B. D. FULLER & J. R. & T. A. REILLY.

POWER TRANSMISSION MECHANISM.

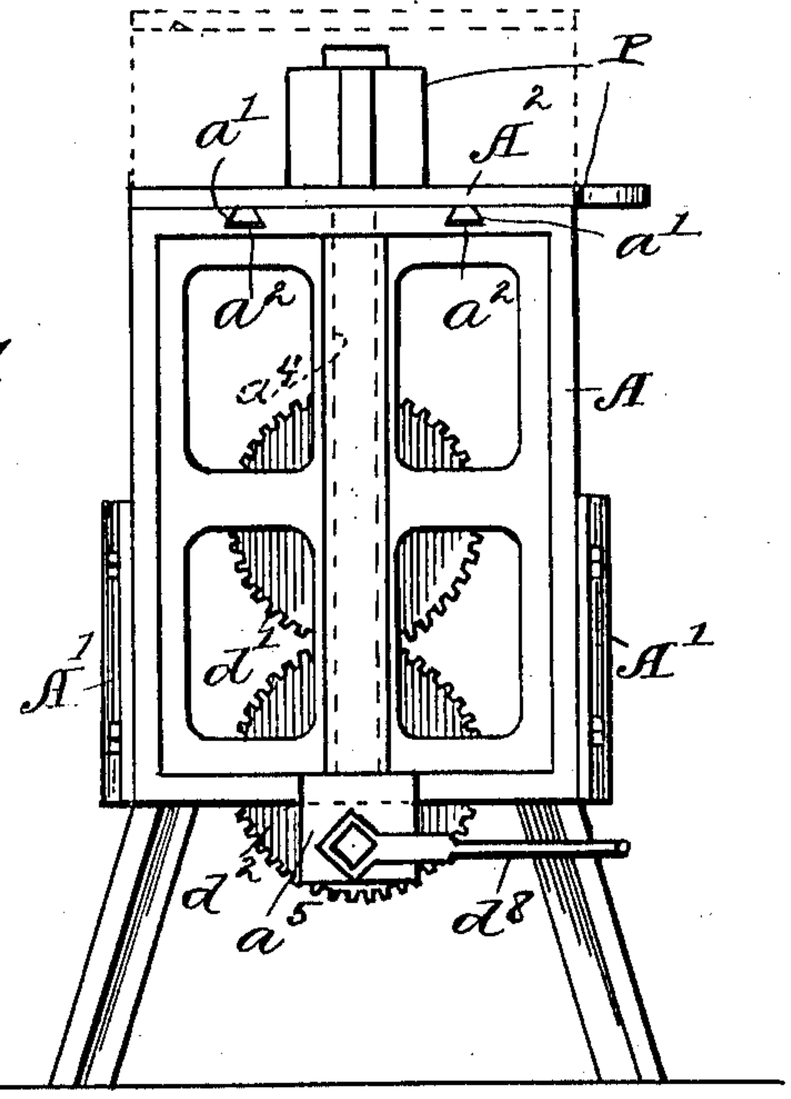
APPLICATION FILED NOV. 15, 1909.

970,440.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.

