Sheet 1-4 Sheets.

# J. Keene,

## Plastering Machine,

No. 66,664. Patented July 9, 1867.

Fig: 1.

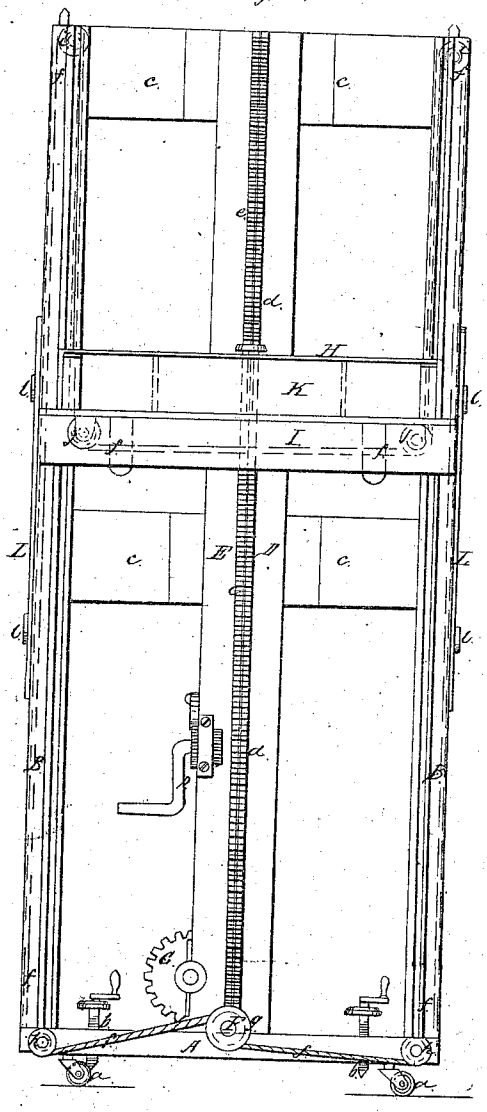


Fig: 2.

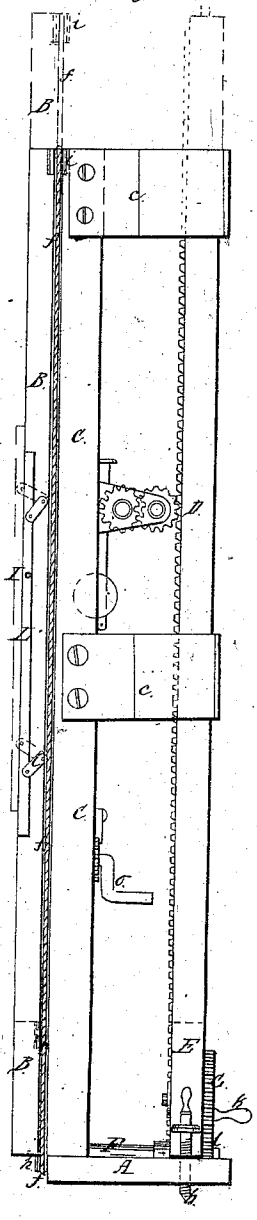
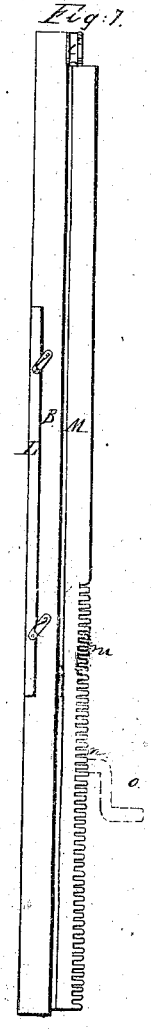


Fig: 3.



Witnesses.
Thos. J. Pokes
J. L. Brooks

Inventor.
Josiah Keene

Sheet 2 - 4 Sheets.

# J. Keene,

## Plastering Machine,

No. 66,664. Patented July 9, 1867.

Fig: 3.

