2 Sheets—Sheet 1.

H. S. SMITH.

BARREL-SHAPING MACHINE.

No. 170,909. Patented Dec. 7, 1875.

Fig 1

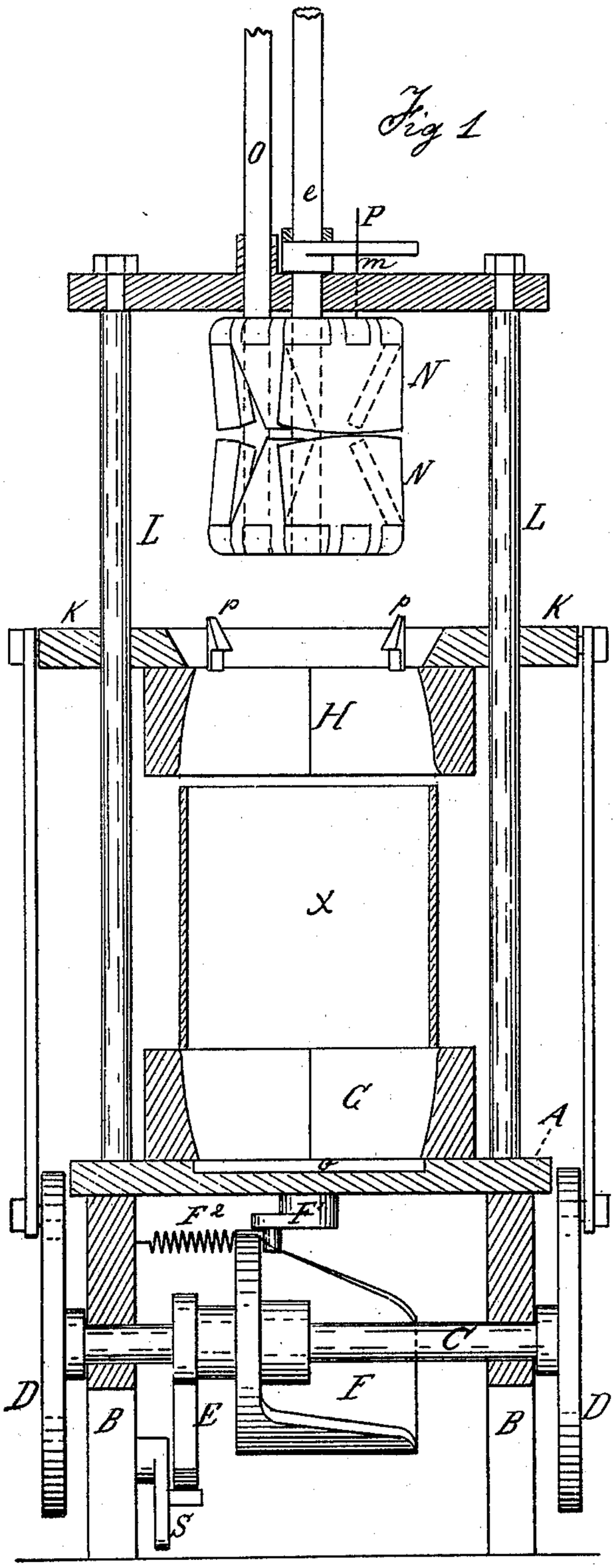
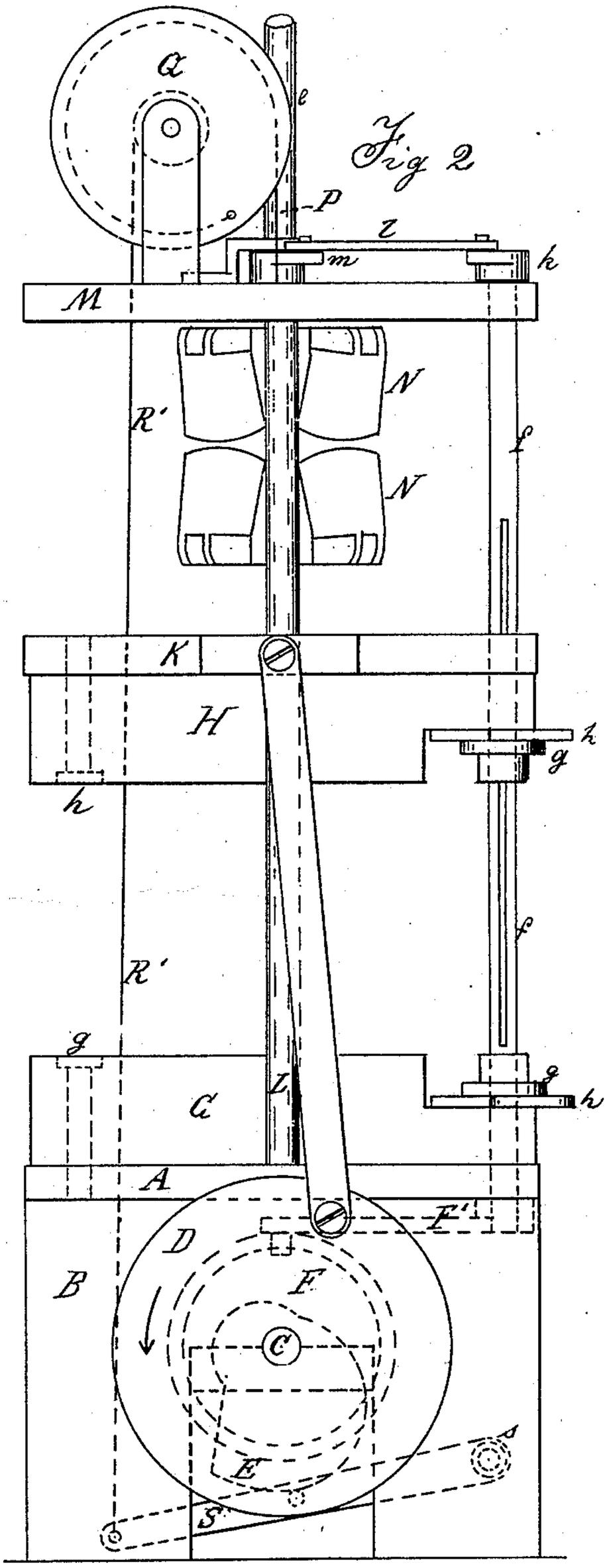