Fig. 1



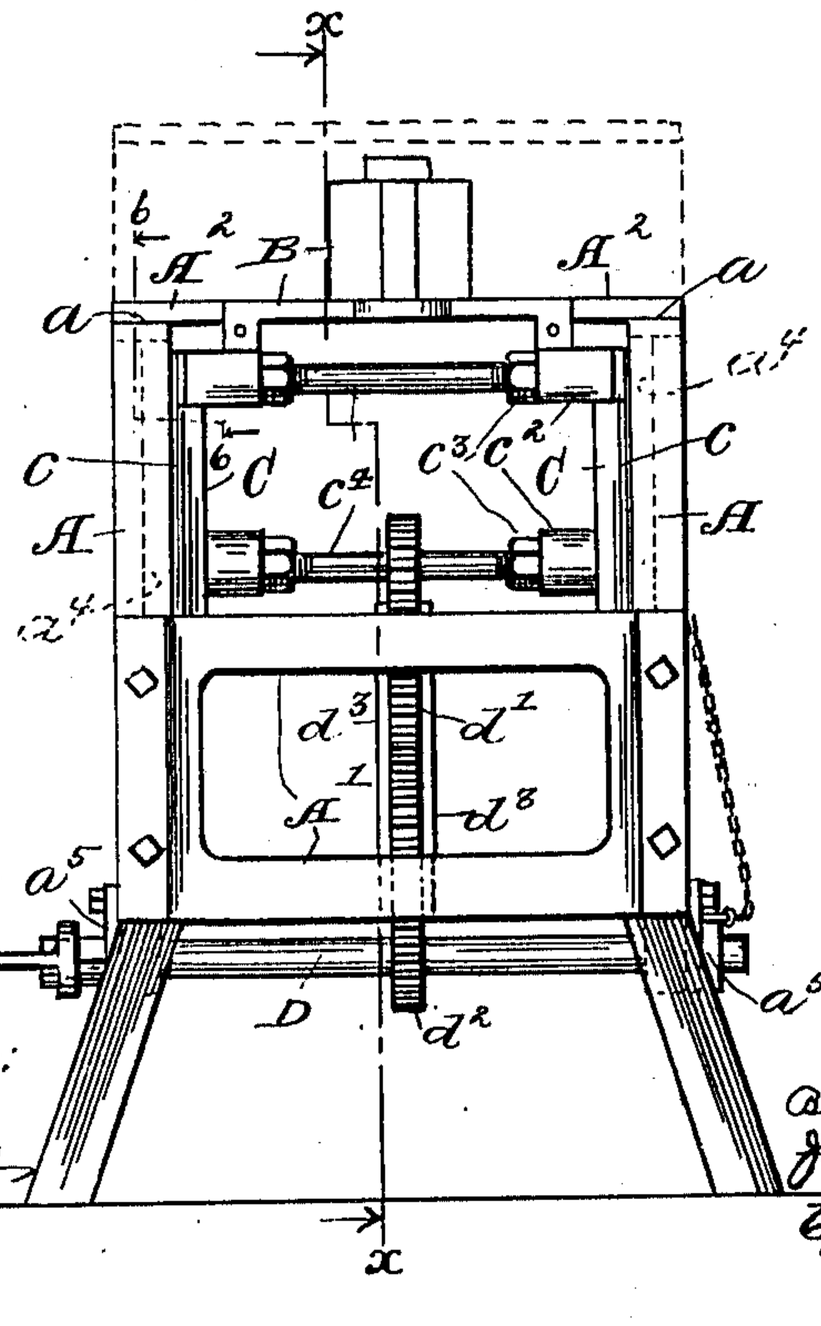


Fig. 2

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