(No Model.) 6 Sheets—Sheet 1.

J. W. BONTA.

METHOD OF ROLLING PLATE OR SHEET GLASS.

No. 462,529. Patented Nov. 3, 1891.

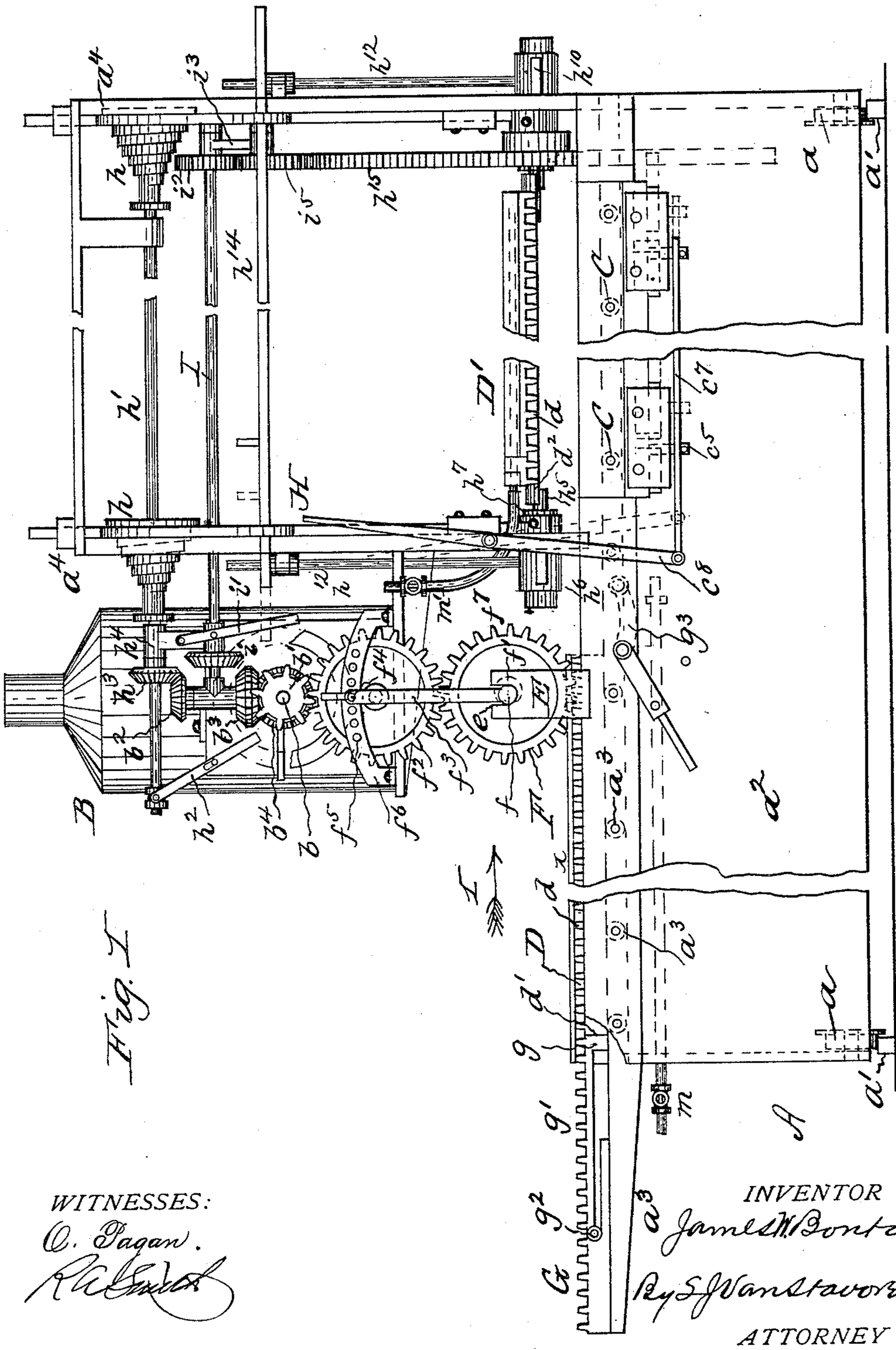

Fig. 1.

