

(No Model.)

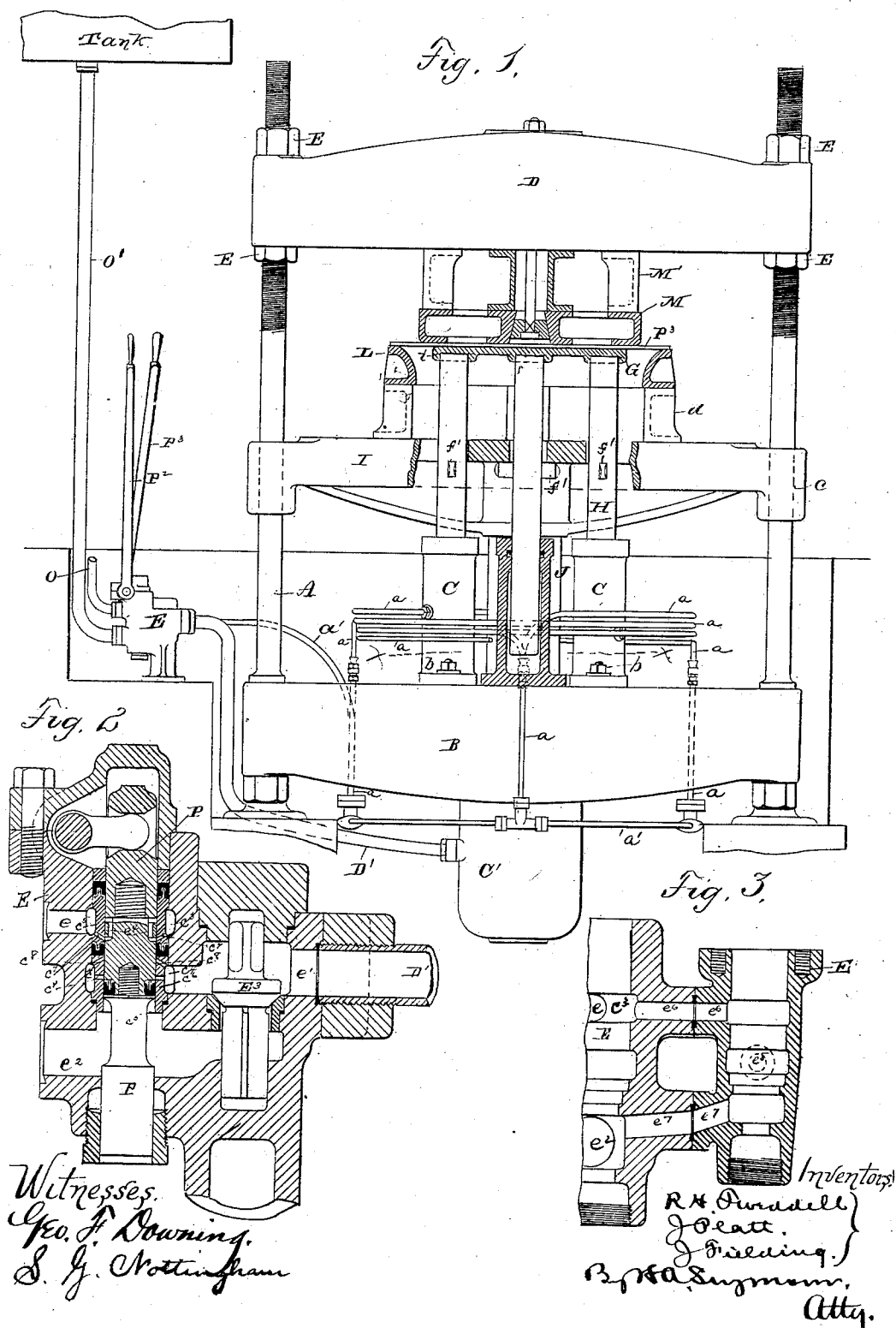
4 Sheets—Sheet 1.

R. H. TWEDDELL, J. PLATT & J. FIELDING.

PRESS FOR FLANGING SHEET METAL.

No. 317,427.

Patented May 5, 1885.



(No Model.)

