J. Cannon,

Spinning Brass Kettles, &c.

No. 16,564. Patented Feb. 3, 1857.

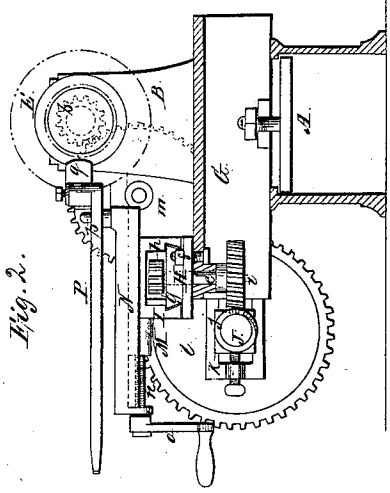

Fig. 2.

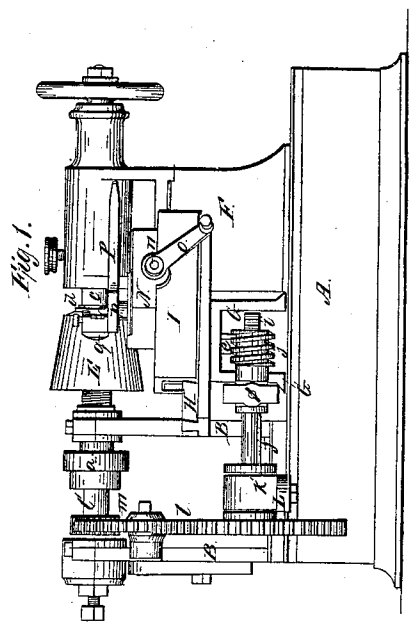

Fig. 1.

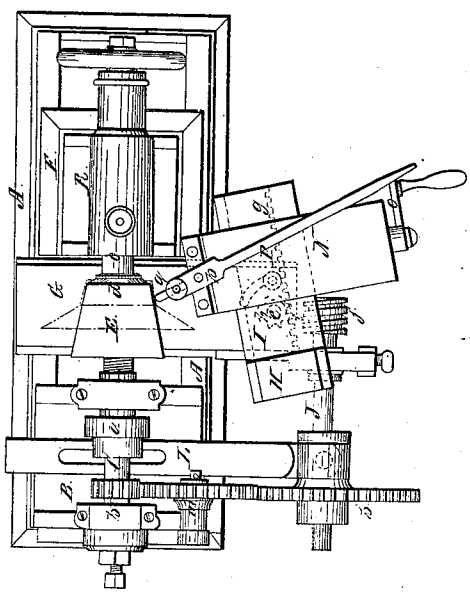

Fig. 3.

UNITED STATES PATENT OFFICE.

MARY ANN CANNON, OF WARREN, RHODE ISLAND, ASSIGNOR TO NEW YORK AND BROOKLYN BRASS COMPANY.

IMPROVEMENT IN BRASS-KETTLE MACHINES.

Specification forming part of Letters Patent No. **16,564**, dated February 3, 1857.

To all whom it may concern:

Be it known that I, MARY A. CANNON, of Warren, in the county of Bristol and State of Rhode Island, am the administratrix of JOHN CANNON, deceased, of the aforesaid place, and that the said JOHN CANNON did invent certain new and useful Improvements in Machinery for Forming Brass Kettles or other metallic vessels or articles of similar character, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of the machine; Fig. 2, a plan of the same, and Fig. 3 a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts in the several figures.

The machinery which constitutes the subject of this invention produces the kettle or other vessel or article from a disk or blank of sheet metal by what is known as the "spinning process."

Before explaining the nature of the improvement I will refer briefly to the machinery heretofore employed for producing kettles and other vessels by that process. That machinery consists of a lathe provided with a series of forms which are secured one at a time in proper succession to the rotary mandrel, up to the face of which the plate of metal of which the vessel is to be formed is held by a poppet-head while the tool is brought into operation on it by means of a mechanically-moving slide-rest to which it is rigidly secured, so as to be moved and directed entirely by the mechanically-produced movement of the said rest.

In practice it is found that great disadvantages result from the movement and direction of the tool entirely by the mechanically-produced movement of the rest. One of these disadvantages consists in the fact that the forms, through being frequently taken off and put on the mandrel to change them, soon get out of truth, and the tool not yielding to the want of truth causes the kettle to be made thinner on one side than on the other, and sometimes causes the metal to be torn apart in the line described by the tool upon it. Another disadvantage is owing to the want of uniformity of hardness that is found to exist more or less in all rolled-metal plate, in consequence of which all parts will not bear an equal amount of drawing, the harder parts yielding less readily to the drawing action, but being more liable to tear apart in drawing, and the rigid movement of the tool submitting every part of the plate to the same degree of drawing, provided the plate is of uniform thickness and the form true.