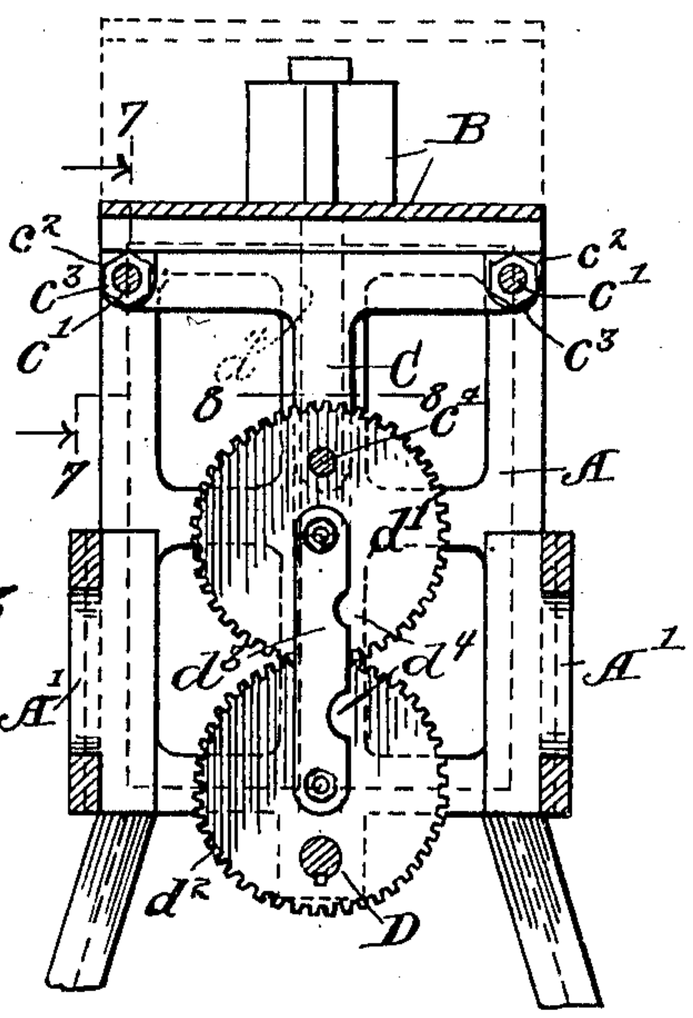
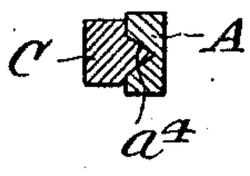


Fig. 3

Fig. 8.