4 Sheets—Sheet 2.

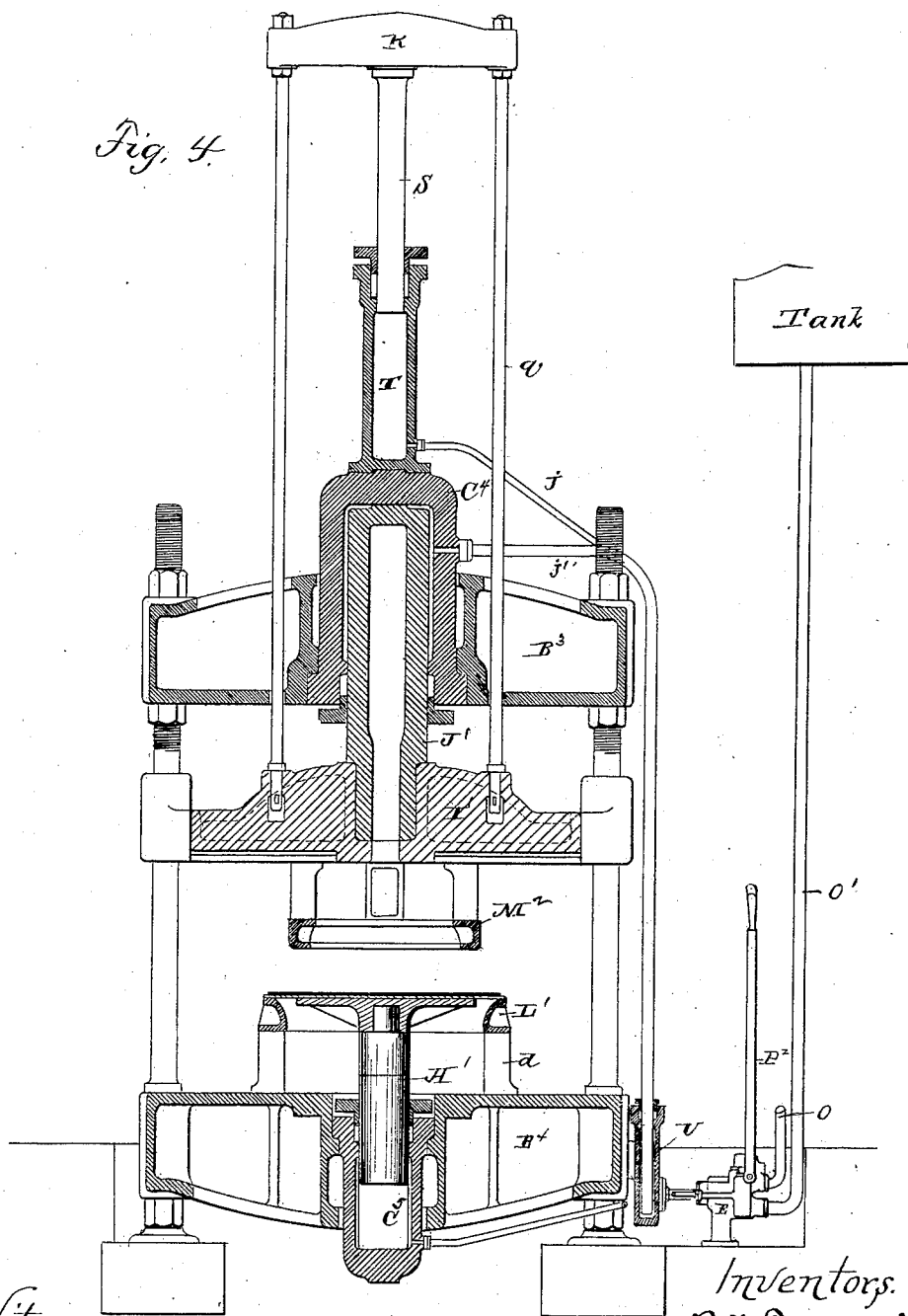
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Fig. 4.



Witnesses
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4 Sheets—Sheet 3.

R. H. TWEDDELL, J. PLATT & J. FIELDING.

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Fig. 5.