Fig 2



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2 Sheets—Sheet 2.

H. S. SMITH.

BARREL-SHAPING MACHINE.

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Fig 3

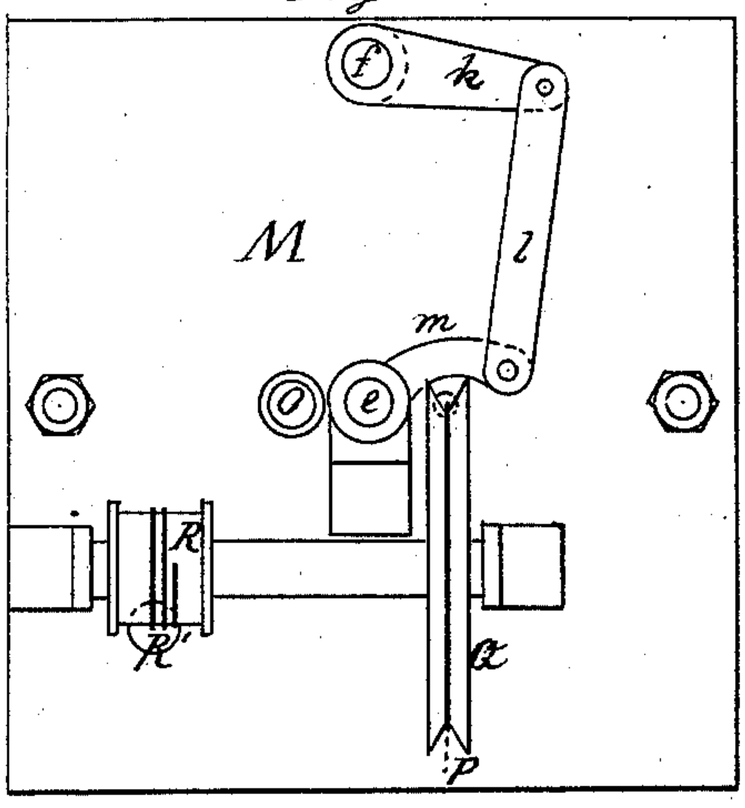