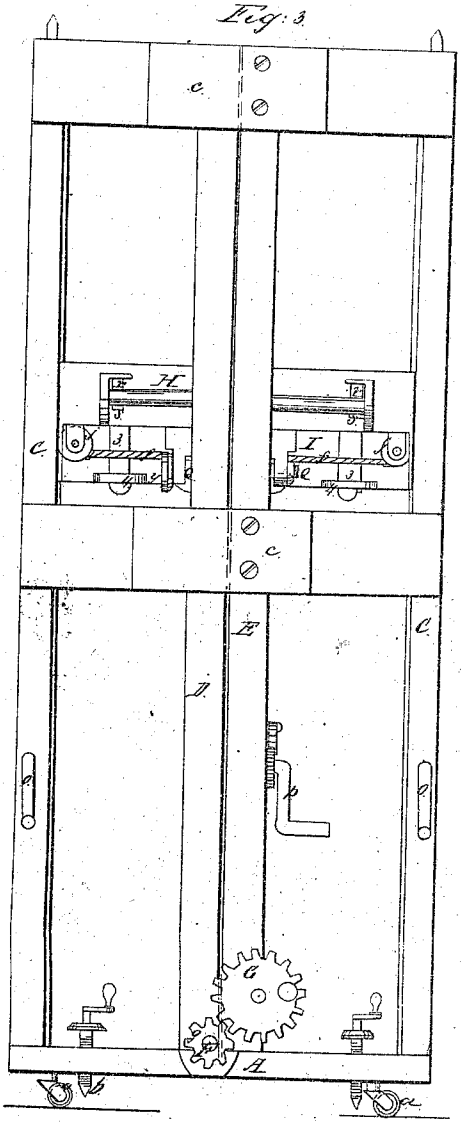


Fig: 4.

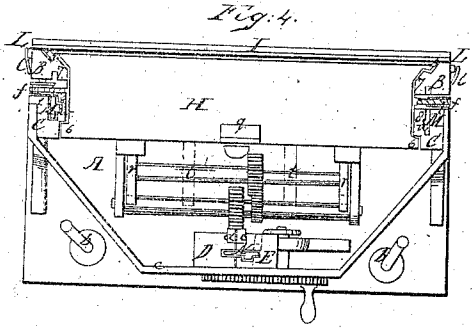


Fig: 5.

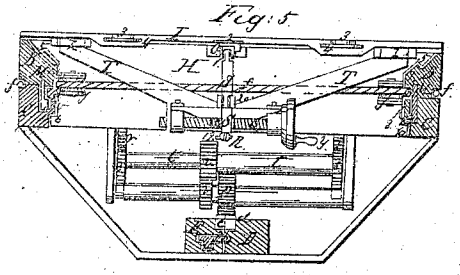
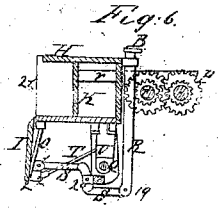


Fig: 6.



