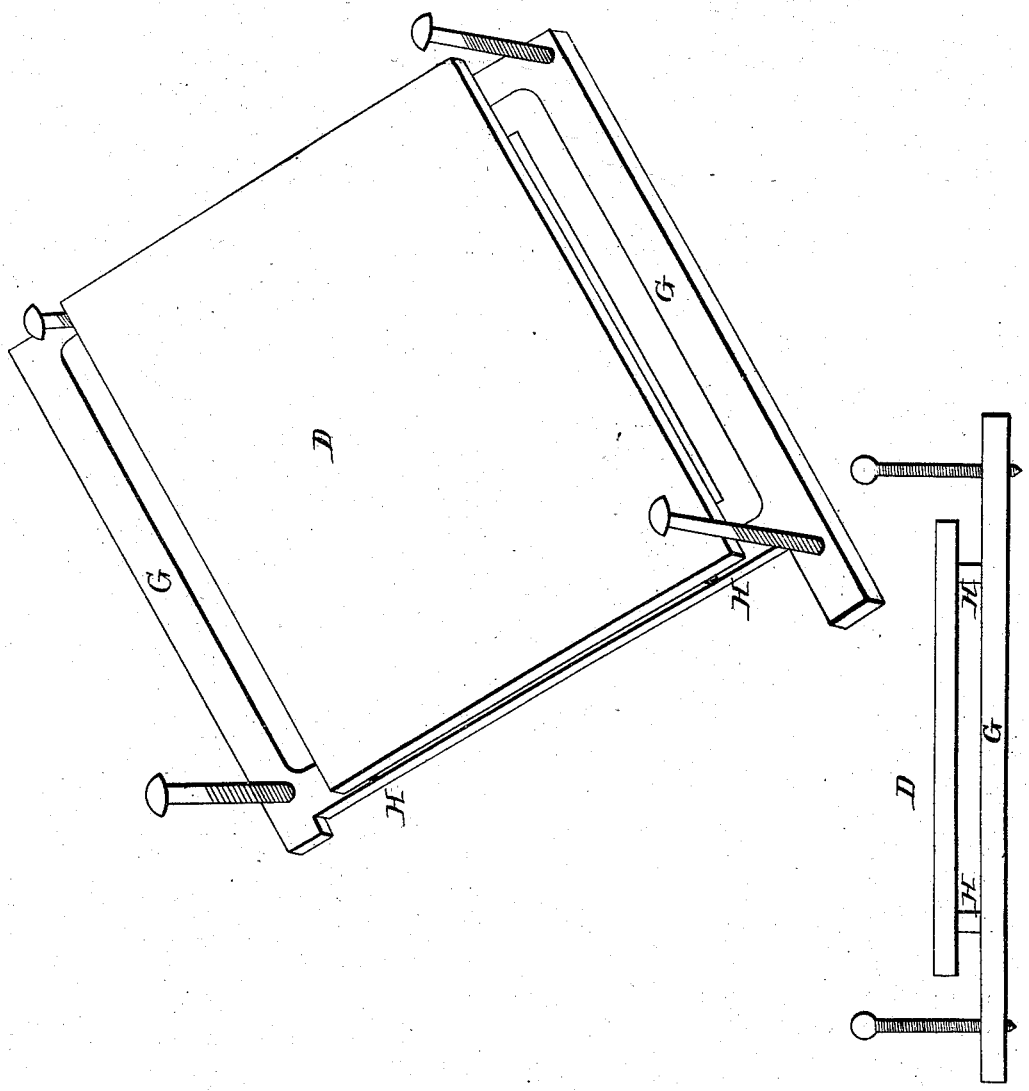
Sheet-1-5Sheets.

C. Davison,

Stereotyping Machine,

No. 3,836. Patented Nov. 26, 1844.