Fig 4

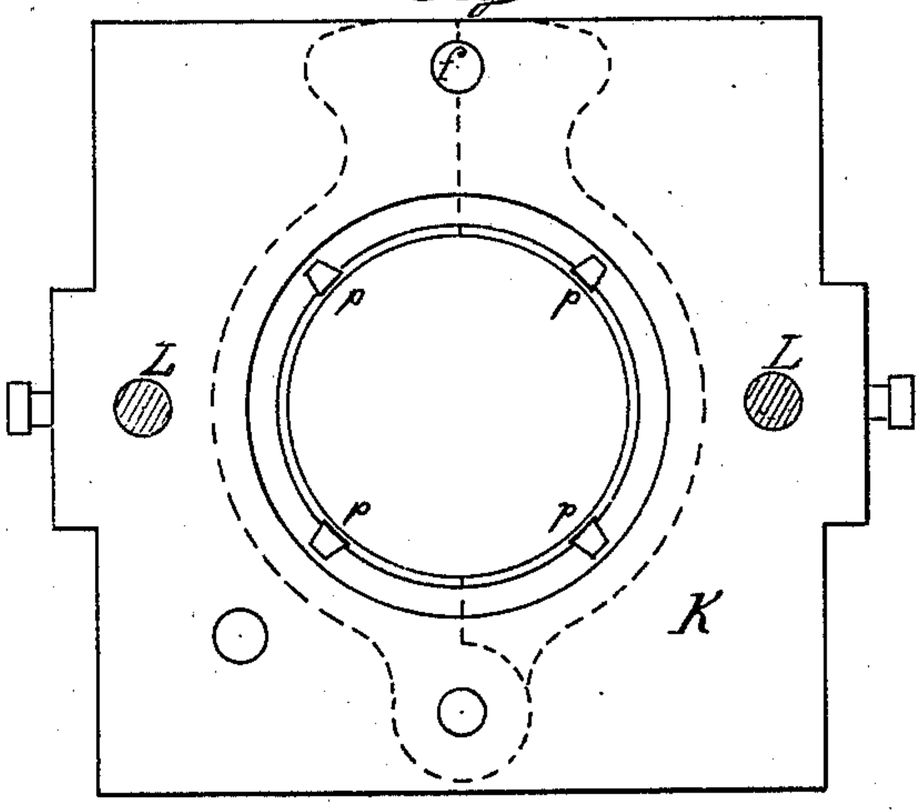


Fig 5

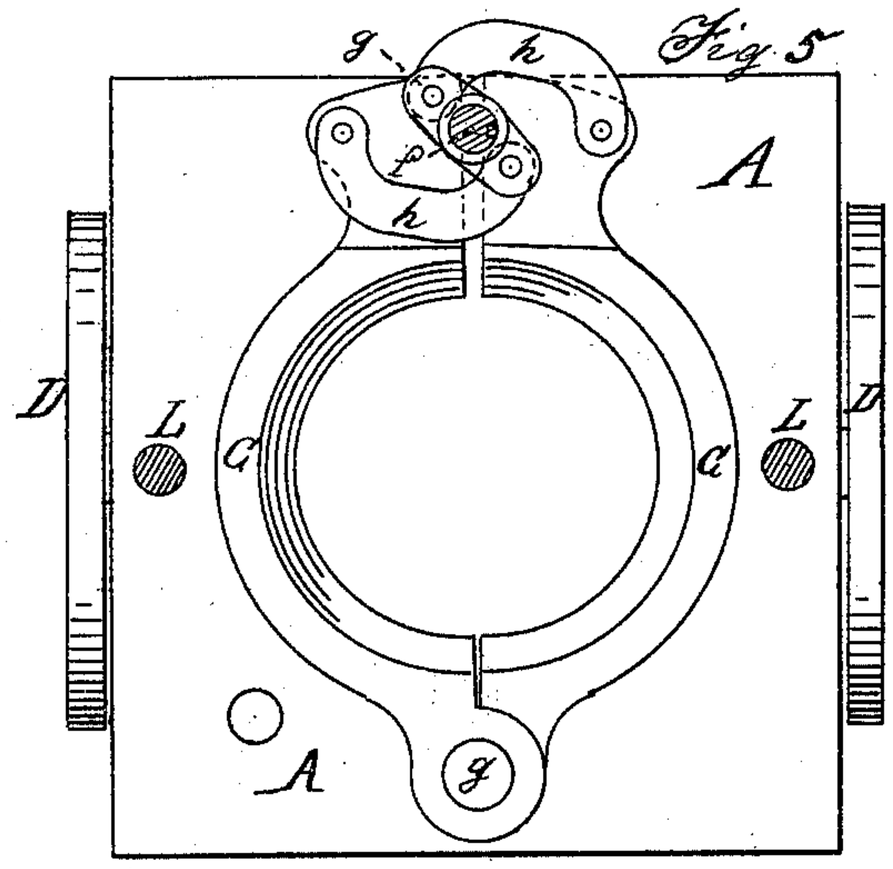


Fig 6

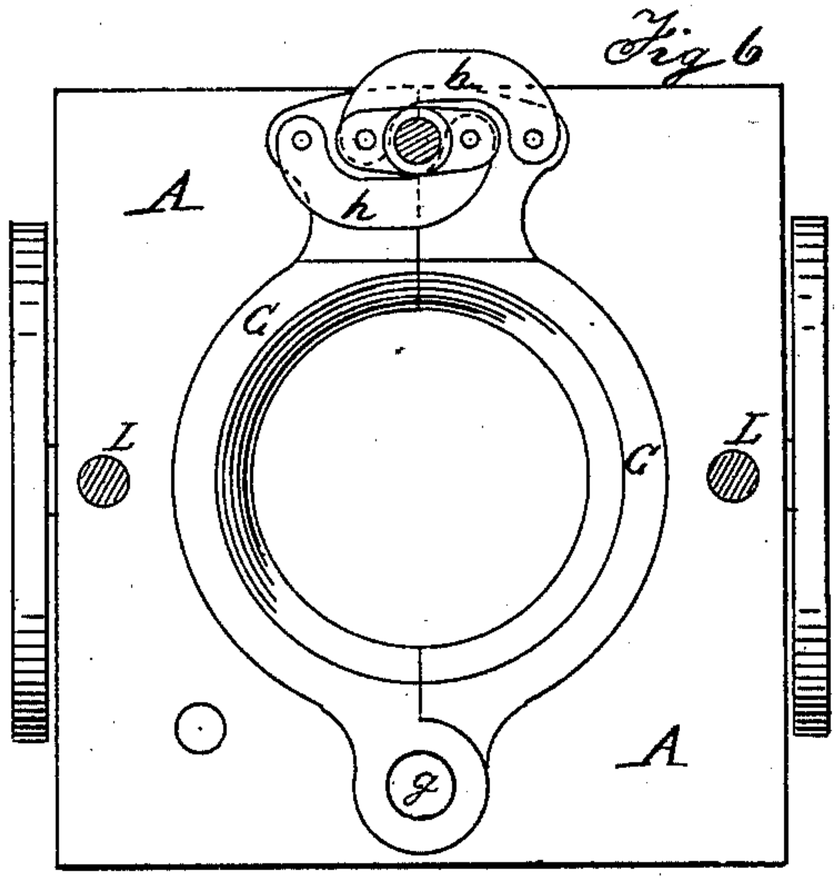


Fig 7

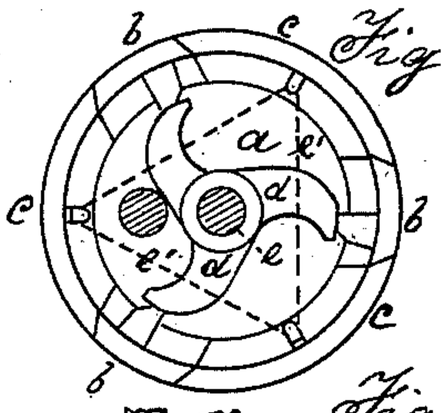


Fig 9

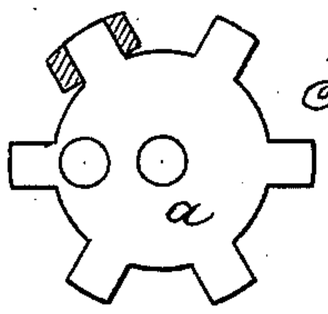
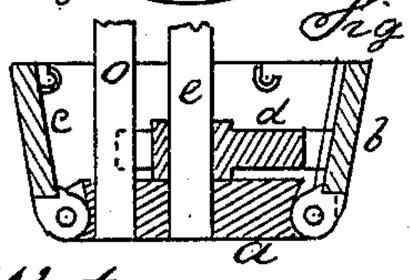


Fig 8



Witnesses
Albert H Hook.
C. A. Brown

Inventor.
Human S Smith

UNITED STATES PATENT OFFICE.