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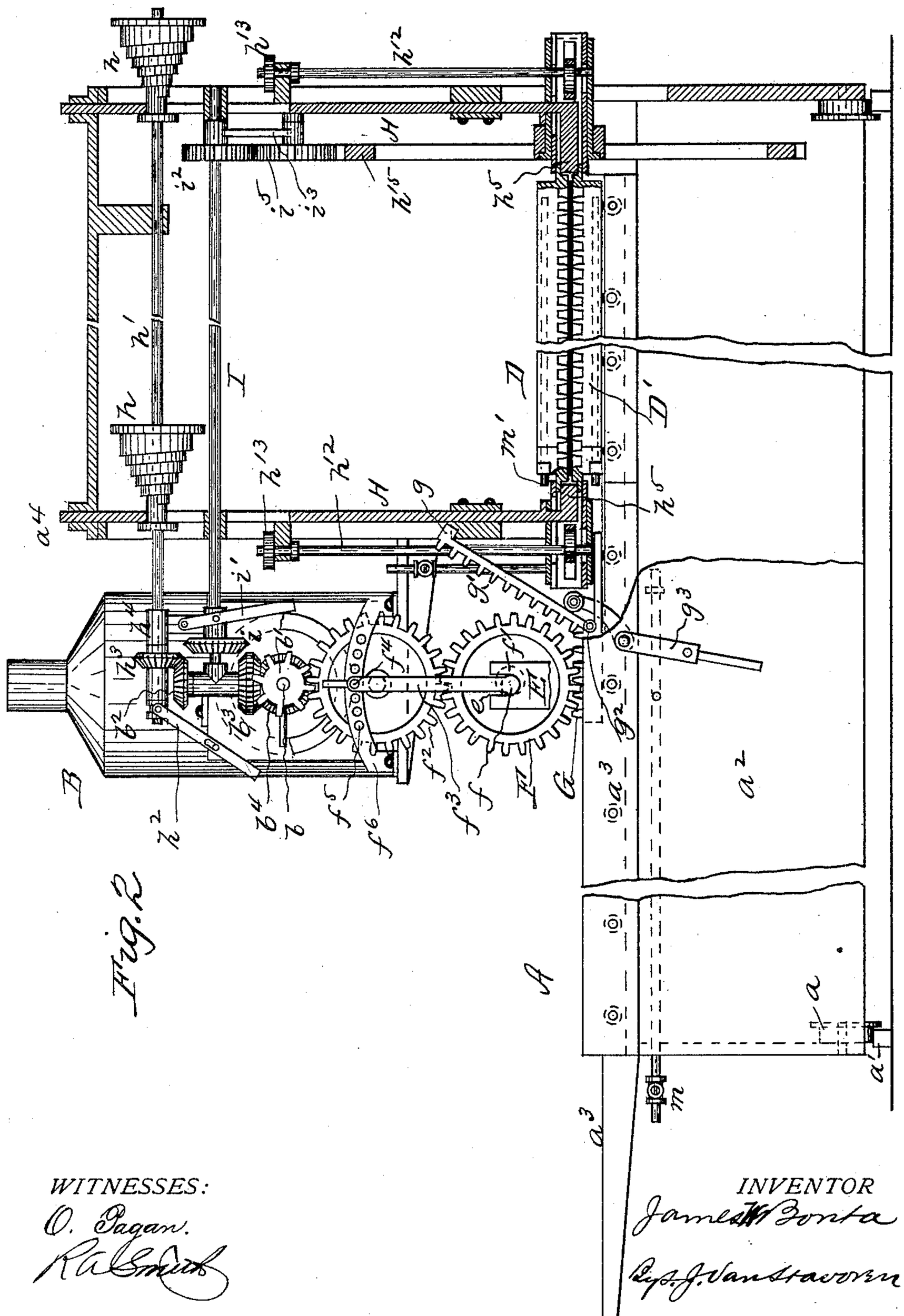

Fig. 2.

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J. W. BONTA.