These improvements consist, chiefly, in controlling the pressure of the tool and partly directing its movement by hand, while it is sustained and moved by mechanical means by attaching it to a lever which is arranged to work on a fulcrum upon a slide-rest or its equivalent, having a mechanical movement nearly such as would be required for the tool to produce the desired shape, provided the form were infallibly true and all parts of the metal of uniform character, said lever to be operated by a workman to control the action of the tool to suit the conditions of the form and of the metal. By this means a far superior article is produced to what is produced by sustaining, moving, and directing the tool entirely by mechanical means. Another improvement consists in a peculiar mechanism for imparting motion to the slide-rest, which leaves the workman at liberty to control the operation of the tool by means of the lever.

To enable others skilled in the art to make and use the invention, I will proceed to describe its construction and operation with reference to the drawings.

A is the main bed, which supports the working parts of the lathe.

B is the mandrel-head, which is substantially like that of an ordinary lathe, and bolted to the bed A.

C is the mandrel, furnished with a belt-pulley, *a*, and a pinion, *b*, and having screwed on its nose a form, E, which is one of a number varying between a flat surface and the shape of a finished kettle.

F is a block fitted to slide on the bed A in a longitudinal direction, and having the poppet-head R fitted to slide transversely upon it. The block F and poppet-head R are both secured to the bed A by a single bolt.

c is the movable cylinder of the poppet-head, which is operated by a screw in a similar manner to the poppet-head cylinder of a common

lathe, and is fitted at the end next the mandrel-head with a loose disk, *d*, whose face is of concave or other form to correspond with the intended form of the exterior of the bottom of the kettle, for the purpose of holding the disk or blank of which the kettle is to be formed firmly up against the end of the form E, which is made of a form to correspond with the intended concave or other form of the interior of the bottom of the kettle. The disk or kettle-blank, before being placed between the form E and the disk *d*, when the bottom is to be of concave or convex form, has the desired concave or other form produced on its central portion by stamping or spinning before being introduced between the disk *d* and the first form E that is to be used to produce the form of the sides of the kettle.

G is the bed of the slide-rest, which rests upon the bed A, upon which it is adjustable in a direction transverse thereto. This bed carries a slide, H, which is adjustable and capable of being secured in any position between one parallel with the axis of the mandrel A and one at right angles thereto, and for that purpose it is fitted to turn, when desired, on a vertical shaft, E, which is fitted to a stationary bearing in the bed G, and has a screw and nut, *f*, fitted to a slot in the bed to secure it at such angle as may be desired.

I is a sliding bed, fitted to move along the slide H, and carrying a toothed rack, *g*, on its interior, which gears with a pinion, *h*, at the top of the shaft E. At the bottom of the shaft *e* is a worm-wheel, *i*, which gears with an endless screw, *j*, on a shaft, J, which is fitted in two bearings, *k k'*, one of which is secured in a guide-piece, K, attached to the bed G, and the other is in a movable bar, L, secured to the mandrel-head B. This shaft J carries a spur-gear, *l*, which engages with an adjustable intermediate gear, *m*, which engages with the pinion *b* on the mandrel. The rotation of the mandrel imparts motion by means of the pinion *b* to the gear *m*, which actuates the gear *l* to drive the shaft J, whose endless screw, acting on the worm-gear *i*, drives the shaft *e* and pinion *h*, and the pinion, acting on the rack, gives the bed I a movement in a longitudinal direction upon the slide H. This gearing is operative in all positions of the slide H, owing to the adjustment to vary the angle of the slide being made upon the shaft *e*. The bed I has rigidly attached to it a transverse slide, M, to which is fitted a sliding plate, N, forming the top of the rest. This plate, which is capable of receiving a sliding movement at right angles to the bed I by means of a screw, *n*, operated by a handle, *o*, carries one or more upright pins, *p*, either of which forms a fulcrum for the lever P, which carries the tool *q*. This lever is similar to what is sometimes used by spinners on a stationary rest, and the tool may consist either of what is known as a "burnisher" or of a roller fitted and secured in a suitable stock at the end of the lever.

The operation of the machine is as follows: Before commencing, the sliding bed N is moved to a favorable position to allow the tool to pass between the poppet-head and the end of the forms E, and the first form having its sides but slightly inclined to the end or part which conforms to the bottom of the kettle is put on the mandrel, and the kettle-blank held up to it by hand till the cylinder of the poppet-head is screwed up to secure it. The slide H is then adjusted so that the bed I will travel in a line parallel with the side of the form E, and the plate N adjusted so that the tool when in contact with the metal on the form E will stand at a desirable angle to its work. The wheels *l m* and pinion *b* are next thrown into gear, and rotary motion is then given to the mandrel by the belt running to the pulley *a*, or by other suitable means, which gives rotary motion to the kettle-blank, and at the same time imparts a movement to the bed I from the center of and up the sides of the form. The end of the lever P is now taken by the workman, who draws or pushes it forcibly to press the tool toward the form E in such a manner as to tend to draw the metal of the blank up the sides thereof. The continued movement of the bed I moves the tool up the sides of the form, and by the action of the tool on the kettle-blank during the rotation of the latter the metal is drawn out in a radial direction, while it is compressed in a circumferential direction, thus making it conform to the sides of the form. As soon as the tool has run up to the edge, or to within a very short distance of the edge of the metal, the machine is stopped by throwing off the driving-belt or otherwise, and the bed I run back by hand to bring the tool down beyond the bottom of the partly-formed kettle, and the poppet-head cylinder is drawn back to release the kettle, which is then removed by hand from the form. Another blank may then be put in and the operation repeated as before. Several blanks may be operated on upon the same form before the form is removed, after which a form having its sides forming a less obtuse angle with its bottom or end is put on and the slide I adjusted parallel to the sides of the said form, after which the partly-formed kettles, having been annealed since their treatment on the first form, are put one by one into the machine and operated in the same manner as upon the first form.

