

(No Model.)

4 Sheets—Sheet 1.

J. J. BREACH.
MACHINE FOR GRADING PATTERNS.

No. 318,539.

Patented May 26, 1885.

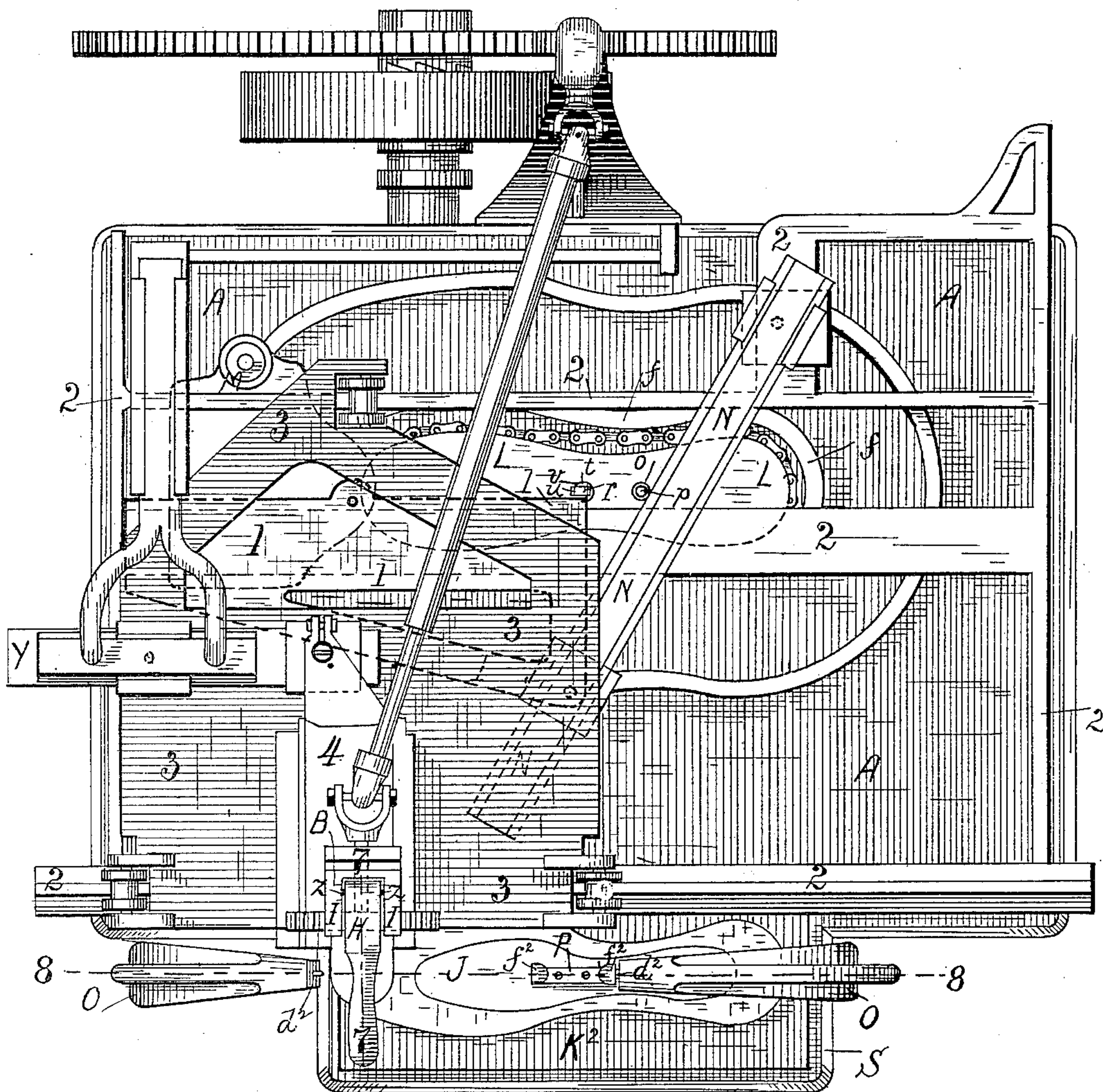


Fig. 1.