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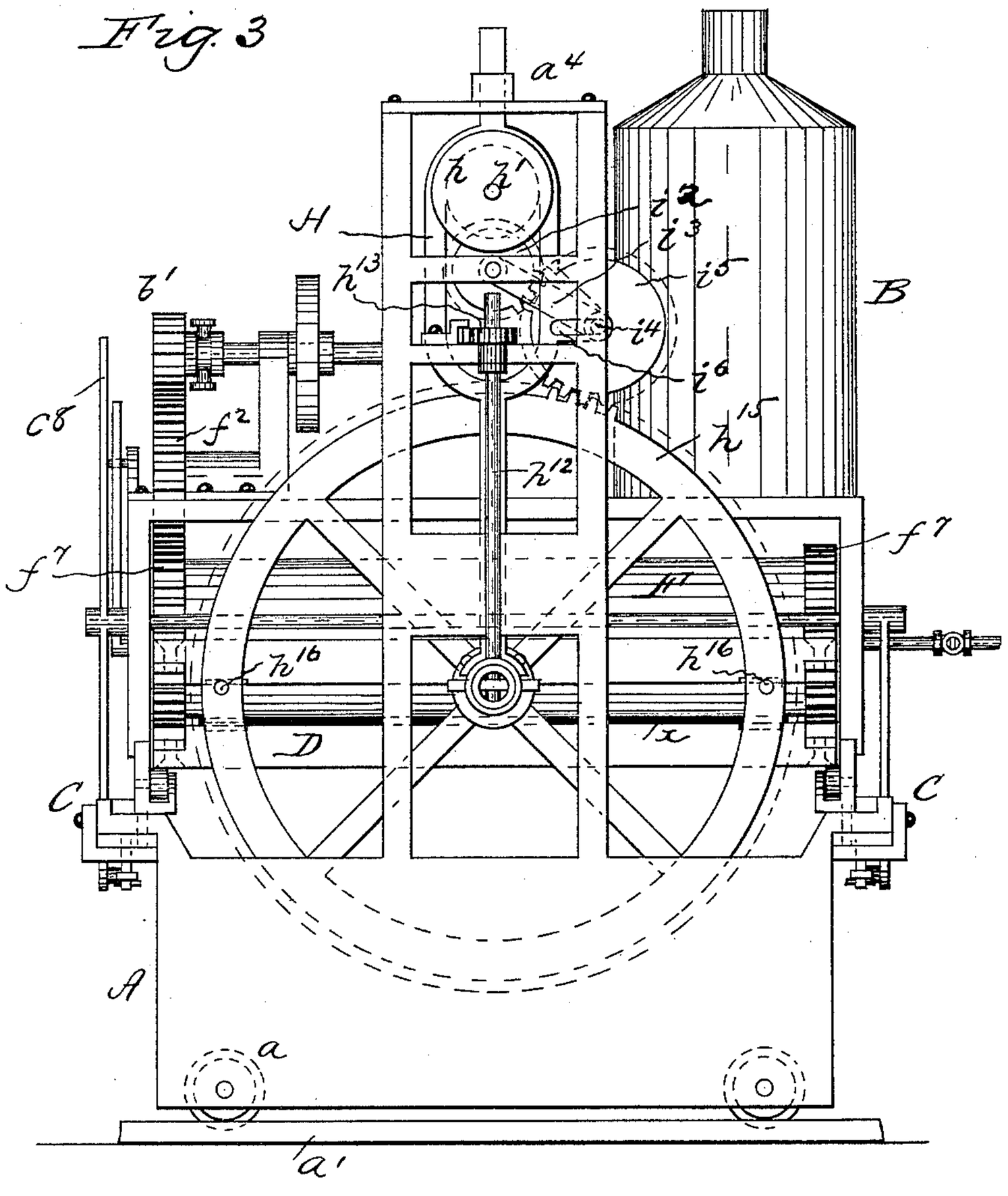
Fig. 3



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