Witnesses.
Thos. T. Parker
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Inventor.
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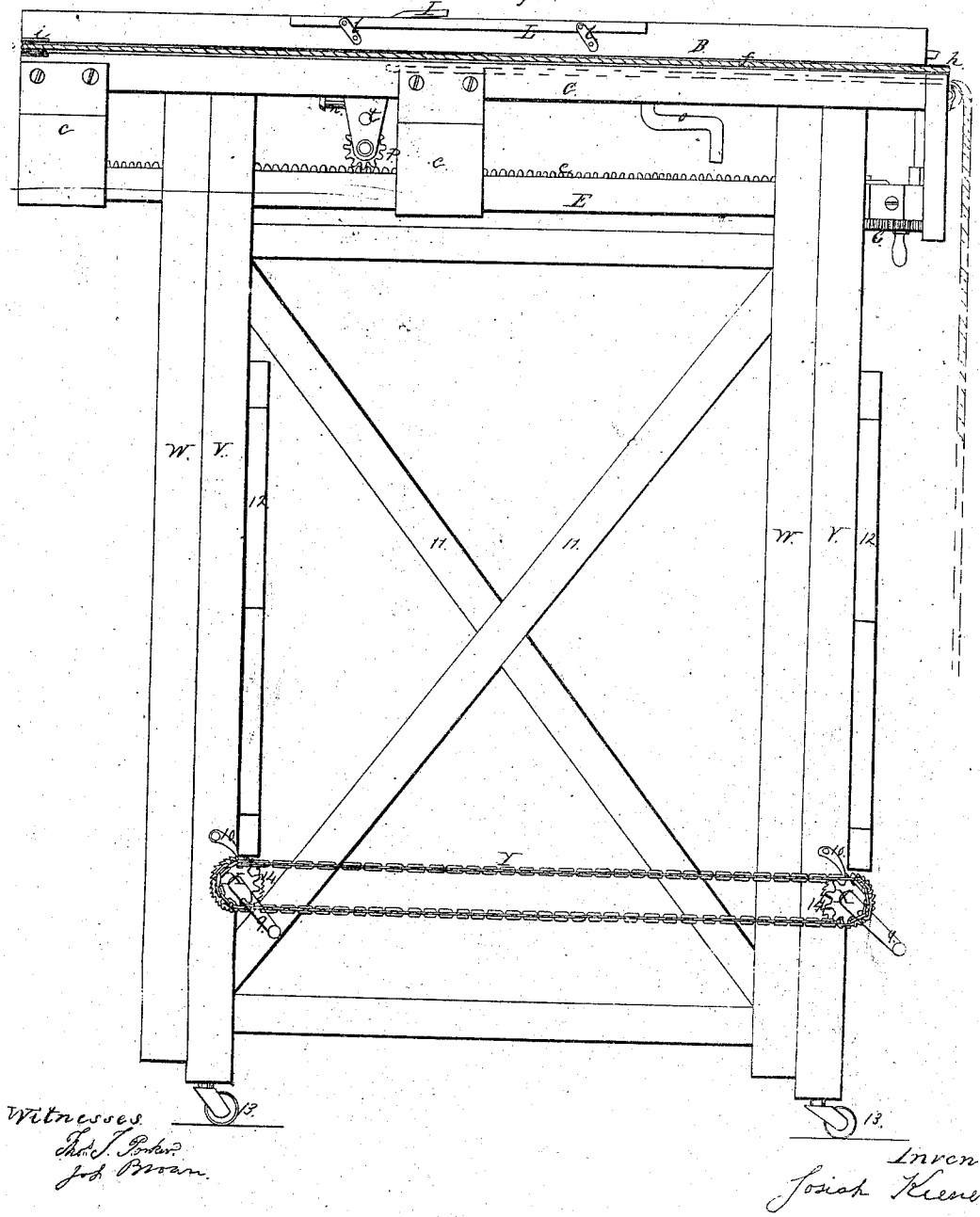
Sheet 3 - 4 Sheets.

# J. Keene,

## Plastering Machine,

No. 66,664. Patented July 9, 1867.

Fig. 8.




Witnesses.
Thos. J. Parker
Jos. Brown.

Inventor
Josiah Keene

Sheet 4 - 4 Sheets.

# J. Keene,

## Plastering Machine,

No. 66,664.

