. On the same stud as the sprocket-wheel L is journaled the sprocket-wheel N, which imparts motion to the feed-rollers *a* by its connection by chain and sprocket *b* on the end of the feed-roller spindle *d*.

As represented in the drawings, the machine is not in operation, as it will be seen that the friction-clutches B and C are disengaged; but immediately upon the foot-lever O being tilted upon its pivot o^4, it presses the pin *c*, formed on the end of the bell-crank P, against the hub of the main driving-pulley A, and throws the internal friction-clutch, C, which forms part of the same hub, against the clutch B, fast on the shaft D, thus throwing the machine into operation.

It will be seen that by means of the series of gearing before described the shaft Q, upon which gear-wheels H and I are fixed and the barrel-former R is set, will be caused to revolve, as also, by means of the sprocket-wheel L and intermediate connections, as above described, the feed-rollers *a* on the spindle *d*, which is separate from the shaft of the former.

It will be noticed that the spindle *d* is journaled in bearing-boxes *d'*, suitably supported, one near each end of the former, on the standards *e*, and may be adjusted vertically by means of the screw-spindles *f* to suit the size of the barrel placed upon the former. These standards *e* are pivoted at their lower ends on the shaft *m*, and near their middle on their rear side they are hollowed, as shown at e^5, to receive the shaft Q when they are in the position in which they are shown in Fig. 1.

As the barrel-former R revolves in the direction indicated by arrows, the rollers *a*, to which the staves *h* are fed in any convenient manner, act upon the staves *h*, feeding them in till they reach the point indicated in Fig. 1, where they are held by the dogs *g*, pivoted at *g'* on the portion of the rings called S. The rollers *a* continue to act till all the staves necessary for the completion of the barrel are fed in.

As the barrel-former R revolves in the direction indicated by arrow and the rollers *a* revolve in the opposite direction, they act jointly upon the staves *h h'*, drawing them in upon the former R under the portions of the ring called T from the fixed plates 13, over which the staves are fed.

In order to prevent too great spring of the staves *h* as they are being fed in, I pivot upon the spindle *d* the hand-levers *i*, having their free ends connected with the rod *i'*, joining the standards *e* by means of springs i^2. In order to bend the staves *h h'* into the shape of the former R, and thus insure their being fed upon the former R under the ends of portions T, the hand-levers *i* are brought to bear upon

the ends of the staves *h*, thus pressing the ends of the staves down before being fed into the former. The hand-levers *i* are brought to bear upon the staves *h* as they are being fed between the portions of the rings called T and the barrel-former R, which as it revolves brings each succeeding stave gradually round until the entire annular opening between the former R and the sections S and T is filled up with staves. Each of the rings consists of two separable like portions, S T. The rings are arranged one near each end of the former, soon to be described. When the first stave, *h'*, has completed the circuit and been brought around by the revolution of the former R past the portion T to the position indicated in Fig. 1, it is held by the pivoted dogs *g*, the tails of which are upheld by the pins 15, which throw the point of the tooth downward to grip the edge of the stave *h'*. The rollers *a*, former R, and hand-levers *i* are brought to act upon each succeeding stave until it butts against the one preceding it and already fixed in position, and all the staves necessary for the completion of the barrel are thus closed together. After the staves are all in position the pins 15 are removed and the dogs *g* withdrawn, when the end hoops are placed over the ends of the staves, which are thus bound together.

In Fig. 2 I show the portions S T of the rings within which the barrel is formed separated to permit of its removal when formed. This is accomplished by the hand-wheels *j*, which operate the spindles *k*, which have a right and left hand thread cut on each to permit the ring portions S and T of each ring to work from or toward the center of the spindles *k*, so as to close or open the ring. It will be seen that these spindles are connected together by the sprocket-chain *l* on the side of the machine opposite to the hand-wheels *j*. The portions S and T of each ring may be adjusted longitudinally on the frame M by the set-screws 11.

12 are catches pivoted on the portions T, and are designed to hook over the shaft *d* to keep the standard *e* in a vertical position during the process of forming the barrel.

13 are plates pivotally secured at 21 to the upper end of the portions S, and have flanges 14 on the outer ends, against which flanges one end of the staves *h h'* is placed, in order to deliver the staves with their ends even into the former R, for the purpose of making the feed even into the former.

15 are stop-pins placed beneath the tail of the dogs *g* to prevent them getting in the way of the staves as they are fed in.

16 are guards placed on the portions S to protect the cutters U.