J. W. BONTA.

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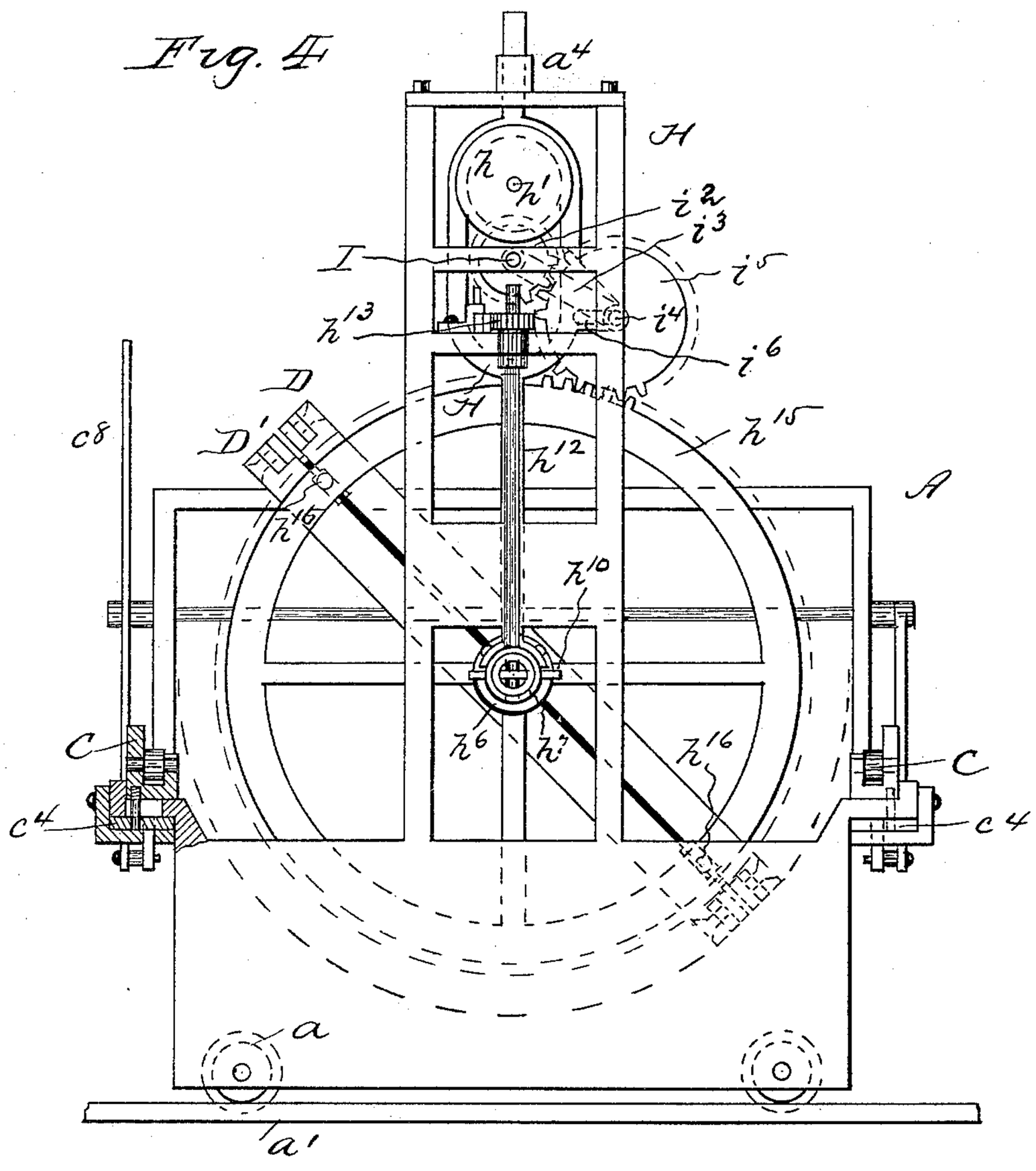
Fig. 4