Sheet 2 - 5 Sheets

C. Davison,

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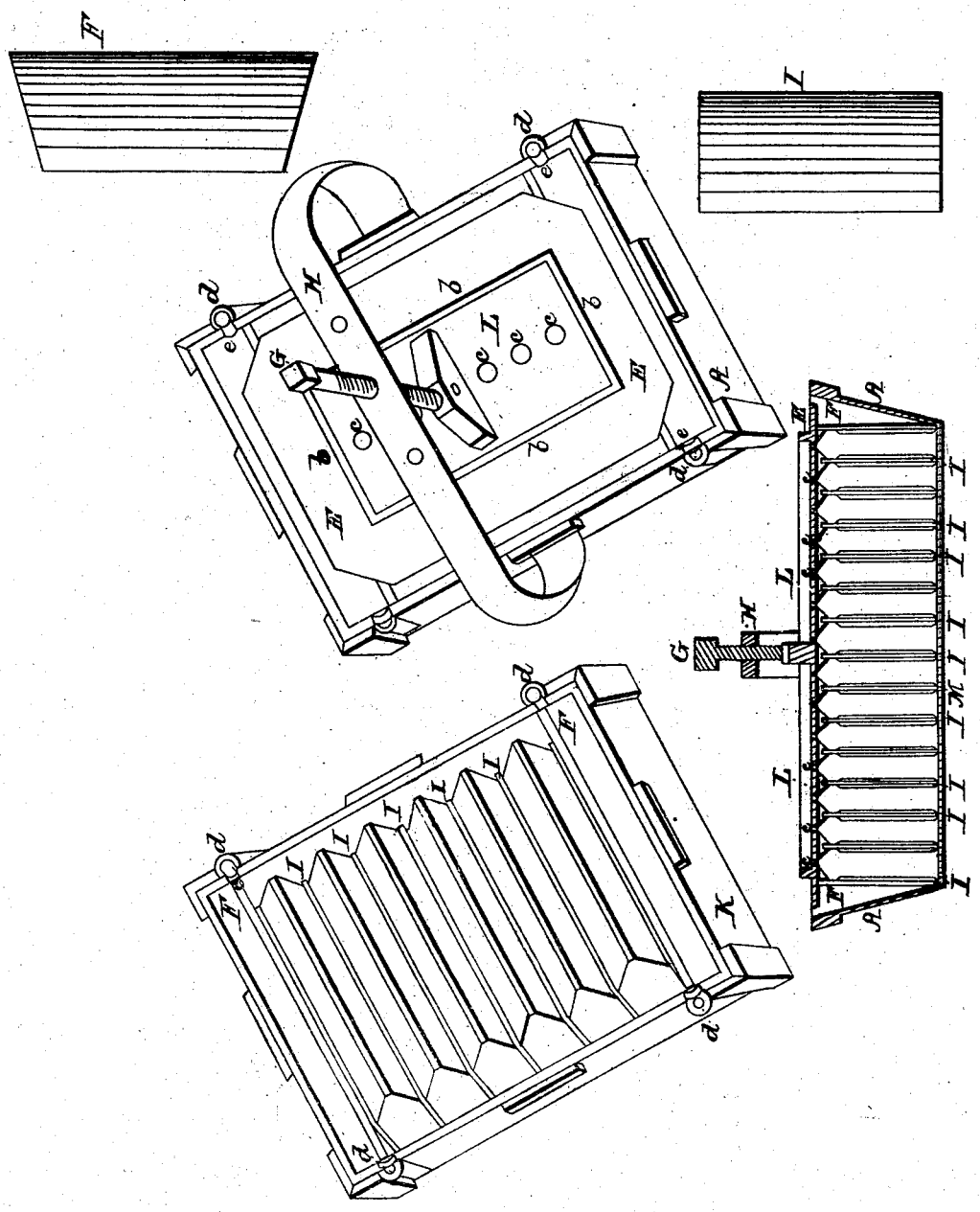