Upon the inner surface of the portions S and T of the rings I attach removably in any suitable way (for instance, by making them of material sufficiently resilient to allow of their being sprung in place) minor ring portions *s* and *t*, which may be varied in thickness to suit the size of the barrel desired to be formed.

There are disks *m'* that I pivot on the outer face of the ring portions S, which press against the ends of each stave as it is being cut off and finished by the cutters U.

As there is nothing different in the cutters from the ordinary ones now in use, being simply circular saws, preferably, I shall now proceed to describe the means by which they are driven and the mode of adjusting them to the different-sized barrels.

Upon the bed-plate of the main frame M, I journal the shaft *m*, which derives motion by the belt *n*, connected to the motive power. On this shaft, which is arranged parallel to the stud of the sprocket-wheel N, I place the pulleys *o*, which are connected by the belts *p* to the cutter-shafts *q*, suitably journaled in advance of the former in bearings in the standards *e*, and by rocking the said standards upon their shaft *m* the cutters U are brought against the staves. Upon the shaft *q*, I rigidly secure the collars *r*, two near each end. Into the recess between each two of these collars is fitted the bent end *u* of the slide *v*, which may be adjusted longitudinally in any suitable way—for instance, by means of the handle *v'* on said slide—so as to move the shaft *q* endwise, and thus bring the cutter U into the proper position for sawing off the ends of the staves for the different lengths of barrels.

On reference to Fig. 4 the means of adjusting the cutter U to suit the different diameters of the barrels may be easily understood.

w is a hand-wheel at the end of the screw-spindle *x*, which passes through the set-screw *y*. The set-screw *y* extends into the box *z*, which supports the cutter-shaft *q*, all of which work upon the bracket V.

When the barrel desired to be formed is of small diameter, the cutter may be brought closer to the standard *e*, and when the barrel is desired to be of greater diameter it may be removed farther away from the standard *e* by manipulating the hand-wheel *w* so as to bring the set-screw *y* toward the outer end of the slot formed in the bracket V, as shown in Fig. 4.

Upon the ends of the staves of the barrel being finished by the cutter U, there being one at each end of the former on the shaft *q*, the end hoops, which may be suspended from hooks, arranged one near each end of the former and preferably attached to or forming a part of the boxes *d'*, as shown in Fig. 1, may be slipped off onto the ends of the barrel, as shown in Fig. 2, where they are secured in any well-known manner. The drum or barrel-former R is then collapsed, as hereinafter described, and the barrel may be withdrawn.

In Fig. 3 I show the method of constructing my improved cage, drum, or barrel-former R. It will be seen in this figure that it is composed of four sections, W, attached by pivoted arms X to a collar, Y, fixed on the main shaft

Q. Toward the inner end of the drum or barrel-former R, upon the shaft Q, I place the collar Z, which has a flat key, 2, passing through it and the slot 8 in the shaft Q, which is hollow from this point to its outer end. To this collar I pivot the arms 3 at their inner end, while at their outer end they are connected to the arms X by the pins 9. The pin 9 passes through elongated slots 10 formed in the forked end of the arm 3, the slots in the opposite arms being of the same length, but those of one pair of arms being of greater length than those in the other, so that one pair will pull before the other. On reference to Figs. 2 and 3, it will be seen that there are two collars, Y, and two sets of arms, X; but only one of the collars Y is provided with arms 3. The key 2 passes through the collar Z and the slot 8 in the shaft Q and engages a slot in the spindle 4, and thus connects the collar Z to the spindle 4, which passes through the shaft Q, and at the outer end of which the handle 5 is attached. The handle 5 has two bell-cranks, 6, pivoted to it at w^4, the inner ends of which fit into the recess 7 on the end of the shaft Q. In this position the barrel-former is held expanded ready for the formation of the barrel.

When it is desired to collapse the barrel-former or drum R so as to permit of the removal of the barrel, the attendant of the machine has merely to press the outer ends of the bell-cranks 6, so as to remove their inner points from the recess 7, and draw outwardly, as indicated by arrow, thus moving the collar Z outwardly along the shaft Q, and bringing the arms 3 and X, and consequently the four sections, closer to the shaft, the pins 9, riding in the slots 10, permitting this movement, the fitting points of the sections being beveled, as shown at x^2, Fig. 3, so as to permit one pair to fold within the other. The standards *e* are pivoted in any suitable way so as to be thrown back into the position shown in Fig. 2 to allow of the ready removal of the barrel.

It will be seen from this description that the labor of making barrels from my machine is such as a boy can easily attend to. Another great advantage in my machine is the means for adjusting the rings longitudinally on the frame M to suit the length of the barrel, different sized drums or barrel-formers being set on the shaft Q to correspond with the position of these rings, the removal of the key 2 and the means which secure the collars Y to the shaft Q allowing of the removal of the former.