HEMAN S. SMITH, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO ALANSON T. BRIGGS AND WILLIAM H. THRALL, OF NEW YORK CITY.

IMPROVEMENT IN BARREL-SHAPING MACHINES.

Specification forming part of Letters Patent No. **170,909**, dated December 7, 1875; application filed October 8, 1875.

To all whom it may concern:

Be it known that I, HEMAN S. SMITH, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Barrel-Shaping Machines; and I do hereby 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in barrel-shaping machines, for shaping or compressing, and trussing straight cylindrical shells, whether made from a single sheet of wood, or of a number of staves, into barrel shape; and my invention consists in, first, an expansible and contractible core, made in two halves, that is introduced into the cylinder in a contracted shape, and it is then expanded outward so as to form a perfect circle; second, in making the compressing-jaws in two parts, and connecting them together so that they may be opened and closed; third, in trussing and compressing or shaping the barrel at the same operation; fourth, in the arrangement and combination of devices that will be more fully described hereafter.

Figure 1 is a vertical longitudinal section through the center line of the machine. Fig. 2 is a side view of the machine. Fig. 3 is a a plan view of the plate M, and its attachments. Fig. 4 is a plan view of the plate K carrying the upper shaping-jaw. Fig. 5 is a plan view of the plate A, and the lower jaw attached thereto, the jaw being shown opened; Fig. 6, the same, the jaw being shown closed. Fig. 7 is a plan view of the lower core in its expanded position. Fig. 8 is a vertical section thereof; Fig. 9, a plan view of the plate *a*, to which the wings are hinged.

The machine containing these improvements is constructed substantially as follows:

A represents a horizontal plate, which rests upon the two side frames B B. C is a horizontal shaft having two crank-wheels, D D, at its ends, and two cams, E and F, attached to it at suitable places between the bearings of the shaft. G and H are the shaping or compressing jaws, the lower one, G, being stationary upon the plate A, while the upper one, H, is secured to the bottom side of another plate, K, which receives a vertical reciprocating motion from the crank-wheels B B, and which plate is guided up and down on two vertical rods, L L. Each of these shaping-jaws is made in two halves, which halves are hinged together at *g* and *h*, and are capable of opening and closing by a mechanism hereafter to be described. M is a horizontal plate secured to the upper ends of the vertical rods L L. N N are the two halves of the core around which the barrel is to be shaped, and which are secured to the end of a vertical rod, O, which slides up and down in a proper bearing in the plate M. This core is raised and lowered by a cord, P, which winds around a grooved pulley, Q, to which one end of it is fastened, while the other end is attached to the upper half of the core. This pulley Q is on a shaft, which carries also a smaller pulley, R. A cord or chain, R′, winds on this pulley, and connects with the end of a lever, S, which has its fulcrum at *s*, and is operated by the cam E. Thus the up and down motion of the core is obtained from this cam, which must be so timed and shaped as to raise and lower the said core in such a manner as will be hereafter described.

The core itself must be capable of contracting, as in its expanded state it could not be extracted from the barrel. I therefore construct this core in the following manner:

Each half of the core consists of a plate, *a*, of a shape, as shown in Fig. 9, having six projections at its periphery, to which are hinged six wings, three wide ones, and three narrow ones, alternately the narrow ones *b* entering between the wide ones *c*, wedge-like, as shown in Fig. 7, and when these wings are expanded they present an uninterrupted surface of the shape of the interior of the barrel. The expanding of these wings is produced by a threefold cam, *d*, which is fastened to a vertical rock-shaft, *e*, which passes through both plates *a a* loosely, and through the plate M.

The cam operates against the narrow wings *b* only, which are therefore provided with

projections at their inner sides, which are in contact with the cam. The cam forces the narrow wings *b* outward, and these, by means of their wedge shape, force the wide wings *c* outward. The wide wings *c* are provided with springs *e'*, which tend to contract the wide wings *c*, and force the wedge-shaped narrow wings *b* inward, when the cam turns.