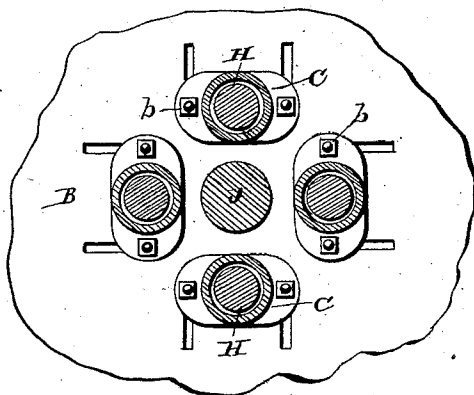
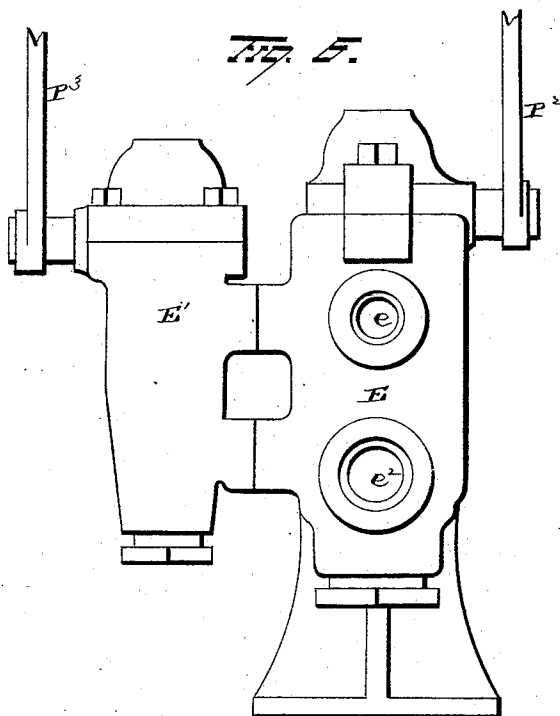


Fig. 6.



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(No Model.)

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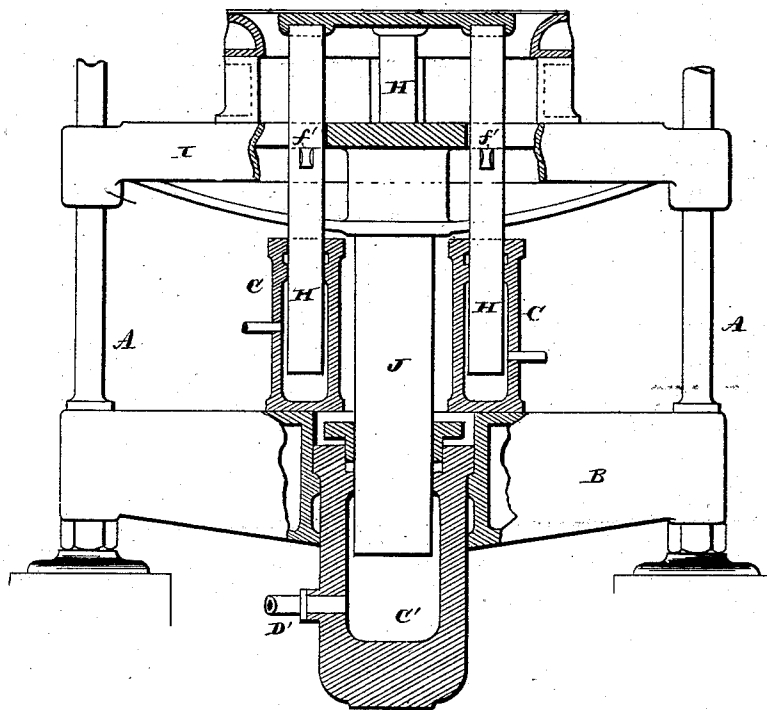
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Fig 7.



WITNESSES
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UNITED STATES PATENT OFFICE.

RALPH HART TWEDDELL, OF WESTMINSTER, COUNTY OF MIDDLESEX, AND
JAMES PLATT AND JOHN FIELDING, OF GLOUCESTER, COUNTY OF GLOUCESTER, ENGLAND.

PRESS FOR FLANGING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 317,427, dated May 5, 1885.

Application filed April 25, 1884. (No model.)

To all whom it may concern:

Be it known that we, RALPH HART TWEDDELL, of Westminster, in the county of Middlesex, and JAMES PLATT and JOHN FIELDING, of Gloucester, in the county of Gloucester, and Kingdom of Great Britain, have invented certain new and useful Improvements in Presses for Flanging Sheet Metal; and we 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 appertains to make and use the same.

Our invention relates to an improvement in presses for flanging sheet metal, the object of the same being, first, to provide means whereby plates of different sizes and shapes can be flanged on a single machine.

A further object of our invention is to provide means whereby a great saving of the compressed water is accomplished; and with these ends in view our invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of one style of press embodying our invention. Fig. 2 is a view in vertical longitudinal section of the valve and valve-box. Fig. 3 is a view in vertical transverse section showing the valve-box for supplying the small pipes and cylinder. Fig. 4 is a view of a modified construction of press. Fig. 5 is a view on the line *xx* of Fig. 1, showing the arrangement of small cylinders. Fig. 6 is a view in rear elevation of the valve-boxes; and Fig. 7 is a vertical sectional view through the main cylinder and plunger, the smaller cylinders and plunger, and the follower.