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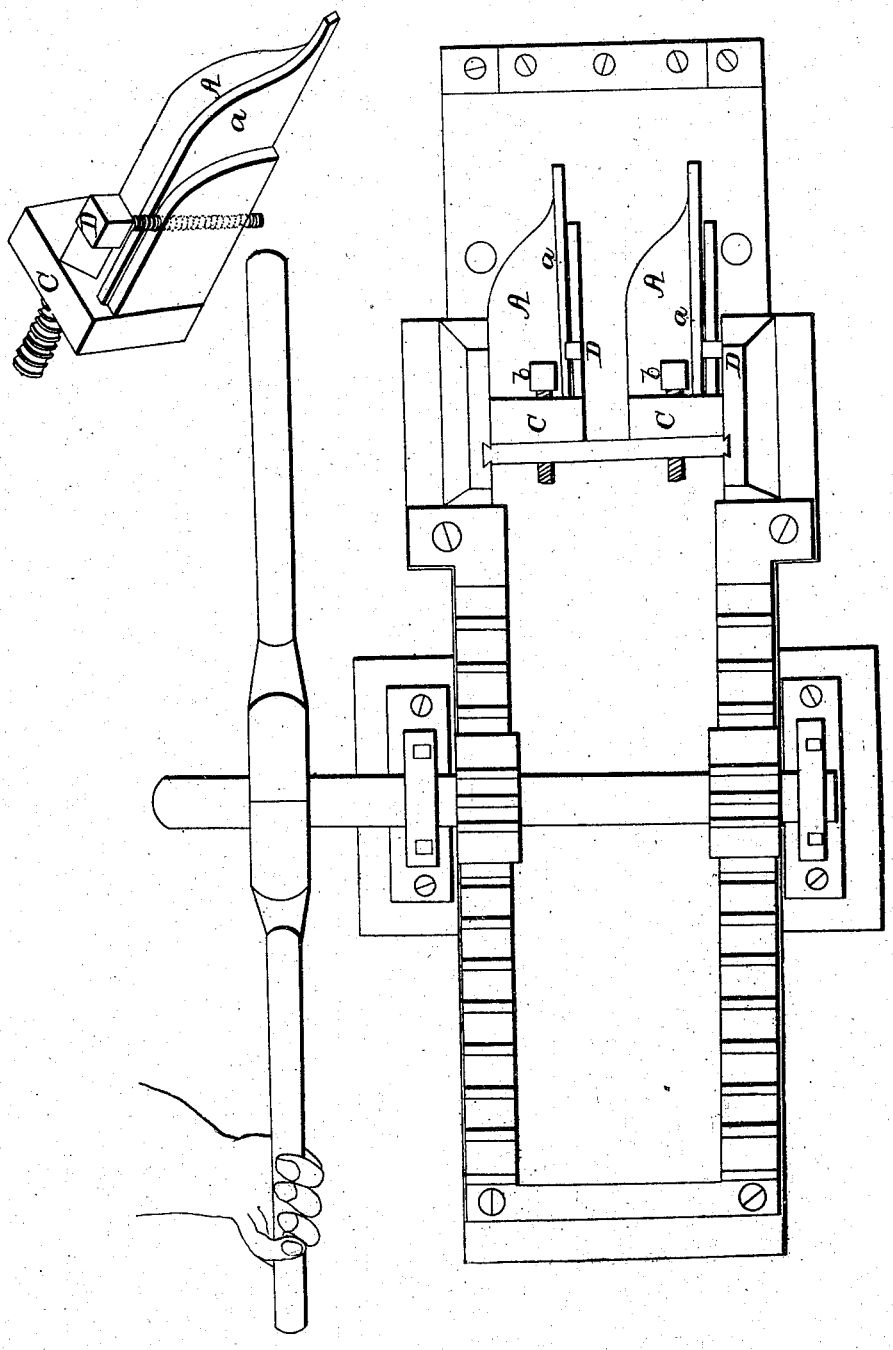