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METHOD OF ROLLING PLATE OR SHEET GLASS.

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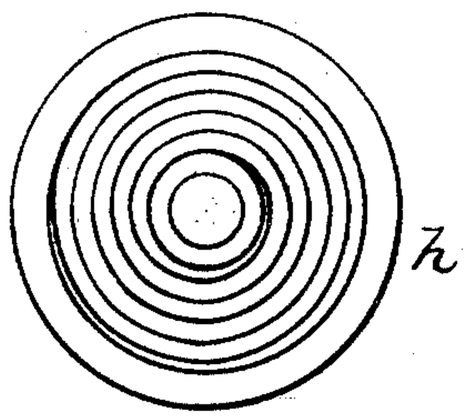


Fig. 5

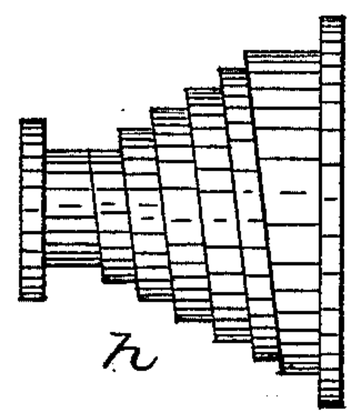


Fig. 6

Fig. 7

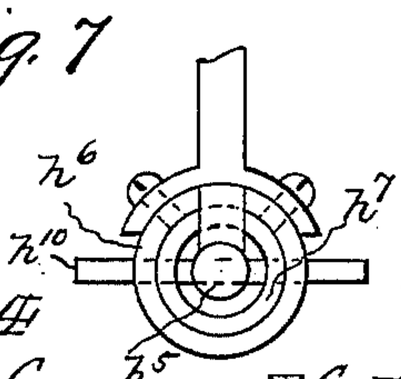


Fig. 14

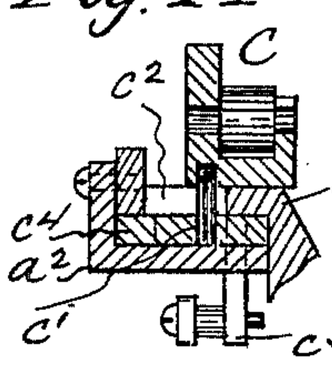


Fig. 8

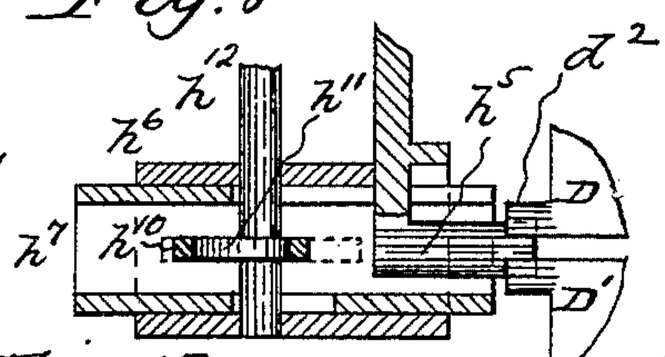


Fig. 15

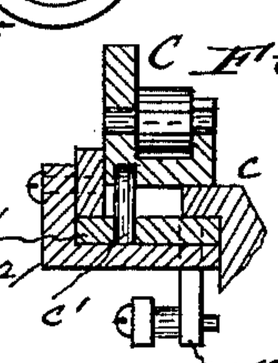


Fig. 9

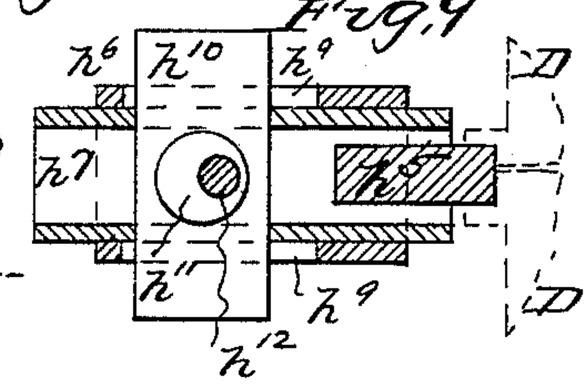


Fig. 11

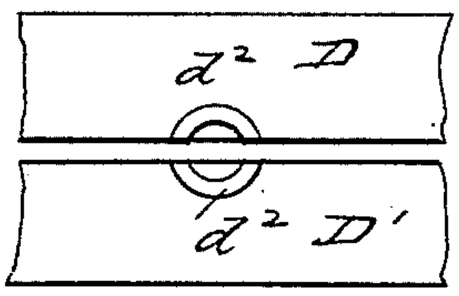


Fig. 12

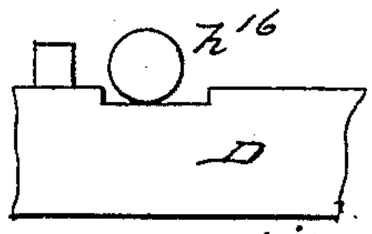


Fig. 16

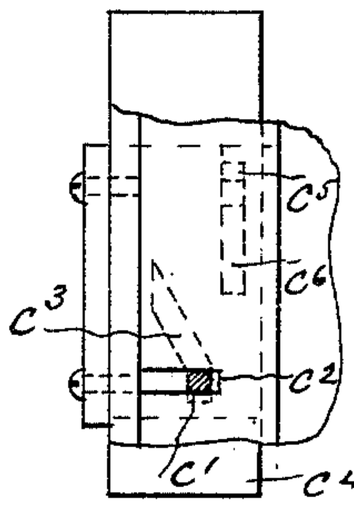


Fig. 17

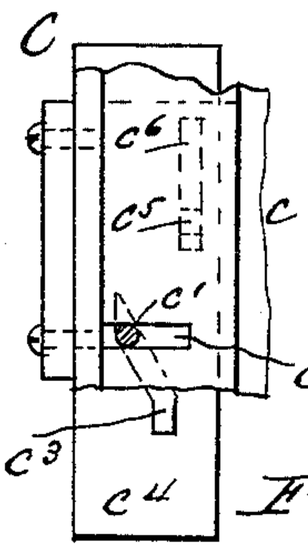


Fig. 10

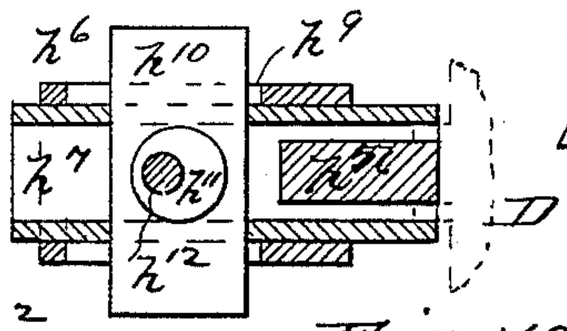
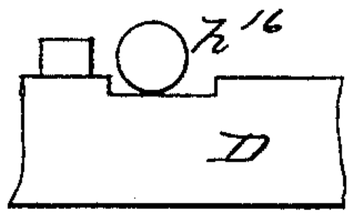


Fig. 13



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METHOD OF ROLLING PLATE OR SHEET GLASS.