Patented July 9, 1867

Fig: 9

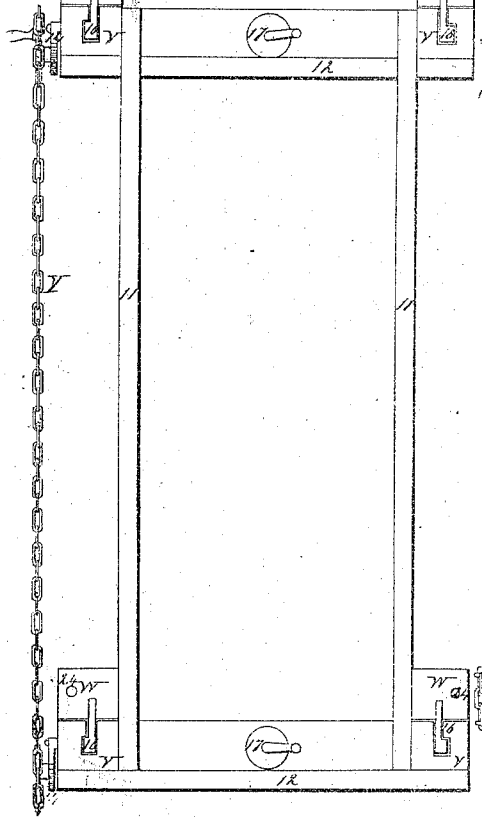
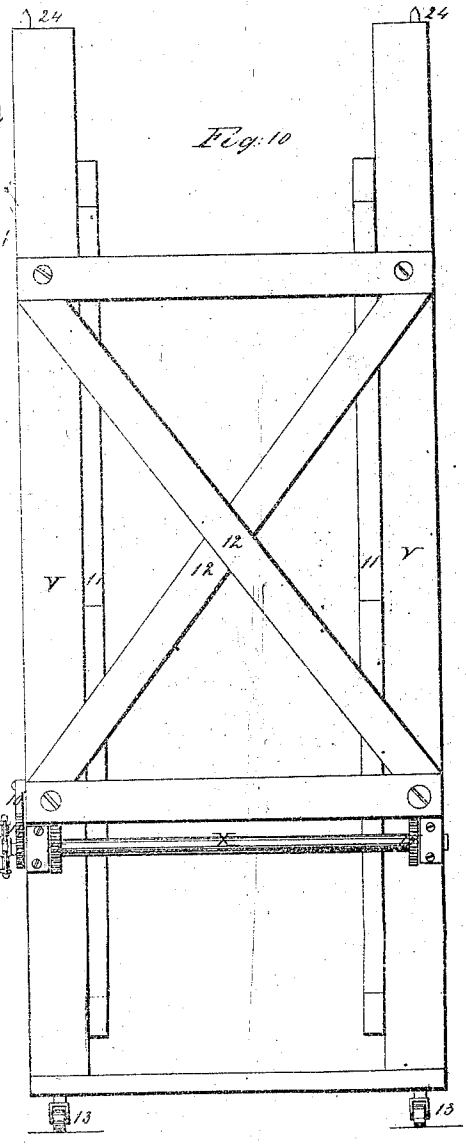



Fig: 10




Witnesses
Thos. L. Parker
J. S. Brown

Inventor
Josiah Keene.

# United States Patent Office.

JOSIAH KEENE, OF WASHINGTON, DISTRICT OF COLUMBIA.

*Letters Patent No.* 66,664, *dated July* 9, 1867.

## IMPROVED PLASTERING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOSIAH KEENE, of Washington, in the county of Washington, and District of Columbia, have invented a new and improved Plastering Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a front elevation of the machine.

Figure 2, a side elevation thereof.

Figure 3, a rear elevation of the same.

Figure 4, a top view thereof.

Figure 5, a horizontal section thereof, looking upward, below the mortar-box.

Figure 6, a transverse vertical section of the mortar-box.

Figure 7, a side view of one of the adjustable or extension standards attached.

Figure 8, a side elevation of the frame or apparatus (including the plastering machine in operation) by which the machine is applied to plastering ceilings.

Figure 9, a top view of this apparatus.

Figure 10, an end elevation thereof.

Like letters designate corresponding parts in all of the figures.

The leading features of my invention consist in a mortar-box moved upward or along in close proximity to, and parallel with, the wall or surface to be plastered between or by the guide-ways of a frame or stand; a follower, inside of the mortar-box, which is forced forward by the upward movement of the mortar-box at such a rate as to supply mortar just sufficient to spread the surface to the proper and uniform thickness; and a trowel for forming and smoothing the surface of the plaster, all substantially as hereinafter specified.