What I claim as my invention is—

1. The combination, with the feed-rollers, their shaft, the shaft Q, and the former carried thereby, of the shaft D, parallel with said shaft Q, driving-pulley A and friction-clutches thereon, gear-wheel E on the shaft D, wheel I on the shaft Q, and intermediate gearing, substantially as described, between the shafts D and Q, sprocket-wheels L N K, the latter driven from the wheel I, and connections with the shaft of the feed-rollers, as and for the purpose specified.

2. The feed-rollers *a* and *a* and a drum or barrel-former, R, driven substantially as specified and fed with staves by the feed-rollers *a*, in combination with hand-levers *i* on the shaft of said feed-rollers, substantially as and for the purpose specified.

3. The shaft *m*, standards *e*, shaft *d*, and the feed-rollers *a*, located on the shaft *d*, which is journaled in bearing-boxes on the standards *e*, pivoted on the shaft *m*, combined with the barrel-former R, substantially as and for the purpose specified.

4. The standards *e*, spindle *d*, and the rollers *a*, located on the spindle *d*, journaled in bearing-boxes adjustably held on the standards *e*, in combination with the barrel-former R, and the screw-spindles *f*, arranged to adjust the feed-rollers *a* vertically, substantially as and for the purpose specified.

5. A shaft, Q, and a shaft, D, friction-clutches B and C, and barrel-former or drum R, set upon the shaft Q and connected by a series of spur-wheels, H, G, F, and E, to the shaft D, on the end of which the friction-clutches B and C are situated, in combination with the bell-crank P, the pin *c* on said bell-crank, and a lever, O, pivoted on the bed-plate and arranged to bring said pin *c* against the hub of the main driving-pulley A, so as to bring the clutches B and C into gear, substantially as and for the purpose specified.

6. A shaft, Q, a barrel-former, R, carried on said shaft, a series of spur-wheels, H, G, F, and E, connecting said shaft Q to the shaft D, and the gear-wheels I J, in combination with the sprocket-wheels *b*, L, N, and K, the shaft D, spindle *d*, and the feed-rollers *a* on the spindle *d*, which is caused to revolve by the sprocket-wheels *b*, L, N, and K, connected together by sprocket-chain, the sprocket-wheel K being on the same shaft as the gear-wheel J, which is driven by the gear-wheel I, located on the shaft Q, substantially as and for the purpose specified.

7. The cutter U, the slide *v*, the end *u* of which fits into the recess between the collars *r* on the cutter spindle or shaft *q*, said shaft *q* and the sliding block *z*, in which it is journaled, in combination with the collars *r* on said shaft, the screw-spindle *x*, bracket V, set-screw *y*, and the hand-wheel *w*, operating the screw-spindle *x*, which projects through the set-screw *y*, extending into the block *z*, situated on the bracket V, substantially as and for the purpose specified.

8. A barrel-former, R, divided into sections W and connected to collars Y on the shaft Q by the arms X, in combination with said arms, shaft, and collars, the spindle 4, key 2, handle 5, and the collar Z, connected by the arms 3, slotted, as described, to the arms X of one of the collars Y, the said collar Z being connected to the spindle 4 by the flat key 2, and so arranged that when the handle 5 is drawn out the sections W of the former R will collapse, substantially as and for the purpose specified.

9. The slotted arms 3, arms X, provided with pins 9, the sections W, and the collar Z, connected to the sections W by the arms 3, provided with slots 10, within which the pins 9 on the arms X work or slide to permit the collapse of the sections W, in combination with the spindle 4, connected to the collar Z, the shaft Q, and the handle 5, for operating said collar longitudinally on the shaft Q, substantially as and for the purpose specified.

10. A collar, Z, arms 3, bell-crank 6, and a barrel-former, R, having sections W, connected by the arms 3 to the collar Z, shaft Q, having recess 7, and the rod 4, having handle 5, said collar constructed to hold the former or drum R expanded during the time the end of the bell-crank 6, pivoted to the handle 5, fits into the recess 7, substantially as and for the purpose specified.

11. The combination, with the shaft *m*, and the barrel-former R, rotated from said shaft, of the standards *e*, pivoted at their lower ends on said shaft, spindle *d*, journaled in bearings on said standards, feed-rollers carried by said spindle, and means for vertically adjusting said spindle, substantially as and for the purpose specified.

Toronto, July 23, 1886.

W. T. VALE.

In presence of—
CHARLES C. BALDWIN,
J. M. JACKSON.