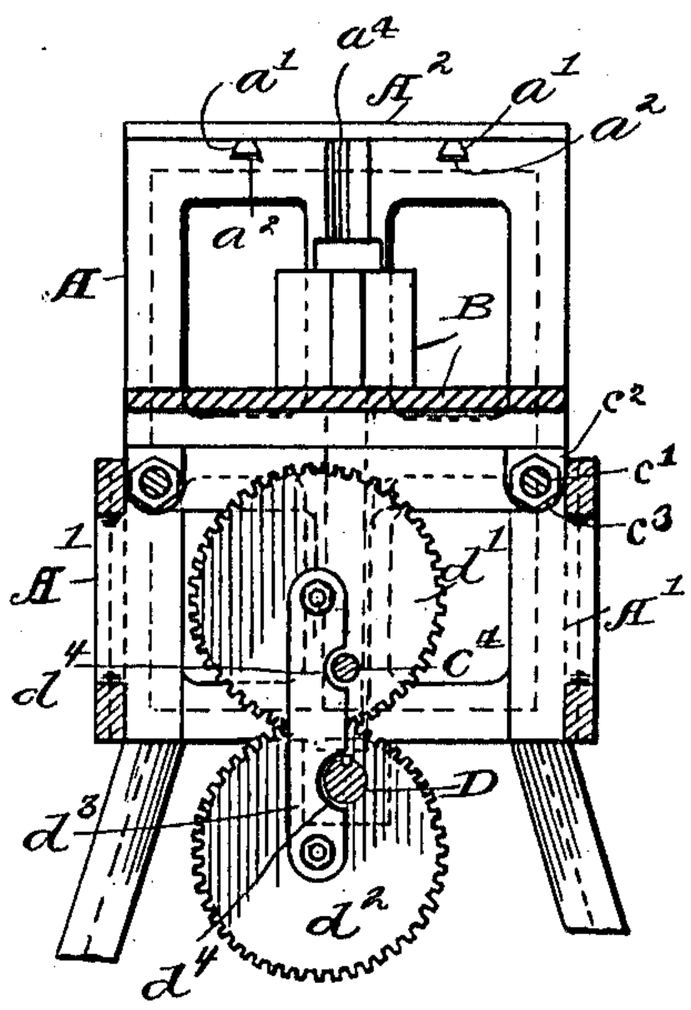


Fig. 4

Fig. 5

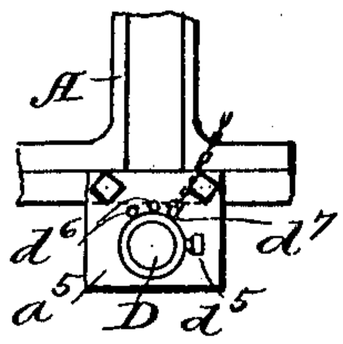


Fig. 6

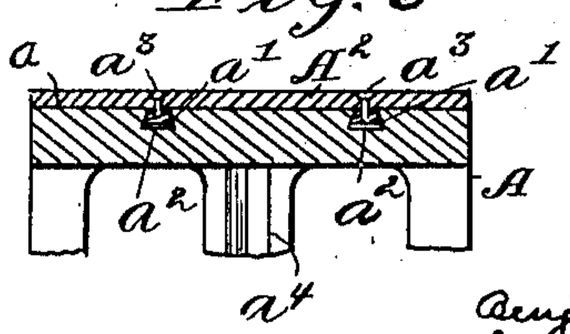
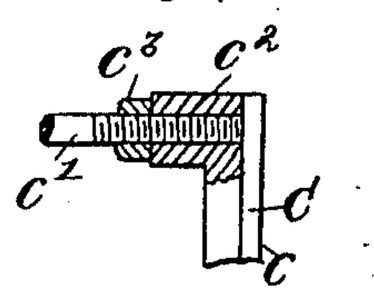


Fig. 7



Witnesses:

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UNITED STATES PATENT OFFICE.

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POWER-TRANSMISSION MECHANISM.

970,440. Specification of Letters Patent. **Patented Sept. 13, 1910.**

Application filed November 15, 1909. Serial No. 528,101.

To all whom it may concern:

Be it known that we, BENJAMIN D. FULLER and JAMES R. REILLY, residents of Lakewood, and THOMAS A. REILLY, a resident of Cleveland, county of Cuyahoga, State of Ohio, citizens of the United States, have jointly invented a new and useful Improvement in Power-Transmission Mechanisms, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating as indicated to power transmission mechanisms, has more particular regard to that type of mold making machine wherein a reciprocable support carries the pattern plate and is thus adapted to withdraw the pattern from the independently supported flask or mold box after the sand has been packed around said pattern. While in the embodiment of the invention herein illustrated it is contemplated that such flask or mold box shall be manually placed on the machine frame and removed therefrom after the pattern has been withdrawn, the several features characterizing the invention are obviously equally adaptable for use in connection with machines of the rock-over type wherein the flask is lowered away from the pattern plate in the inverted position of the latter.

The object of the invention is the provision of a simple and compact mechanism for thus stripping the pattern from the mold, whether by lowering the pattern plate or the flask, whereby a maximum range of movement of the pattern-plate carrying support may be secured within a frame of prescribed dimensions. At the same time, it is sought to procure an even steady movement of the support so as to avoid any tendency to damage the mold.

Yet another object is the provision for the easy and convenient adjustment of the machine to the reception of pattern plates and corresponding flasks of various sizes.

To the accomplishment of the foregoing and related objects, said invention consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a side elevational view of a machine of the type above referred to, wherein are embodied our several improvements; Fig. 2 is a front elevation of such machine; Figs. 3 and 4 are transverse vertical sections of said machine on the line *x*—*x* Fig. 2 showing the pattern plate plunger in its raised and lowered position respectively; Fig. 5 is an elevational view of a detail of the machine viewed from the opposite side to that shown in Fig. 1; Fig. 6 is a sectional detail taken on line 6—6 Fig. 2; Fig. 7 is another sectional detail taken on the line 7—7, Fig. 3; and Fig. 8 is a sectional detail on the line 8—8 in Fig. 3.