The method of constructing and arranging these main parts of my invention may be varied in many particulars; but I will proceed to describe the construction, arrangement, and operation of the invention as I have embodied it in practice, and represented in the accompanying drawings.

First, the frame or stand has a base, A, near the floor, to be provided with casters or friction-wheels, *a a*, so that the stand may be readily shifted from one position to another, and also provided with points or dogs *b b*, to be screwed or forced down to the floor, and thus to hold the stand securely in a fixed position when it is located in any place for operation. When the wall in front of the machine has been plastered the dogs *b b* are screwed or raised up away from the floor so as to allow the stand to be moved to another position. The guide-ways are required to extend from the base A nearly or quite up to the ceiling, and to be secured at the upper end accurately in position; and since the heights of rooms differ greatly it is necessary to have these guide-ways adjustable in length. For this purpose each way is composed of two parts, a fixed standard, C, and an extension standard, B, one each of which is represented on each side of the machine. The fixed standard C may be tubular, and the extension standard slide up and down therein; but I have represented the two standards as situated side by side, and coupled together by a metallic flanch, M, one edge of which is permanently secured in the extension standard B, and the other edge fits into a groove in the edge or side of the fixed standard, there being a feather or projection, *w*, on one side of the flanch to fit into a corresponding depression at one side of the standard groove, as shown in figs. 4 and 5, to keep the flanch in place in the standard. The coupling flanch, with the extension standard B, slides freely in the grooved standard C, and in order to extend or retract the standard B a set of rack-teeth, *m*, fig. 7, is formed on or in the flanch M, and into this rack a driving-pinion, *n*, mounted in the fixed standard C, and turned by a crank, *v*, is geared, as specially indicated by red lines in the same figure. The standards B B are represented in red lines in fig. 2 as extended; and there are points upon the upper ends thereof to strike and pierce the ceiling sufficiently to hold the ways firmly in position at the upper end. The extension standard may be held up by locking the raising pinions *n n* with pawls, acting on a ratchet-wheel on the pinion-shaft, as indicated in fig. 2, or by any equivalent means. It is necessary that there should be some sure and ready means of adjusting the stand or frame with the guide-ways in exactly the proper position in relation to the lathing or surface to be plastered, and at uniform and proper distance therefrom, to be adjustable at pleasure. For this purpose I employ gauge-plates or bars,

L L, one on each extension standard B, near the front edge thereof. These gauge-plates are pivoted to short parallel bars, *l l*, so that they may be moved forward or backward in exactly parallel positions, as indicated by black and red lines in fig. 2. They are set in the proper position, so that their front edges, by bearing against the lath, wall, or plastering, will determine the exact distance at which the stand should be set from the wall to lay the plaster on to the desired thickness. The gauge-plates may be set or secured in any given position by clamping with set-screws, or by an equivalent device. Any equivalent of the gauge-plates may be employed.