A are upright metallic standards, suitably supported and secured at their lower ends, and provided with the base B, on which are situated the four laterally-movable cylinders C, and to which is secured the large depending cylinder C'. The upper ends of these standards A are screw-threaded, and support the cross-head D, which latter is adjustably secured in position by the nuts screwed onto said standards. The large cylinder C' is provided with a pipe, D', communicating with the valve-box E, through which the pressure and exhaust water passes, and the smaller

cylinders C are each provided with independent flexible pipes *a*, which latter communicate with the common pipe *a'*, one end of which is secured to the valve-box E', shown in Figs. 3 and 6 situated alongside of, and preferably in communication with, the valve E. The pipes *a* are made of copper, and are preferably carried around all the cylinders before they are secured to their respective cylinders, for the purpose of enabling the cylinders C to be moved toward and away from each other as necessity demands. These cylinders are adjustably secured to the base B by the bolts *b*, and are adapted to be moved toward or away from each other to accommodate themselves to different size holding-plates G. Each cylinder C is provided with a plunger, H, which, combined, support and carry the holding-up plate G, which latter is situated above the vertically-movable follower I. This follower is rigidly secured to the plunger J of the large cylinder C', and is guided and steadied in its movements by the standards A, which latter pass through suitable sleeves *c*, formed integral with the follower. The plungers H pass upwardly through elongated slots in the follower, and support the holding-up plate G. These slots are made elongated for the purpose of enabling the cylinders to be adjusted as before described.

L is a matrix removably secured to the bed-plate *d* on the follower I, the inner or working face of this matrix being beveled or curved, to enable it to bend the plate without cutting or injuring it. This matrix operates in conjunction with the die M', which, together with its base M, is removably secured to the cross-head D.

The valve-boxes E and E' are situated at a convenient distance from the machine-frame, and, besides communicating with the pipes already described, are in communication with the pipe O direct from an accumulator or pressure-supply, and with the exhaust-pipe O', which latter leads to an elevated tank, into which the exhaust-water from the large and small cylinders is forced. These valves are each provided with a lever, P² P³—one for regulating the flow to and from the main cylinder C', and the other for regulating the flow simultaneously to the small cylinders.

The main valve-box E is provided with a pressure-opening, *e*, through which the water-supply enters from the pipe O, with the opening *e'* communicating with the pipe D' and with the exhaust-opening *e''*, through which the exhaust passes.

The valve-box E is provided with the annular chambers *c³*, *c⁴*, communicating, respectively, with the supply-opening *e* and the opening *e'*, and with the metallic packing-rings *c⁵*, *c⁶*, forming the internal walls of said chambers. The upper packing-ring, *c⁵*, is provided with a series of perforations near its lower end, and a lower packing-ring with a series of perforations, *c⁷*, near its upper end, and a series of perforations, *c⁸*, near its center, both of which latter series communicate with the chamber *c⁴*. The piston or valve P is operated by the lever P², and is provided about midway its length with the port *e'*, shaped as shown, and lower down with the cut-away portion *e''*. When the valve is in the position shown in Fig. 2, the port *e'* is cut off from both the supply-port *e* and exhaust-port *e''*. By moving the valve or piston downwardly until the upper portion of the port *e'* registers with the perforations *c⁷*, the lower end of said port *e'* will register with the upper series of perforations, *c⁸*, of the packing-ring *c⁶*, and permit the water to flow through port *e*, perforations *c⁷*, port *e'*, perforations *c⁸*, and perforations *c⁹*, into port *e'*. When it is desired to exhaust the water from cylinder C' through port *e'*, it is simply necessary to elevate piston or valve P until the cut-away portion *e''* thereof comes opposite the perforation *c⁹*. The valve-box E' is also provided with a valve or piston, (not shown,) which operates precisely like the valve or piston P, previously referred to. In this instance supply-port *e''* of this valve communicates with the chamber *c³* of the valve-box E, and the discharge-port *e'* communicates with the discharge-port *e''* of the said valve-box, while the port *e⁸* of the box E corresponds with the port *e'* of the valve E'. The piston or valve employed in the box is similar to the valve P, and is operated in a similar manner by the lever P³. If desired, these valves can be disconnected.