While the general form and dimensions of the supporting frame of the machine are a matter of indifference so far as the spirit of the invention is concerned, we prefer, in the interest of simplicity and strength of construction, the form illustrated, which comprises two similar side members A rigidly secured together by transversely disposed frames A′ joining the lower portions of said side members. The upper portions of the latter are thus allowed to project, as will be obvious from Figs. 2 and 4. The upper faces *a* of said side members are of sufficient extent to afford an adequate support for plates A² that form a table support for the flask or mold box (shown in dotted outline only, Figs. 1 and 2). These plates are adjustably secured to such upper surfaces of the side members by means of blocks *a′* loosely fitted into suitable undercut grooves *a*² transversely formed in such upper faces, to which blocks the plates are attached by means of flat-headed screws *a*³ (Fig. 6) extending downwardly from above. The adjustment of the blocks in the undercut grooves is such that when these screws are drawn up tightly, the plates are firmly clamped to the side members, but by loosening such screws, their transverse adjustment may be readily accomplished, so as to accommodate between them pattern plates of different sizes. Such pattern plate, of which a typical form B is illustrated in Figs. 1 and 2, is carried by a vertically reciprocable support comprising two similar side members C of general T-shape that are slidably held

in the corresponding side members A of the machine frame, by being provided on their outer faces with a V-shaped tongue c fitting in a groove of corresponding section on the inner faces of said side members A. Such T-shaped frames are spaced apart and at the same time rigidly secured together by means of two stay rods c' and a lower stay rod c^4 oppositely threaded at their ends and fitted into suitable openings in bosses c^2 at the extremities of the frames (see Fig. 7). Lock nuts c^3 at such shaft ends serve to retain the parts against relative movement, once they are secured in desired position. At the same time it will be obvious that by loosening the lock nuts on either shaft and rotating the shaft one way or the other, the support members C may be adjusted to take up wear and maintain a proper working fit in the grooves of the side members A of the supporting frame. The pattern plate B previously referred to, is designed to be attached directly to the upper portions of said frames C, thus constituting the pattern carrying support.

An actuating shaft D is transversely mounted in suitable bearings a^5 in the lower portions of the side frames A, which shaft is operatively connected with the pattern-plate support by means of two intermeshing gears d' d^2 respectively rotatably mounted upon the lower transverse stay rod c^4 of said support, and fixedly mounted upon said actuating shaft. Gears d' d^2 are thus mounted on their respective shafts on axes removed from said gears' centers. The centers of the gears, are however, connected by means of two bars d^3, one on each side of the gears, which bars are notched at d^4 to receive said shafts in that position of the gears (illustrated in Fig. 4) in which their pivotal axes most closely approach each other. This position, as will be obvious, corresponds with the lower position of the pattern plate support, which latter is elevated to its upper position in that position of the gears in which said axes are separated by the greatest distance, as shown in Fig. 3.

Any suitable means may be utilized for positively rotating actuating shaft D, such means consisting simply of a crank d^8 in the form of machine illustrated. It will likewise be obvious that it is immaterial which of the intermeshing gears d' or d^2 be thus positively operated, although as a matter of convenience, the one having a relatively fixed axis of support is preferably thus utilized. By means of the reciprocating mechanism just described, not only is an easy gradual movement of the pattern plate support obtained, all jerks and stops being eliminated; but a very much greater throw is also secured within the limited space that can be provided in a machine having otherwise normal dimensions, than where the prevailing arrangement of levers and the like is utilized for connecting the actuating shaft with the pattern plate support. Since such a large throw is thus obtained it is contemplated that in handling relatively shallow patterns, it may be found a matter of convenience not to utilize the whole of such throw, and to this end we provide means for limiting the downward movement of the pattern plate support to whatever extent may be desired. Such means conveniently take the form shown in Fig. 5 and consist of a radially projecting pin d^5 on the corresponding end of the actuating shaft, and a series of holes d^6 lying in the path of such pin, in any one of which a stop pin d^7 may be inserted to correspondingly limit the rotation of the actuating shaft and thus the downward movement of the aforesaid support (see Fig. 5).