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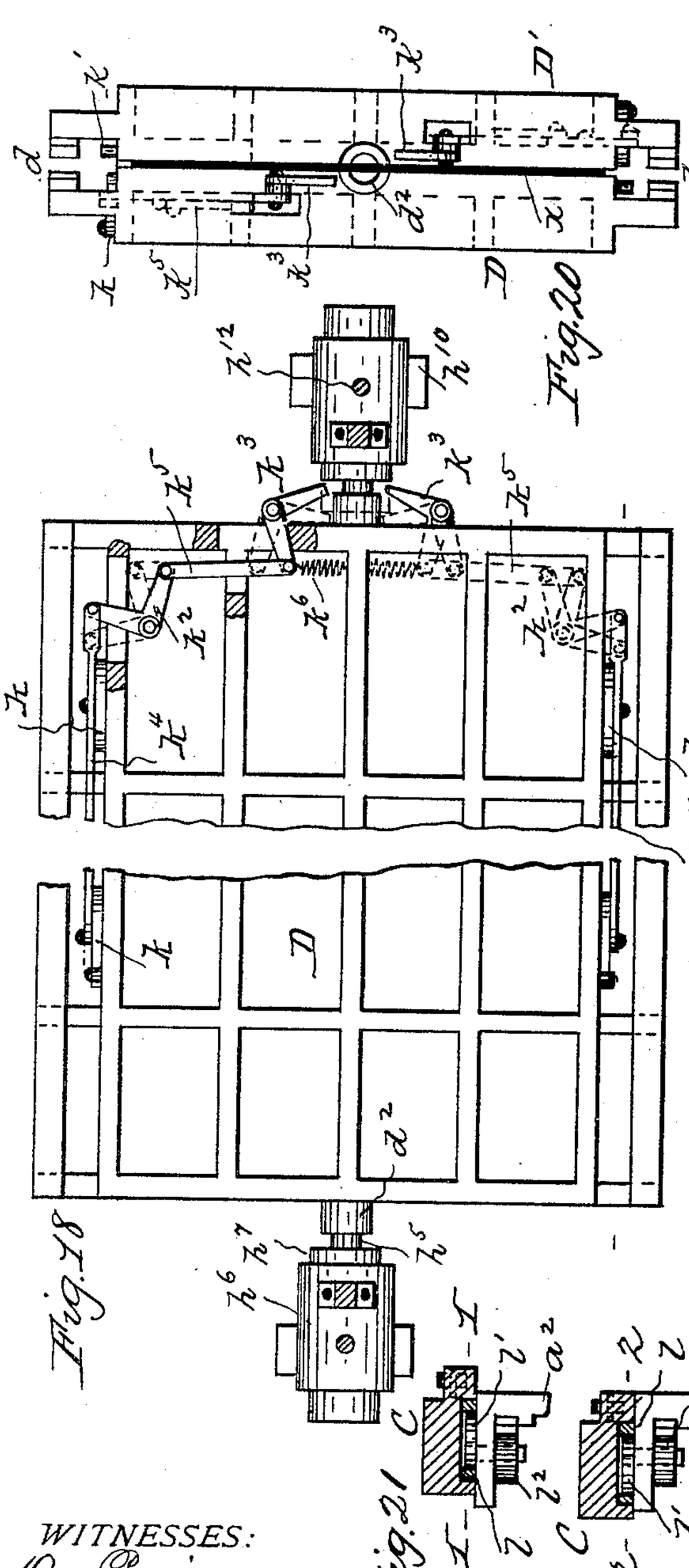

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UNITED STATES PATENT OFFICE.

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METHOD OF ROLLING PLATE OR SHEET GLASS.

SPECIFICATION forming part of Letters Patent No. 462,529, dated November 3, 1891.

Application filed April 7, 1891. Serial No. 388,050. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. BONTA, a citizen of the United States, residing at Wayne, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Rolling Plate or Sheet Glass, of which the following is a specification.

My invention has relation to rolling plate-glass; and it has for its object a method of rolling both sides of the plate successively, in order to remove irregularities therein and thus dispense as much as possible with the undue grinding of the same when rolled only on one side, as heretofore practiced.

To this end my invention consists in first rolling the plate on one side, then locking the plate between upper and lower platens, then rotating the plate to bring its lower or unrolled side uppermost, and then rolling the latter side to complete the operation of rolling both sides of the plate-glass. The manner in which such method is accomplished is fully set forth in the following specification of a form of apparatus devised by me, and reference is had to the accompanying drawings, wherein—

Figure 1 is a side elevation, partly broken away, showing a machine for rolling both sides of plate-glass in accordance with my invention. Fig. 2 is a longitudinal section of the same, partly in elevation. Fig. 3 is an end elevation of the same. Fig. 4 is a like view, partly sectional, illustrating the rotation of the plate-glass and platens. Fig. 5 is a detail view, drawn to an enlarged scale, showing end elevation of supporting-journals and locking mechanism for the platens. Fig. 6 is a longitudinal vertical section of same, with part of the platens in elevation, showing the locking or movable tubular sleeve released from the platens. Fig. 7 is a horizontal section of the same. Fig. 8 is a like view showing the locking tubular sleeve in engagement with the platens. Fig. 9 is a broken end elevation of the platens. Figs. 10 and 11 are elevations, partly sectional, the former showing stop-pin and one position of separating-strip for the platens and the latter the other position of said strip. Fig. 12 is a cross-section of laterally-moving guide rails or supports for the platen when moving into position in the machine for rotation, said figure showing such rails or supports in their normal position. Fig. 13 is a like view showing the rails or supports moved laterally out of the way of the platens. Fig. 14 is a plan view of Fig. 12, and Fig. 15 is a like view of Fig. 13. Fig. 16 is a plan view, partly sectional, showing mechanism for clamping the platens together. Fig. 17 is a side elevation, partly sectional, of the same. Fig. 18 is an end elevation of same. Figs. 19 and 20 are cross-sections showing preferable form of actuating mechanism for laterally moving the guide rail or supports for the platen, the same being shown in two different positions. Fig. 21 is a section on line 1 1, Fig. 19; and Fig. 22 is a like view on the line 2 2, Fig. 20. Figs. 23 and 24 are sectional views of the parts in Figs. 21 and 22, at right angles thereto, showing the throw of cam l'.