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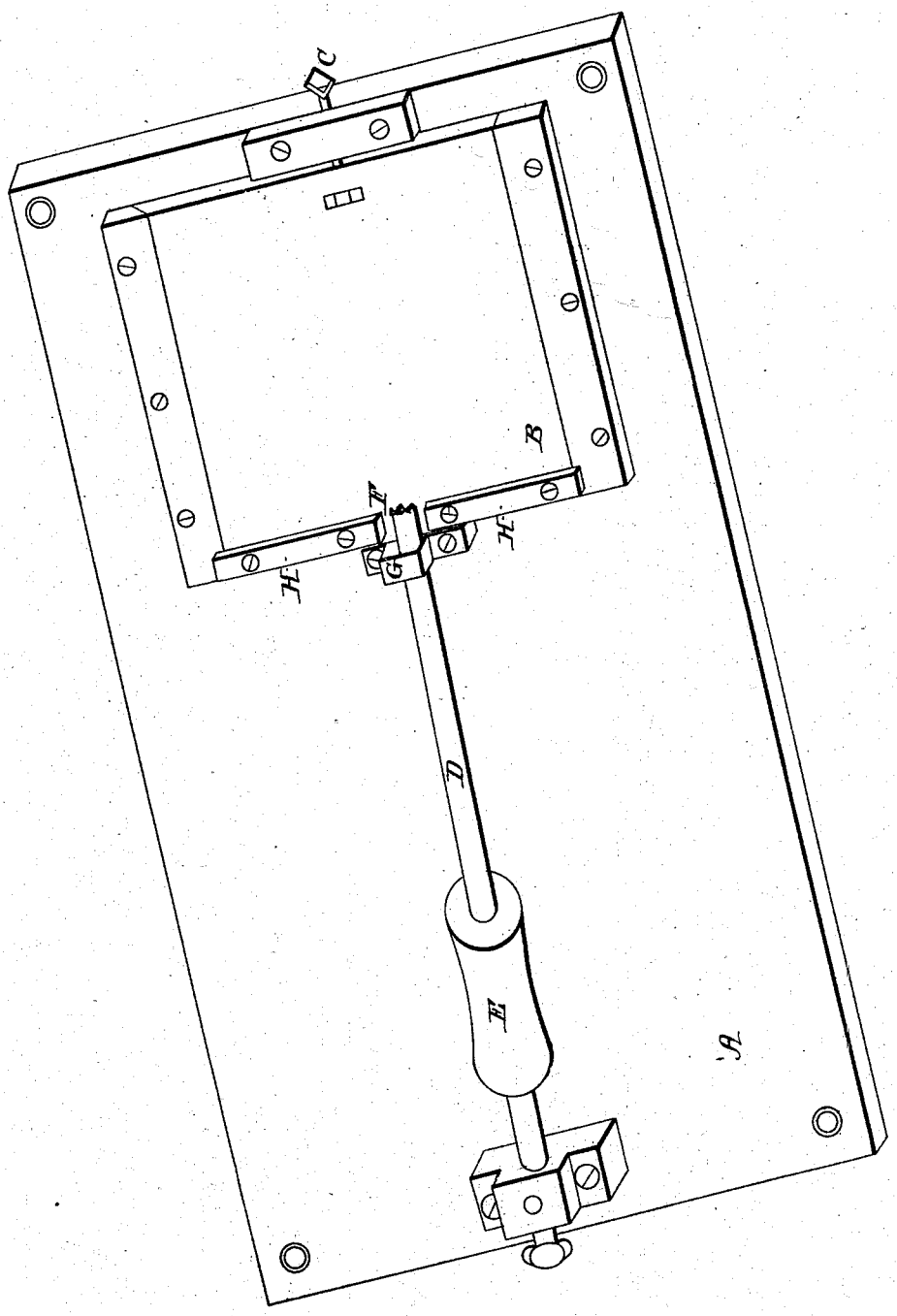
Stereotyping Machine,

No. 3,836. Patented Nov. 26, 1844.