It may be added in conclusion, that other mechanical connections may be utilized between the actuating shaft D and reciprocable carrying support, in which the use of gears is eliminated. For the gears may in one sense be regarded as levers, or simply as members rotatably attached to the support and frame respectively, which members are connected eccentrically of their axes by a third member consisting of paired bars d^3. The function of the intermeshing gear teeth in connection with the foregoing, is to rotate said two members, or levers, about their points of attachment to said third member or connecting bars. This rotation of the members is obviously accomplished simultaneously with their rotation about their own proper axes of rotation in the frame and support respectively, and it is to the combined effect of the two rotative movements, producing a sort of lazy tong effect, that we attribute the advantageous results previously referred to.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including two members respectively rotatably attached to said element and frame, a third member connecting said two members eccentrically of their axes of rotation, and means for rotating said two members about their points of attachment to said third member.

2. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating

said element, said means including two members respectively rotatably attached to said element and frame, a third member connecting said two members eccentrically of their axes of rotation, and gear means for rotating said two members about their points of attachment to said third member.

3. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including two members respectively rotatably attached to said element and frame, a third member connecting said two members eccentrically of their axes of rotation, and other means connecting said two members whereby, upon rotation about their axes, they are simultaneously rotated about their points of attachment to said third member.

4. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including intermeshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers, and means for positively rotating one of said gears.

5. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including intermeshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers, means for retaining said gears in mesh, and means for positively rotating one of said gears.

6. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including intermeshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers, a bar connecting such centers, and means for positively rotating one of said gears.

7. In a machine, the combination of a frame, a moving element reciprocably held in said frame, and means for reciprocating said element, said means including intermeshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers, and means for positively rotating the gear thus attached to said frame.

8. In a machine, the combination of a frame, a moving element reciprocably held in said frame, and means for reciprocating said element, said means including intermeshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers, bars connecting such centers one on each side of said gears, and means for positively rotating the gear thus attached to said frame.

9. In a machine, the combination of a frame; a moving element reciprocably held in said frame; and means for reciprocating said element, said means including a transversely disposed actuating shaft and intermeshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers.

10. In a machine, the combination of a frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including a transversely disposed actuating shaft and inter-meshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers; and means for retaining said gears in mesh.

11. In a machine, the combination of a frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including a transversely disposed actuating shaft and inter-meshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers; and bars connecting such centers, one on each side of said gears, whereby said gears are retained in mesh.

12. In a machine, the combination of a frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including a transversely disposed actuating shaft and inter-meshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers; and bars connecting such centers, one on each side of said gears, whereby said gears are retained in mesh, said bars being notched to engage said shaft in one position of said gears.

13. In a machine, the combination of a frame; a moving element reciprocably held gears respectively rotatably attached to said element, said means including inter-meshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers and means for positively rotating one of said gears; and means for variously limiting the rotation of said gears in one direction.

14. In a machine, the combination of a frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including inter-meshing gears respectively rotatably attached to said element and frame at points removed from said gears' centers and means for positively rotating the gear thus attached to said frame; and means for variously limiting the rotation of said last-named gear in one direction and thereby correspondingly limiting the reciprocation of said support frame.

15. In a machine, the combination of a

frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including a transversely disposed actuating shaft and inter-meshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers; and means for variously limiting the rotation of said shaft in one direction and thereby correspondingly limiting the reciprocation of said support.

16. In a machine, the combination of a frame; a moving element reciprocably held in said frame; means for reciprocating said element, said means including a transversely disposed actuating shaft and inter-meshing gears respectively rotatably attached to said element and fixedly secured to said shaft at points removed from said gears' centers; a radially projecting pin in said shaft, said frame being provided with a series of holes in the path of said pin; and another pin adapted to be inserted in any one of said holes as desired to variously limit the rotation of said shaft and thereby correspondingly limit the reciprocation of said support.

Signed by us this 8th day of November, 1909.

BENJAMIN D. FULLER.
JAMES R. REILLY.
THOMAS A. REILLY.

Attested by—
ANNA L. GILL,
JNO. F. OBERLIN.