Witnesses:

Wm. S. Bellows

J. B. Mitchell

Inventor.

JAMES J. BREACH.

PER Brown Bros.
ATTORNEYS.

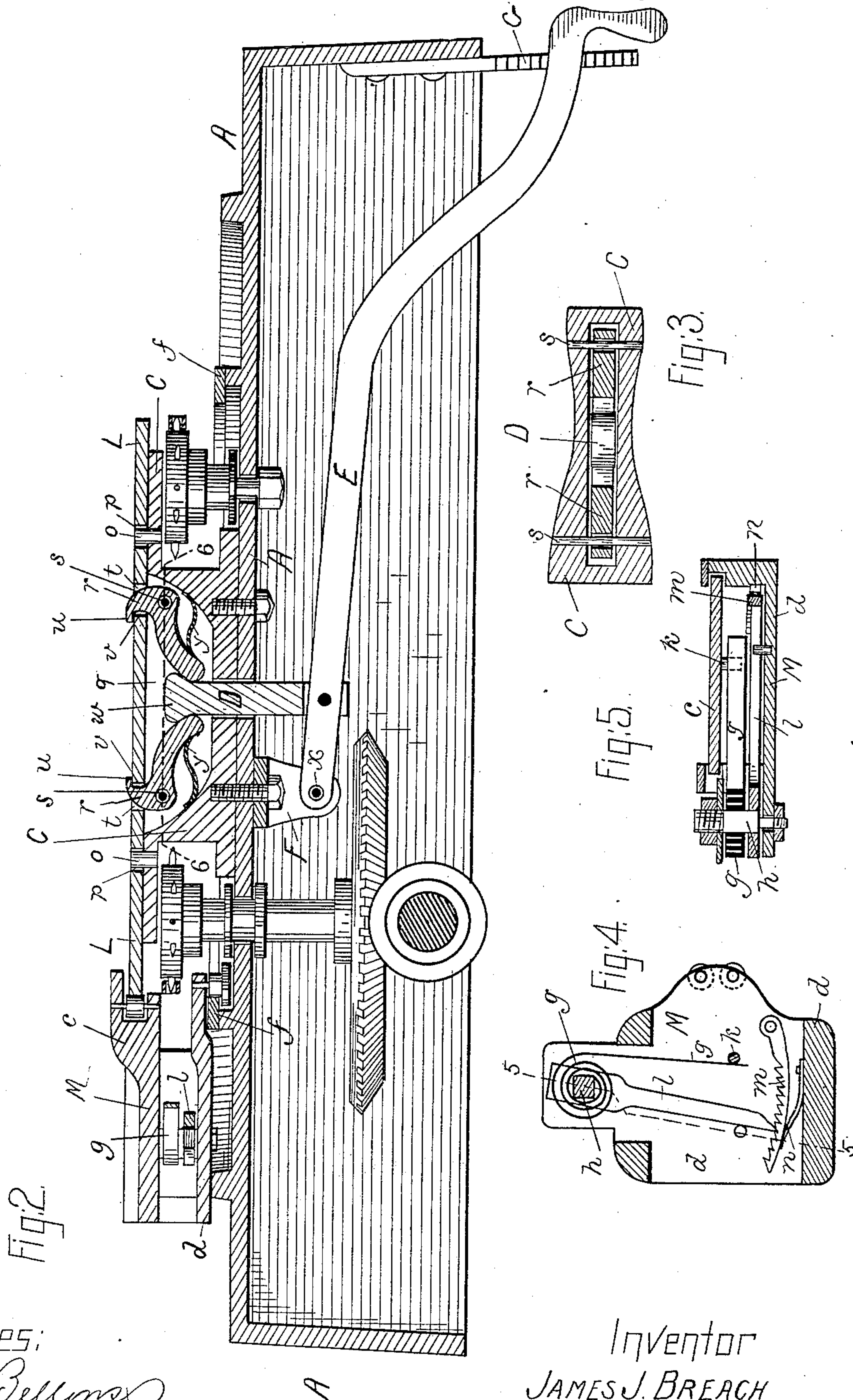
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Wm. S. Bellows
F. B. Mitchell

PER

Inventor
JAMES J. BREACH
Brown Bros.
ATTORNEYS.