A represents the housings or frame of the machine, which preferably carries an engine or motor B, and has rollers or wheels a, running on guides or tracks a', so as to make it portable; but, if desired, it may be located in a fixed position.

The housings of the machine A consist of a long lower part a^2, having at their upper edges fixed guides or roller-supports a^3 and laterally-moving guides or roller-supports C, the latter being near the rear end of the machine, and are of a length approximating that of the platens D D′, used in the machine, and upon these guides or supports said platens are reciprocated to roll the plate-glass.

E E represent vertical standards secured to the housing part a^2 and have open-top bearings e, suitably formed to receive the journals f and eccentrics f' on said journals of a presser-roller F, which is in gear with the driving-shaft b of engine B by means of wheels f^2 and b'. The presser-roller F is provided with arms f^3 f^3, the upper end of which has a pin or other connection f^4 with slots or apertures f^5 in a curved bracket f^6, concentric with the axis of the presser-roller, said pin or connection f^4 being removable from the bracket f^6, so that by moving said arms f^3 f^3 to and fro or radially the eccentrics f' on the presser-roller journals f are moved to set the roller higher or lower to suit different

thicknesses of plate-glass, and also to vary the rolling pressure of the same.

The platens D D′ are provided with side racks d for engagement with the gear-wheels f^7 f^7 on the presser-roller F, and at one end said platens are provided with side recesses d' to receive the ends g of racks g', pivoted at g^2 to racks G, which are located on the fixed guides or supports a^3 in advance of the platen.

a^4 a^4 represent vertical standards, which support a vertically-sliding frame H, of any suitable or desired construction, hung upon variable-speed or other screw-worms or actuating mechanism h for raising and lowering said frame, said actuating mechanism being mounted upon a shaft h', having its bearings in standards a^4, so as to be movable longitudinally by means of a shifting-lever h^2, and has a bevel or other gear-wheel h^3 in engagement with like wheels b^2, b^3, and b^4 with the motor-driving shaft b. The wheel h^3 is splined to shaft h', so as to admit of the longitudinal movement of the latter when shifted and when rotating to lift or lower frame H, as hereinafter described, and said wheel is held in position to always engage the wheel b^2 by a bracket h^4 on the motor B. In standards a^4 is journaled a shaft I, upon which at one end is splined the bevel-wheel i, having a shifting-lever i' to cause said wheel i to engage with and disengage from wheel b^3. At the other end of shaft I is a gear-wheel i^2 and a link i^3, which engages the stud-shaft i^4 of an idler-gear i^5, said stud-shaft i^4 having an end bearing in a slot i^6 in one end of the frame H, as more plainly shown in Fig. 3. The lower ends of frame H on each side thereof are provided with inside and approaching short journals or studs h^5 and with tubular boxes h^6, which inclose said journals, the forward or free ends of the latter projecting beyond said boxes. (See more plainly Figs. 5 to 8, inclusive.) Within boxes h^6, and between them and the journals h^5, are tubular sliding sleeves h^7, having suitable slots h^8 to admit of their sliding movement. Mounted in said sleeves and working in slots h^9 of boxes h^6 are blocks h^{10}, in which are journaled eccentrics h^{11} upon vertical shafts h^{12}, mounted upon the ends of frame H. The upper ends of shafts h^{12} are provided with gear-wheels h^{13}, engaging with a sliding rack shifting or actuating bar h^{14}, so that by moving the latter in one direction the eccentrics h^{11} and blocks h^{10} are actuated to slide the sleeve h^7 in one direction, and by moving the bar h^{14} reversely said eccentrics and blocks are actuated to slide the sleeve h^7 in an opposite direction, for purposes hereinafter described.

Loosely mounted upon the inner ends of boxes h^6 are gear-wheels h^{15}, which engage with the idlers i^5, and thence by wheels i^2 with shaft I. Said wheels h^{15} at suitable intervals on their inner sides are provided with stop-pins h^{16}, (see more plainly Fig. 3,) for a purpose hereinafter to be described.

The laterally-sliding rails or supports C (see more plainly Figs. 12 and 13) rest upon a fixed support c, secured to the housing part a^2, and have depending pins or studs c', which pass through straight lateral slots c^2 in supports c and enter slots c^3 in sliding plates c^4 between supports c and the top edge of the housings. The slots c^3 are partly straight and partly at an angle, as shown more plainly in Figs. 14 and 15, so that when plates c^4 are moved in one direction the angular part of its slots c^3 actuates the studs c' therein to laterally move the roller guides or supports C in one direction, and when reversely moved said supports C are laterally moved in an opposite direction. To actuate the plates c^4 they are provided with depending studs c^5, passing through slots c^6 in the top of the housings and provided with a bar or link connection c^7 and a shifting or actuating lever c^8. (See Fig. 1.)