C. Davison,

Sheet 3 - 5 Sheets

Stereotyping Machine,

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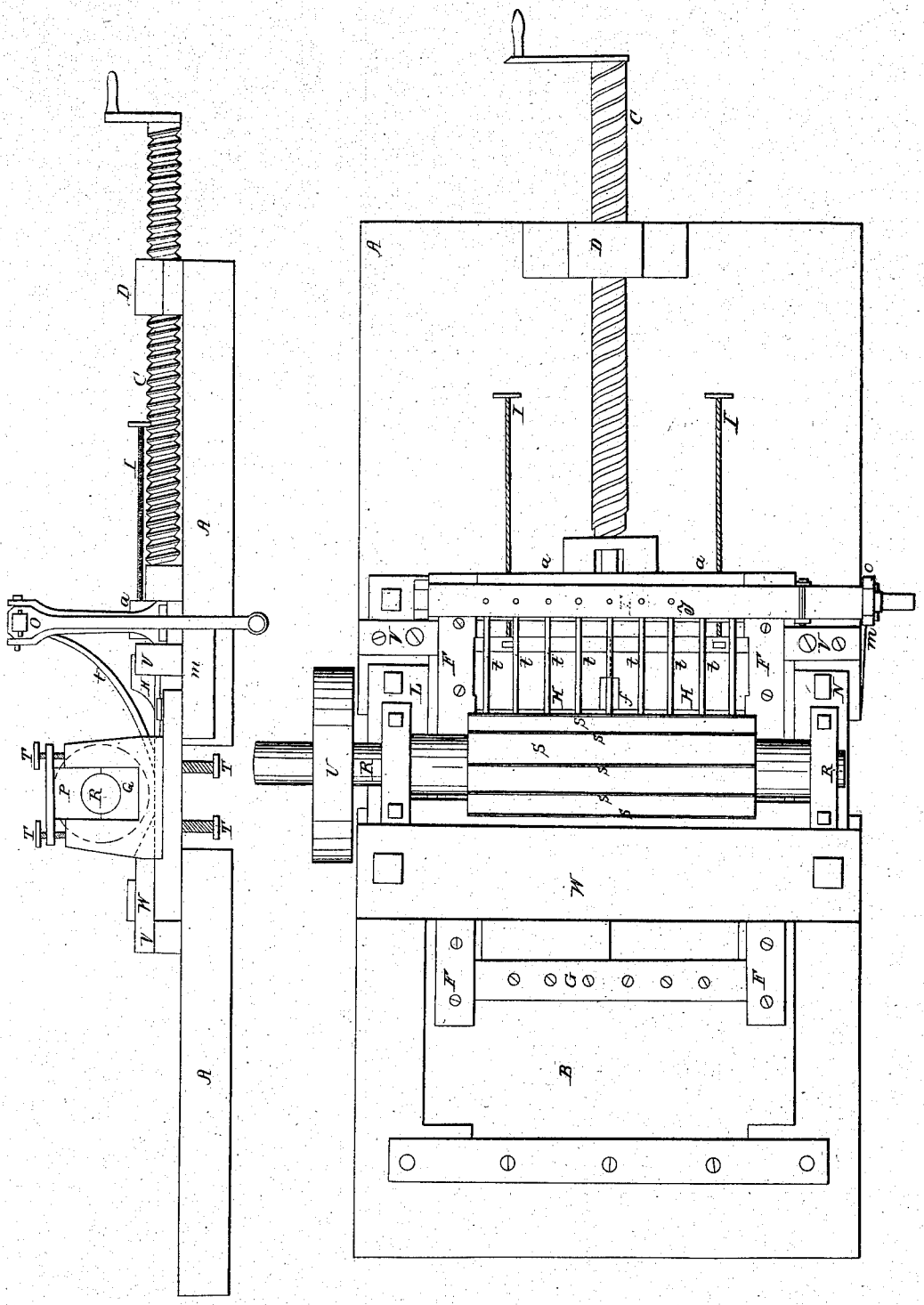

UNITED STATES PATENT OFFICE.

CLEMENT DAVISON, OF SARATOGA SPRINGS, NEW YORK.

STEREOTYPING.

Specification of Letters Patent No. 3,836, dated November 26,1844.

To all whom it may concern:

Be it known that I, CLEMENT DAVISON, of Saratoga Springs, county of Saratoga and State of New York, have invented a new and Improved Method of Molding and Casting Stereotype-Plates, Also of Cutting Out and Chiseling and Finishing the Same; and I do hereby declare that the following is a full and exact description.

In molding, a mold is made in the usual and well known method, to wit: The page or pages to be molded are firmly locked in a metallic frame, called a chase, and then placed upon a flat stone, when the surface of the letters are slightly oiled, the page or pages (called a form,) are encircled in a frame or flask, which prevents the plaster from running off when in a liquid state. The plaster after being mixed with about an equal quantity of water to which a little salt is added is then poured upon the type, and when sufficiently hard is raised from the type, by means of screws at the corners of the flask. After a mold is thus made one is taken of another form, and while the second mold is in an adhesive state, having the plaster highest in the middle of such mold, the first mold which has in the meantime become hard is placed with its back upon the back of the second mold and by gradually working them together the air is entirely excluded between the two, and the two form one solid mass.