Second, the mortar-box H slides, and is guided up and down between the guide-standards B C and B C, there being guide-projections, 5 and 6, on the ends of the box, and fitting in guide-ways or grooves respectively in the standards B and C. As the extension standard B often projects far above the fixed standard C, which then reaches correspondently below the other, it is necessary to guide the mortar-box by each standard singly, as well as by both together, so that additional guide-projections, 7 and 8, on the box should properly be made, and fit in corresponding grooves respectively in the standards B and C, as indicated by red lines in fig. 4. The extension standards B B are bevelled on the inside in front, so that the mortar-box may extend nearly, or, if desired, entirely, or even more than the whole width of the stand of frame, and plaster an equal width on the wall or surface in front thereof. In order to raise the mortar-box from the floor to the ceiling, to lay on the mortar, a strong inelastic cord, *f*, may be employed in connection with a windlass or winding-shaft, F, to which the two ends of the cord are attached, and wound thereon simultaneously and equally. The cord extends thence on both sides, first down and sidewise around pulleys *h h* at the lower corners of the stand or frame; thence upward around pulleys *i i*, located at the upper corners of the frame; and thence down around pulleys *j j* on or under the ends of the mortar-box, all substantially as represented in figs. 1 and 2. Thus by winding the two ends of the cord *f* equally around the shaft F, the mortar-box is raised, and its two ends equally, till it strikes the ceiling above. Then by reversing the motion of the shaft F, so as to unwind the cord, the mortar-box descends in its ways by its own weight. The shaft or windlass F being located down close to the floor, a driving-wheel, G, with a handle or crank, *k*, is employed to communicate the power by hand to a pinion, *g*, on the said shaft. By this gearing, also, the motion of the shaft may be multiplied as much as desired. The mortar-box H may be of convenient length, say three or four feet, so as to plaster a strip as wide as it may be proper and easy to do at once, and a narrower one may be employed for plastering strips by the side of windows and doors and in closets; and it may be subdivided into compartments by one or more vertical partitions, as indicated by the red lines in fig. 1, so as to plaster from all or only a part thereof. The capacity of the mortar-box should be sufficient to hold mortar enough to plaster to as great a height as the highest rooms ordinarily are, or as high as the machine is made to extend; and in order that it may occupy as little space vertically as possible, the width from front to back should be as great proportionally as may be conveniently employed and give a suitable proportion to its dimensions. Thus, for instance, suppose the plaster is to be laid on half an inch thick, or to take up that thickness of mortar, and the vertical depth of the box is six inches, then every inch of width from front to back will lay one foot in height of plaster, so that the entire width (inside) of the mortar-box would be as many inches as the room is feet in height. The rooms not exceeding twelve feet in height, the mortar-box need not be more than six inches in depth; but for higher rooms a box of eight inches would be suitable. The mortar (in plastering vertical walls) may be introduced into the mortar-box through an opening, *q*, (fig. 4,) in the top, to be closed by a lid, or the whole top of the box may be raised, as a lid, for the purpose. The mortar-box may be made of cast iron, sheet steel, or other suitable material.

Third, the follower K, for forcing the mortar forward in the mortar-box, is arranged vertically edgewise, and its edges accurately fit the top, bottom, and ends of the mortar-box, but not so closely but that it will move forward and backward freely therein. It is required to move forward uniformly and just fast enough to supply the mortar at the front of the mortar-box in sufficient quantity to lay the plaster as thick as desired. I accomplish this automatically by the movement of the mortar-box itself, as it is drawn upward, substantially as follows: There are projecting racks *r r* on the back of the follower extending back a sufficient distance to the rear of the mortar-box, and gearing into pinions *s s* on a shaft, *t*, that also has a cog-wheel or pinion, *u*, into which a driving-pinion, *v*, on a parallel shaft, gears. On the latter shaft is secured another pinion, P, which gears into two racks, *d e*, attached respectively to rack-standards D E at the back of the frame or stand. The standard E is fixed to the base A like the way standards C C, and standard D is extended like the extension standards B B, and the two standards D E are connected together by a flanch, N, secured to the extension-standard D, and sliding in a groove of the fixed standard E, in the same way as the standards B C are connected by the flanch M, above described. Also a similar rack on the flanch N to the rack *m*, on each flanch M, and a pinion driven by a crank, *p*, similar to the driving-pinion *n*, for extending and retracting the standard B, are employed for extending and retracting the standard D. It is also held in position by a rack and pinion, as shown in figs. 1 and 3, or an equivalent device. When the standard D is extended, the pinion P travels at the bottom only on the rack *e* of the standard E; in the middle, on both racks; and at the top, only on the rack *d* of the standard D. The travelling of the pinion on the racks *d e*, by which it is revolved, consequently causes the shaft *t* to revolve, and the pinions *s s* thereon drive the racks *r r* forward. Thus the follower K is moved forward equally at both ends, and just in proportion to the upward movement of the mortar-box. The relative rate at which the follower is caused to travel depends on the relative sizes of the pinions P, *v*, *u*, and *s s*; so that, by changing the pinions *s s* for others larger or smaller, the follower will move faster or slower in relation to the movement of the mortar-box upward, and thus will lay the plaster thicker or thinner, as required. When the mortar-box is drawn down, the follower K is drawn back therein by the same means which drives it forward, leaving the mortar-box again ready to receive another charge of mortar. When the mortar-box is divided into compart-

ments, there should be a follower for each compartment, and each follower has a rack or racks gearing into corresponding pinions on the shaft *t*, as indicated by red lines in fig. 4.