The kettles may be made with their sides of uniform or of gradually-diminishing thickness from the bottom to the top edge by the workman increasing the force of his pull on the lever P. The workman watches the operation of the tool in order that he may discover any imperfection in the plate that may require gentle treatment, and graduates the force he applies to the tool accordingly.

In the process of forming kettles as performed by this machine the principle of moving and conducting the tool mechanically is applied as far as is consistent with the pro-

duction of good work, but no farther, leaving the tool as much under the control of the workman as is necessary, to avoid drawing the metal too much, and consequently tearing it in any part. The mechanical motion and direction of the tool and the governing of its operation by hand are thus combined to effect what could not be accomplished by a mechanically-operating tool or hand-tool. I do not claim as the invention of John Cannon, deceased, the sustaining, moving, and directing of the tool by mechanical means. Neither do I claim as his invention the attachment of the tool to a lever working on a fulcrum secured to the rest when applied to a stationary rest.

I am aware that metallic dishes of various concave forms are made from flat plates or disks of metals by placing the said plates between two dies, one of which is concave and the other convex, one of said dies revolving and carrying with it the metallic plate, the dish or vessel being spun by pressing down the other die by means of a lever by hand. Therefore I do not claim, broadly, the spinning of metallic vessels by hand-pressure. An example of a machine in which such hand-pressure as I have just described is used is seen in the patent of Miller and Whitehead, May 13, 1856; but it is to be observed that in this patent, although the spinning is done by hand-pressure, there is no means of directing or controlling the pressure upon a given point. The pressure is the same throughout. Now, the distinctive feature of my improvement is that the pressure imparted to the forming-tool may be varied instantly to suit the nature of the metal. If, for example, there is a hard spot upon one side of the kettle, where greater pressure is required, or a soft spot, where less pressure is needed, the workman can readily change or vary the pressure to suit the requirements of the case. Such variations in the density of the metal cannot be detected by the eye, and hence those tools whose pressure is regulated by a screw or by a spring are not serviceable for the purpose to which my improvement is adapted. It is requisite that the workman should be enabled to feel, so to speak, the density of the metal, and that he should be able instantly to apply or withdraw the pressure.

In Hayden's patent, before mentioned, the tool may be set in or out at pleasure by means of a screw; but as the pressure is effected by a screw, not by hand, the workman cannot apply or withdraw the pressure instantly at a given point, neither can he determine except by the eye at what particular point it is necessary to vary the pressure; besides, if he knew the spot or point where a change of pressure was needed he could not apply such change by screw without injuring the work immediately adjoining, whereas in my machine a greater or less degree of pressure may be applied at any desired spot without in the least injuring the adjoining work.

I do not claim the spinning of vessels by hand-pressure when the spinning-tool is both carried and pressed up against the metal by the workman, as this is the old plan, long known before any mechanism for carrying the tool was invented.

I distinctly disclaim those parts in my machine which are found in Hayden's patent aforesaid, or in Miller and Whitehead's patent, or in any other machine for making brass kettles; but the combination of a hand-lever for effecting the spinning by hand-pressure with a slide-rest which is moved by mechanism is to the best of my knowledge and belief a new combination, possessing great and important advantages. Therefore, disclaiming movable slide-rests in machines for spinning brass kettles, and also disclaiming hand-pressure in itself considered for such purposes.

What I claim as new in brass-kettle machines, and desire to secure by Letters Patent, is—

1. Elongating the handle of the tool *q* into the lever P to be operated by hand when the said tool is moved up to the work by mechanism in the manner and for the purposes substantially as herein set forth.

2. The arrangement of the shaft *e* substantially as described, whereby it is made to serve for the driving of the sliding bed I, and also as a pivot upon which the slide H, which carries the said bed, is adjusted, thereby enabling the adjustment of the bed to be effected without affecting the driving-gear.

MARY A. CANNON,
Administratrix of John Cannon, deceased.

Witnesses:
SAMUEL RANDALL,
STEPHEN DAVOL.