Plate 1: A gage (D) being used to bring the joined molds all to one uniform thickness. The two molds can also be joined together, both having become hardened, by spreading over the back of one, plaster or some other substance in its adhesive state, and then placing them together in the same manner as when only one of the molds is adhesive, but the first mentioned method is found best in practice. When more than one page are molded side by side at one time, they are to be separated, to enable the workman to cast them in a pan perpendicularly instead of horizontally, which is the old method.

The advantages of this process of forming molds are the following. The mold is thicker and stronger and far less liable to warp or crack in casting: By thus joining the molds the process of casting is expedited. The plates can if required be cast thinner than by the old method, and one third of the plaster formerly required is by this method saved. By adopting the above method of making molds and of casting hereafter to be described, we are enabled without risk, to distribute the type as soon as the mold is taken which can not be done by the old method of molding and casting without danger of having to reset the type. The gage (D) before referred to, is a piece of wood or metal about the size of the molding flask (G) having pins or feet (H) of metal or wood projecting from the under side. As soon as the mold is placed upon the back of the other, the gage (D) is laid upon the face of the upper mold having the pins or feet on the under side, and is gently worked back and forth on the face of the mold, until the pins or feet (H) strike upon the upper surface of the flask (G) thus bringing all the joined molds to a uniform thickness.

Plate 2: A casting pan of which the following is a description is then used: The pan (A) for octavo pages is 21 inches long and 12 inches wide at the top, and 17 inches long and 9 inches wide at the bottom, and 5¼ inches deep, all in the clear. The cover (E) is about one fourth of an inch less in size than the inside of the pan, and has a rim or molding half an inch high on the upper side (*b b b b*) which forms a basin to hold melted metal when the space between the cover and pan is chilled so that the melted metal can not pass off. A row of holes (*c c c c c*) about an inch apart and an eighth of an inch in diameter are drilled in the cover through which the metal passes to supply shrinkage. A heavy pressure of melted metal in this basin readily forces a supply where a shrinkage would otherwise occur. Four tubes (*d d d d*) one near each corner are placed perpendicularly on the sides of the pan three inches long with a hole half an inch in diameter. These tubes are open at each end and the rim of the pan opposite the hole at (*e e e e*) is cut away so that the pan is nearly immersed in the metal it rises in the tubes and flows into the pan which effectually excludes dross and particles of antimony which by the old method of flowing over the top of the pan so often injure or spoil the plates.

Two iron plates (F F) fitted across the pan at each end, and placed perpendicularly are half an inch lower than the edge of the pan. They should be half an inch thick and upon the edges of these plates the cover

(E) rests when the molds are in their places for casting, and which is bound firmly by the screw (G) in the clamp (H). Iron plates are made one sixth of an inch thick and of the size of the mold to be cast, they must be perfectly flat and smooth on both sides, and one being laid between each mold forms the back of the stereotype plate when cast. In a pan where thirty plates are cast at one cast thirteen of these plates are required.

(K) is a casting pan with the cover off and the plates and mold are represented as arranged ready for placing on the cover. (M) is a sectional view of the same.

After the molds have been dried and baked in the usual manner they are placed perpendicularly in the casting pan. A pan of the above size and proportions which will receive molds for thirty pages octavo has been found most convenient in practice, while 12mo pages or those of a smaller size may by diminishing the depth and increasing the width may be arranged so as to cast from forty to fifty at one cast, varying with the size of the page. When a mold is placed in a pan an iron plate (I) is placed by the side of it and in this manner the plates and molds are arranged until the pan is filled. The cover (E) is then firmly bound by a clamp (H) and screw (G) in the usual manner. The pan is then by means of a crane lowered into a caldron of melted metal which flows through the tubes (*d d d d*) into the pan until it is filled, it is then removed by the crane to the cooling trough, when the water is gradually suffered to flow into it and by cooling the bottom of the cast first, and the top being kept in a melted state, the shrinkage in the plates is entirely prevented; the water continues to flow until the metal between the edge of the pan and cover is chilled, when the basin (L) on the cover is filled with hot metal, and readily forces a supply where a shrinkage might occur. By this arrangement an important object is gained (viz) the shrinkage is entirely thrown above the plate and not in it as in the old method, which often renders them unsound and injures the face of the letters.