Fourth, the trowel I is situated just in front, and below the mortar-box H. Its upper edge is bevelled, curved, or sharpened, so that it will cleave and separate the mortar, and its front surface is set a little obliquely, so that its lower edge projects forward somewhat more than the upper edge, in order that it may, in ascending, compress the surface of the plaster, and thereby finish it more smoothly. Its length is equal or nearly equal to, or sometimes greater than, the entire width of the frame or stand, so that it may finish close up to a corner of the room, or other projecting surface; and in order that it may sometimes finish even somewhat further than the frame or stand can extend, in one direction, I have provided means by which it may be adjusted endwise, or transversely to the stand. As shown in fig. 5, this is accomplished by having the trowels mounted on stationary guides 3 3, which project downward from the mortar-box and fit in slots 4 4 of the trowel, the slots being longer than the width of the guides, so as to allow side movement of the trowel in either direction. Then, by connecting the trowel, through springs T T, with a travelling-nut, U, on a stationary screw, Q, and turning the said screw (by a crank-handle, *y*, or equivalent means) in one or the other direction, the trowel is moved or adjusted in either direction required. The guides 3 3 may be elastic, so as to give elasticity to the trowel and allow it to yield, if it strikes a stone in the mortar. The projection of the trowel below the mortar-box enables me to begin the plastering as near to the floor as necessary, although the mortar-box may not be brought down to the floor by a few inches. The mortar-box, with the strong pressure of its follower, lays the plaster upon the wall thoroughly, and the office of the trowel is to separate the mortar, and form and smooth the plastered surface; but although the mortar-box can be raised close up to the ceiling, the trowel, if kept stationary below the mortar-box, cannot finish that portion of the surface of the plaster which lies in front of the mortar-box when at its extreme height. This portion might be smoothed or finished by hand; but I have provided means by which, when the mortar-box reaches the ceiling, the trowel is moved upward in front thereof, so as to finish the surface close up to the ceiling. The drawings represent an automatic device for accomplishing this purpose.