The platens D D′ are on their ends and at their middle provided with semicircular projecting journals or supports d^2 for engagement with the journals h^5 on the ends of frame H. Both platens are identical in construction, and one of them is always in position on the end of the frame H, as shown by Fig. 1, and the other upon the fixed guides a^3 in front of the presser-roller F normally, to begin operations, which are substantially as follows: The presser-roller F is adjusted for the thickness of the glass and the pressure required for rolling, and after the plate-glass is laid upon the platen in front of the presser-roll, which glass is indicated at x, the pivoted racks g' are engaged with the recesses d' in the platen. The movement of the presser-roller engages the racks d of the platen to move it in the direction of arrow t, and as it is so moved the glass is rolled on one side. The platen so moves until it comes under the platen D′, supported upon the frame H, the racks g' and G being provided and keeping in engagement with the presser-roller gears f^7 to admit of the full length of such movement. As soon as the platen D arrives at such described position the pivoted racks g' are raised out of engagement with the platen by means of a lever g^3, (see more plainly Fig. 2,) meanwhile the rotation of the presser-roller having been stopped or its actuating mechanism being thrown out of gear. The shaft h' is then shifted to lower the frame H and platen D′ until the latter rests upon the platen D, with the journals h^5 of the frame H between the semicircular boxes or bearings d^2 of the platens. (See Fig. 2.) The shifter-bar h^{14} is then actuated to project or slide the tubular sleeves h^7 into engagement with the platen boxes or bearings d^2 to lock the same together. The shaft h' is then actuated to raise both platens, and during such movement the guides or supports C are moved outwardly or apart from one another by actuating-lever c^8, so that said platens can be rotated without raising them to an undue

height. When sufficiently raised, the movement of shaft h' is stopped, and the shaft I is put into operation to rotate wheels h^{15}, the stops or studs h^{16} of which being in engagement with the platens, as shown in Fig. 4, the latter are rotated to bring the platen D on top, reversing the position of the platens and bringing the unrolled side of the glass uppermost. The shaft h' is then actuated to lower the platens, the lever c^8 being meanwhile shifted to return the supports C to their normal position to receive the platens. Bar h^{14} is shifted to unlock the sleeves h^7 from the platen boxes or bearings d^2, and the shaft h' is then actuated to raise the upper platen D from the lower one D', the glass remaining upon the latter. The pivoted rack g' is then moved into engagement with the recesses in platen D', and the presser-roller F is then started, but in a reverse direction, to cause the platen to move in a direction the opposite of that indicated by arrow x, Fig. 1, to roll the other side of the glass.

If desired, the platens may be furnished with pivoted clamps k and studs k', the former being on one and the latter on the other platen, (see Figs. 16 to 18,) for clamping the platens at their sides when rotated. These clamps k may be connected to suitably-arranged angle-levers k^2 k^3 by links k^4 k^5, having reacting-springs k^6, the free ends of the levers k^3 being in line with the inner end of the clamping tubular sleeves h^7, so that when the latter are moved to clamp the studs or journals d^2 of the platens said sleeves will also actuate the levers k^3 to automatically cause the clamps k to engage with the studs k', and when said sleeves are released the reacting-springs k^6 will act to cause the levers k^2 k^3 to move to unlock the clamps k from the studs k'.

Instead of using the actuating mechanism for the movable guides C, as above described, and shown in Figs. 12 to 15, a block l, with eccentric l', having a gear connection l^2 with a shifting rack-bar, may be substituted, as shown in Figs. 19 to 24. It will be noticed, therefore, that the details of the machine may be greatly varied within the scope of the invention, and hence the construction and arrangement of the machine may also be correspondingly varied.

I do not herein claim the machine, as the same forms the subject-matter of another pending application filed of an even date herewith, Serial No. 388,049, the invention herein claimed being the method of rolling both sides of plate-glass to remove its irregularities, and thereby avoid the undue grinding necessary when it is rolled only on one side, such method broadly consisting of first rolling one side of the glass, then rotating or reversing said sides, and then rolling the other side, and to this end my invention includes any construction and operation of mechanism for accomplishing such end.

What I claim is—

1. The method herein described for rolling plate-glass, which consists in first rolling one side of the plate, then rotating said plate to reverse its sides, and then rolling the other side of the plate, substantially as set forth.

2. The method of rolling plate-glass, which consists in first rolling the plate on one side, then placing it between platens, then raising both platens, then rotating the same, then lifting one of said platens, and then rolling the other side of the plate, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES W. BONTA.

Witnesses:
S. J. VAN STAVOREN,
CHAS. F. VAN HORN.