By casting the plate perpendicularly, any particles of dust or any impurity in the metal floats until it rises above the face of the letters, and does no damage, whereas by the old process dust or dross could not escape. By the old process the mold being exposed flatwise to the pressure of the floats and metal are frequently broken, but by placing them edgewise to all pressure such danger is avoided.

By the old method only three or at most four octavo pages could be cast at once, while by this process thirty are advantageously cast at each time, and the pages are easier broken from the cast than by the usual method.

By allowing the metal to run in from below the surface through the tubes (*d d d d*) the excess of antimony and dross is effectually excluded; by the old process plates are often injured from this cause. In addition to the above the expense of fuel is reduced about one half and the labor of casting two thirds.

Plate 4: After the stereotype plate is properly leveled upon the back, it is necessary to cut from the face of it such portions as are designed to be blank. Instead of using the ordinary hammer and chisel, chisels of various widths are employed and shown at (A, A,) which are in shape similar to the common ducks bills chisels. They are strengthened by a flanch horizontal, and also a perpendicular one (*a a*) which are shown in the detached drawing in Plate 4. These join the head piece (C) of the chisel that fits against the head piece of the leveling machine, and is attached thereto and adjusted by a screw bolt (*b*) so as to cut at the proper point on the plate. It is steadied by set screws (D D) that pass down vertically through the flanch (*a*) of the chisel and rests on and slides along the bed plate gaging the depth of the cut and steadying the point of the chisel. Instead of a screw it will be evident a cam can be substituted for the purpose of gaging the chisel, and with the same effect prevent the trembling or yielding in the head piece and also preventing cutting too deeply into the plate.

The advantages derived from the use of my chisels are a saving of one half the time, and the plates are less liable to be bent and the blanks can be cut smoother and deeper, thus preventing blacking in printing, and the danger of breaking off letters is almost entirely avoided.

Plate 5: After the plate is properly leveled and the blank places upon the face cut out in the manner before described, the revolving marginal cutter is used for beveling the margin of the plates and is described thus. It consists of a platform (A) upon which is a movable piece (B) on which the stereotype plate is placed. This movable piece (B) is graduated at pleasure by means of a screw (C) or other mechanical contrivance so as to determine the distance upon the plate upon which the said revolving cutter shall act. The cutter consists of a spindle (D) or mandrel, with a pulley (E) or whir or other mechanical arrangement for the purpose of giving the spindle (D) or mandrel a rotary motion. The point or cutting part (F) projects over the movable piece (B) and is so cut or formed as to present sharp edges which when the spindle (D) or mandrel is in motion produces the effect above mentioned. The cutting part (F) is ta-

pered so as to produce the desired bevel, and the box (G) nearest the cutting point (F) in which the journal of the cutter turns is made to be raised or depressed at pleasure so as to determine the depth of the bevel. On the movable piece (B) a fence or guide (H) is elevated, against which the edge of the stereotype plate is placed with the face uppermost and those parts of the margin of the plate which require beveling or cutting down are brought under the cutting part (F) and reduced to the desired thickness. Or, the stereotype plate may be laid upon a movable slide or platform, and to said platform a lever, wheel or other mechanical arrangement may be so fixed that said platform or plate shall be held or moved by one hand while with the other the stereotype plate shall be firmly held on said slide or platform, by which arrangement the cutter is made to act upon the plate whenever desired.

The advantages of the above machine is the neatness, rapidity and safety with which it acts, occupying much less time than the old way of chiseling, and avoiding blacking in printing which in plates prepared in the old way is of frequent occurrence.