Thus, in figs. 5 and 6, springs T T are hinged to the lower edge of the trowel, at *z z*, near its ends. These springs are secured under the mortar-box, and are so set that they will spring the trowel, when free, up in front of the mortar-box. When the trowel is brought down to its ordinary position below the mortar-box, it is held in position by a spring-catch, (or catches,) *o*, attached to the mortar-box and holding against a notch or projection, 2, at the lower edge of the trowel. By tripping this catch *o*, the trowel will be forced upward immediately by the force of the springs T T. To trip the catch automatically, a lever, S, is pivoted thereto, at 1, and to a projection of the mortar-box at 20; and it is so shaped that, on depressing its rear end, its front end will be moved backward, so as to draw the spring-catch *o* from the notch or projection 2 of the trowel, and set the latter free. A vertical rod, R, is pivoted at 19 to the lever S, and extends upward a little above the top of the mortar-box, as shown in fig. 6, where it is held and guided in a loop or hole, so that it will slide freely up and down. Thus, just before the mortar-box reaches the ceiling, the rod R strikes it, and, being depressed thereby, it moves the lever S and trips the trowel-catch. As the trowel ascends in front of the mortar-box it is guided in position by the front edges 21 (fig. 6) thereof, which project forward most at the upper edge, as shown, and thereby cause the trowel, when in that position, to project forward most at the upper edge. Then, on letting down the mortar-box, the trowel glides smoothly over the surface of the plaster just formed without injury thereto, but rather improving the finish thereof. Or, if preferred, the stand may be set free and moved from place before lowering the mortar-box, by pushing sidewise along nearly parallel with the wall, being careful not to allow the trowel to injure the plastered surface. I employ the same machine for plastering ceilings. For this purpose, it has to be mounted on a supporting apparatus, a form of which I have represented in figs. 8, 9, and 10. This apparatus consists of a standard frame, V, suitably braced both ways by braces 11 and 12, and sliding or extension standards, W W, on which the plastering machine is mounted, and which are raised and adjusted by racks on the coupling-flanches 16 16, and by pinions 15 15, similar in construction and action to those described for raising the extension standards B B D in the plastering machine. As there are two of these extension standards at each end of the supporting frame, and since all should be elevated equally and uniformly together, the two elevating racks 15 15, at each end, are secured on one shaft, X, and the two shafts X X at the two ends of the frame are connected by a chain band, Y, or its equivalent, so that said shafts shall be turned precisely at equal speeds. Cranks or handles 9 9 are used for turning these shafts. There are ratchet-wheels 14 14 on the shaft, into which pawls 10 10 catch, to hold the standards at the exact height required. On the upper ends of the extension standards W W are pins or equivalent projections, 24 24, which fit into holes or depressions in the back side of the frame or stand of the plastering machine. By this or an equivalent means the plastering machine is secured on the extension standards, so that, when mounted horizontally, with its front side upward, as shown in fig. 8, it will be firmly held on said standards. When thus mounted, the mortar-box is drawn to the lower end (as when in a vertical position) of the plastering-frame, and is filled with mortar. The shafts X X are then turned so as to raise all the standards W W equally, thereby lifting the plastering machine till it is brought close up to the ceiling, as determined by the gauges L L. The mortar-box is then moved along by turning the crank G, as in plastering vertical walls, the machine acting in precisely the same manner as in said vertical position. But in drawing back the empty mortar-box, since its own weight cannot here effect that movement, a cord, as shown in red lines, fig. 8, passing over a pulley at the bottom of the frame of the machine, may be employed for that purpose. The supporting standards are then lowered far enough to enable the mortar-box to be filled conveniently, and the supporting-frame V is then moved on casters 13 to a new position. It may then be secured in position by points or dogs 17, (fig. 9.) The operation is then repeated by raising the machine up to the ceiling and plastering another breadth as before. The machine is

held up to the ceiling by the pawls 10 10 and ratchet-wheel 14 14, before described, or their equivalents; and, if necessary or desirable, there may be points or dogs for securing the machine firmly in position under the ceiling, and prevent any side movement or swaying, similar to those described for holding the extension standards B B to the ceiling in plastering vertical walls.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a mortar-box, H, with a stand or frame having adjustable and extension guide-ways or standards, substantially as and for the purpose herein specified.

2. I also claim forcing the follower forward by the movement of the mortar-box itself, by means of a stationary rack or racks, D K, and a travelling pinion or pinions, substantially as and for the purposes herein set forth.

3. I also claim the extensible way-standards B C and stationary racks D E, connected and retained in their extended positions, substantially as and for the purposes herein specified.

4. I also claim the combination of the adjustable points or dogs, for holding the stand in position, and the casters or wheels on which it is moved, substantially as specified.

5. I also claim the combination and arrangement of the windlass or winding-shaft F and cord *f*, for the purpose of raising the mortar-box, substantially as herein specified.

6. I also claim a trowel, I, adjustable transversely to the machine, substantially as herein set forth.

7. I also claim the arrangement of the trowel I, so as to have a separate movement upward in front of the mortar-box, in combination with the springs T T and catch *o*, constructed and operated as described, and for the purpose set forth.

8. I also claim, in combination with the plastering machine set forth, the stand or frame V, constructed nd operating as described, and for the purpose herein specified.

JOSIAH KEENE.

Witnesses:
J. S. BROWN,
E. J. BROWN.