When the operation of compressing takes place, the shaping dies or jaws must be closed, and when the barrel is made and ready to be removed from the machine the dies must be opened, and this motion is produced by a vertical rock-shaft, *f*, which receives its rocking motion from the side cam F, through a lever, F^1, keyed onto the lower end of the said shaft. A spring, F^2, serves to return the lever F^1. The shaft *f* passes through between the two halves of each of the compressing-dies G and H, and operates them by means of short double arms *g*, to each of which are jointed two connecting-links, *h*, which are pinned to the jaws, as clearly shown in Figs. 5 and 6. As the upper jaw slides up and down, its double arm *g* and links *h* must be made to slide with it, and this may be done by planing a groove in the shaft, and fitting a feather in the bore of the arm. The rocking motion of the shaft *f* also produces the expansion and contraction of the core by an arm, *k*, at its upper end, which transmits the motion to the rock-shaft *e* by means of a link, *l*, and an arm, *m*, on the rock-shaft *e*. As this shaft *e* slides up and down with the core N, while the arm *m* must remain in the same horizontal plane with the arm *k*, the shaft must be provided with a groove, and the bore of the hub of the arm *m* with a feather.

The plate A, which supports the lower jaw or die G, has a circular cavity sunk into its top side, indicated by letter *o* in Fig. 1, which serves to receive the truss-band which is to be driven onto the lower end of the barrel. The plate K has a circular orifice cut through it, just above the orifice of the compressing-die H, but somewhat larger, and four spring-hooks, *p*, the shanks of which may be fastened to the bottom side of the plate K, or to the circumference of the compressing-die. These hooks serve to hold the truss-band which is to be driven onto the upper end of the barrel.

The operation of the machine is as follows: The machine is stopped when the upper die is at its highest elevation, as represented in Fig. 1, and a shell, *x*, is placed vertically into the mouth of the lower shaping-die. Previous to this, however, the truss-band, which is to go on the lower end of the barrel, is dropped into the cavity *o* in the plate A, and another truss-band is placed between the hooks *p p*. Now, the machine is set in motion, and in turning in the direction of the arrow in Fig. 2, the first effect is to send the core N N down into the shell where it expands. Next, the upper die H descends, and in doing so forces the barrel-shell into itself, and into the lower die, and through both of them into the lower and upper truss-band, the hooks *p p* preventing the giving away of the upper truss. In the mean time the core N has followed the down motion of the barrel. Now the upper die has arrived at its lowest descent, the core collapses, and is carried upward to its highest elevation, and the dies open, and when the upper die has returned to its elevated position the compressed barrel, with the two trusses on, can be removed from the machine.

Having thus described my invention, I claim—

1. The expansible and contractible core herein described, that is made in two halves, each of which halves is expanded and contracted at the same time, substantially as shown.

2. A core for barrels made in two parts, each part being formed of wide and narrow hinged plates *b c*, in combination with the cam *d* and spring *e'*, substantially as described.

3. In a barrel-shaping machine, a shaping-die, G H, made in two parts, one of which is stationary, and the other movable, in combination with an expansible and contractible core, and devices for operating the same, substantially as set forth.

4. The combination of the hinged or pivoted parts of each half of the die and the expansible core, herein described, with the mechanism for closing the dies and expanding the core simultaneously, substantially as and for the purpose set forth.

5. In a machine for shaping barrels, the expansible shaping-die, the expansible core, and the mechanism for operating them, all as herein described, in combination with a mechanism for moving the upper part of the die up and down, substantially as shown.

6. In combination with the core N, the cords or chains P R', pulleys Q R, lever S, and cam E, as described.

7. The combination of the cam F, crank F^1, spring F^2, shaft *f*, arms *g*, connecting-rods *h*, and dies G H, as specified.

8. The combination of the shaft *f*, and its operating mechanism, with the crank *k*, connecting-rod *l*, crank *m*, and shaft *e*, substantially as shown and described.

9. The combination of the springs *p*, or their equivalents, with the die H for holding the truss up above the die, substantially as specified.

10. In combination with the dies G H, adapted to be opened and closed upon the barrel, the shaft *f*, arms *g*, and connecting-rods *h*, substantially as shown.

In testimony that I claim the foregoing, I have hereunto set my hand this 8th day of October, 1875.

HEMAN S. SMITH.

Witnesses:
ROBT. M. BARR,
J. WM. GARNER.