Plate 6: The machine for leveling or planing the backs of the plates is shown at Plate 6, where a plan and elevation is represented. It is composed of a flat casting or foundation (A) of an oblong form on which rests and slides a bed plate (B) between guides (V, V,) on each side; the bed plate is moved by a screw (C) which is turned by hand or otherwise, in a nut (D) attached to the foundation (A) on the bed plate (B). At the end next the feeding screw (C) is a head piece (*a a*) that projects above said plate through which two screws (I) pass horizontally. These screws are connected with two followers (H H) that rest on the bed plate and are held down at each end by side pieces (F) that are screwed to the bed and are champhered off at their under side, at the inner edge under which a projection on the ends fit. In the center between the followers is a similar piece (*f*) fastened; which together with the outside ones hold down the followers. Toward the other end of the bed plate there is a narrow ledge (G) screwed on across said bed, against which one end of the stereotype plate to be planed rests; the follower is then screwed tight up against the other end, and the stereotype plate is thus secured firmly to the bed. On each side of the foundation plate (A) are pedestals rising above the bed plate which contain the boxes (P^2) in which the journals (R) of a cutting cylinder (S) turn. From the face of this cylinder project cutters (*s s s s*) that run straight across from end to end, as in the drawing, or are placed spirally around the cylinder, which I prefer in practice; this cylinder is turned with a rapid motion by any power with which it is connected, by a pulley (U) and band. Just behind the cylinder cutter is firmly affixed a stationary knife (W) made very stout and strong, so as not to be sprung by the pressure of cutting; its edge is brought near to the cutters on the cylinder and acts on the plate directly after the cylinder cutter has reduced it somewhat level; taking off a shaving and leveling the plate so as to complete the whole at one operation. By the ordinary mode of operation in leveling plates, if they are cast thick they have to be passed several times through the machine, and if very thick, the cost of reducing them would be greater than casting over, but by the apparatus thus described the thickest plate can be reduced at one operation. While at the same time it is leveled by the stationary knife, and is of great importance and can not be effected by the lathe that has been heretofore used for the purpose of turning off plates, or by the revolving cutter alone. The plate as it passes under the cutters requires to have a pressure on it, directly before them to keep it down steady. To effect this a shaft (T) is placed across the machine in front of the cylinder cutter, on standard projection up from the foundation plate, from which shaft fingers or springs (*t t t*) extend out curving down and backward to the plate on which they rest, just in front of the point where the cylinder cutter is acting. They are held down with any degree of force required by means of a crank (O) which may be held by a catch on the plate (*m*) when in operation; these springs act with much greater certainty than rollers as they will each follow any irregularities in the thickness of the plate at the point where they are resting. One page quarto, or two pages octavo or three pages 12mo can be passed under the above described cutters at one time.

The advantages of my leveling machine over that ordinarily used are, a saving of two thirds of the time, and the plates are never bent or warped, which is an objection to the old method; the face of the letters are far less liable to injury, the plates can be if required made thinner when finished, and thick plates can be leveled without the expense of recasting them.

Having thus described my improvements, and their operation, what I claim as my invention and desire to secure by Letters Patent is—

1. The joining the molds in the manner described, or in any other substantially the same.

2. I claim constructing the casting pan in the manner described with upright tubes (Plate 2) at the sides thereof, through which the metal flows into the pan; and the

cover, having a cup formed on the top thereof with holes through it into the pan, the whole being arranged in the manner and for the purpose described.

3. I claim the combination of the molds, the floaters or plates between them, and the pans in the process of stereotyping substantially in the manner, and for the purposes set forth; by which any convenient number of plates can be cast at one time, without danger of breaking the molds, or injuring the face of the letters by dirt or dross or shrinkage.

4. I claim the combination of the revolving and stationary cutters for reducing and leveling the back of stereotype plates as herein made known and in combination therewith the springs or fingers for holding down the plates.

5. I claim the combinations of the chisels, constructed and arranged as herein described, with the ordinary leveling machine, in the manner and for the purpose above specified.

6. I claim also the revolving marginal cutter for beveling the edges of the stereotype plates, arranged and constructed in the manner set forth in combination with the chiseling machine for finishing stereotype plates.

CLEMENT DAVISON.

Witnesses:
J. J. GREENOUGH,
LAFAYETTE CALDWELL.