Within the passage-way *e'* of the valve-box E is situated the valve E³, which latter closes communication between the passage-way *e'* and the opening *e''*. This valve is normally held on its seat by gravity and the pressure of water in the cylinder C'; but when the piston or valve P closes the supply-ports in the valve-box E and the follower I is elevated by the small plungers H, as will be hereinafter described, a vacuum is created in the cylinder C', which causes the valve E³ to rise, and allows the waste water in the tank to flow into the cylinder C' and fill up the space caused by elevating the plunger J. Now, when the follower has been elevated sufficiently to bring the matrix L up in contact with the metal plate P³ to be operated on, the piston or valve P is depressed, so as to open communication

between the accumulator and the cylinder C'. The water under pressure then enters the cylinder C' and acts directly on the plunger J. By an arrangement of parts whereby the large cylinder is first partly filled with waste or exhaust water, and then with water under pressure, a great saving of the latter is accomplished without impairing the efficiency of the machine. Each plunger H is provided with an opening, through which the cotters or bars *f'* are passed for the purpose of elevating the follower I and matrix by means of the small cylinders. These small cylinders are operated by a valve situated in the valve-box E', which, as before stated, is similar to that shown in the valve-box E.

The operation of the device is as follows: A plate, P³, is placed in position on the holding-up plate G, and the latter, together with the follower, are elevated until the holding-up plate or the sheet metal on the holding-up plate comes in contact with the die M. Water under pressure is then admitted to the large cylinder C', which causes the follower I and the matrix L to rise, and the matrix, coming in contact with the metal plate, turns up a flange thereon. After the plate has been flanged the water is exhausted from the cylinders and the movable parts allowed to descend. The die, matrix, and holding-up plate are all removable, and hence it is only necessary, when it is desired to change the shape or size of the die and matrix, to remove them and replace them by another set.

In Fig. 4 we have shown an arrangement of parts in which the matrix is stationary and the die movable. The frame-work of this press is similar to that shown in Fig. 1, with the exception that the cross-head B³ is provided with a cylinder, C⁴, carrying a plunger, J', to which the follower I', having the die M², is rigidly secured. In the base B is secured a small cylinder, C⁵, in which the plunger H', carrying the holding-up plate, moves. This base is also provided with the standards *d*, to which the matrix L' is secured. In this device the follower I' is secured to the rods *g*, which latter pass up through the cross-head B³, and are secured to the opposite ends of the bar R, secured to the upper end of the draw-back plunger S. This plunger moves in the cylinder T, secured to the top of the cylinder C⁴, and is supplied with pressure-water through the pipe *j*, while the cylinder C⁴ is supplied by the pipe *j'*. The opposite end of the pipe *j'* terminates in the well U, which latter is in direct communication with the valve-box E, while the pipe *j* is in communication with the valve-box E'. The plungers S and J' work in opposite directions, the plunger S being solely for the purpose of elevating the die after the latter has flanged the plate.

To operate the machine, the plate is first laid on the matrix and the holding-up plate elevated. Water is then exhausted from the cylinder T, and water from the tank allowed to flow into the cylinder C⁴ as fast as the plunger J

descends. When the die strikes the plate to be flanged, the valve or piston P is operated, which allows the pressure-water to enter the cylinder C⁴ and cause a further descent of the die, which forces the plate and the holding-up plate downward. After the plate has been flanged, the water is exhausted from the cylinder C⁴ and the pressure-water allowed to flow into the cylinder T. This causes the plunger S to rise, and with it the follower and die.

From the foregoing it will be seen that numerous slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit of our invention, and hence we would have it understood that we do not restrict ourselves to the exact construction shown and described, but consider ourselves at liberty to make such changes and alterations as fairly fall within the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a flanging-press, the combination, with a cylinder and plunger, a valve-casing provided with three communicating ports, a pressure-supply pipe connected to one of said ports, a pipe from a waste-tank, connected to another of said ports, and a pipe from the press-cylinder, connected to remaining port, of a valve located within said valve-casing, for opening and closing communication between the pressure-supply and press-cylinder, and for opening and closing communication between the press-cylinder and waste-tank, and an automatically-operating valve for closing communication between the press-cylinder and waste-tank, substantially as set forth.

2. In a flanging-press, the combination, with a die, a movable matrix, and a holding-up plate, of laterally-adjustable cylinders and plungers moving in said cylinders and supporting the holding-up plate, substantially as set forth.

3. In a flanging-press, the combination, with a die, a movable matrix, and a holding-up plate, of a suitable pressure-supply, laterally-adjustable cylinders, the plungers of which support the holding-up plate, and flexible pipes connected to the adjustable cylinders, substantially as set forth.

4. The combination, with the die, follower, and matrix, of the small laterally-adjustable cylinders, the plungers of which are each provided with an opening, and cotters removably secured in said openings, for engaging the follower, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

RALPH HART TWEDDELL.

Witnesses to the signature of Ralph Hart Tweddell:

H. G. SCOTT,
WM. BAILEY.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JAMES PLATT.
JOHN FIELDING.

Witnesses to the signatures of James Platt and John Fielding:

JOHN A. POPE,
H. CADENNE.