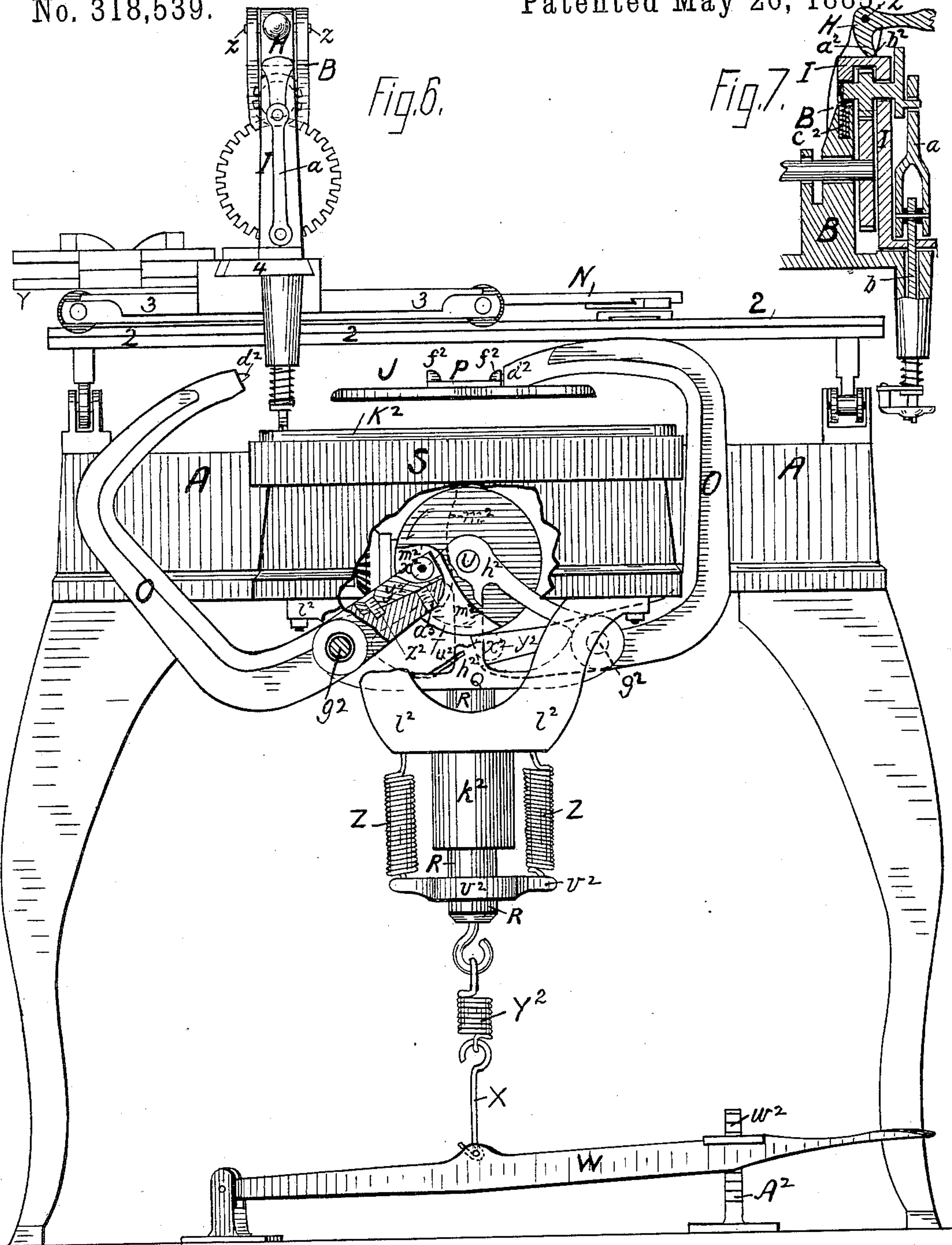
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Wm. S. Bellows.
Marion E. Brown

Inventor.

JAMES J. BREACH
PER. Brown Bros.
ATTORNEYS.

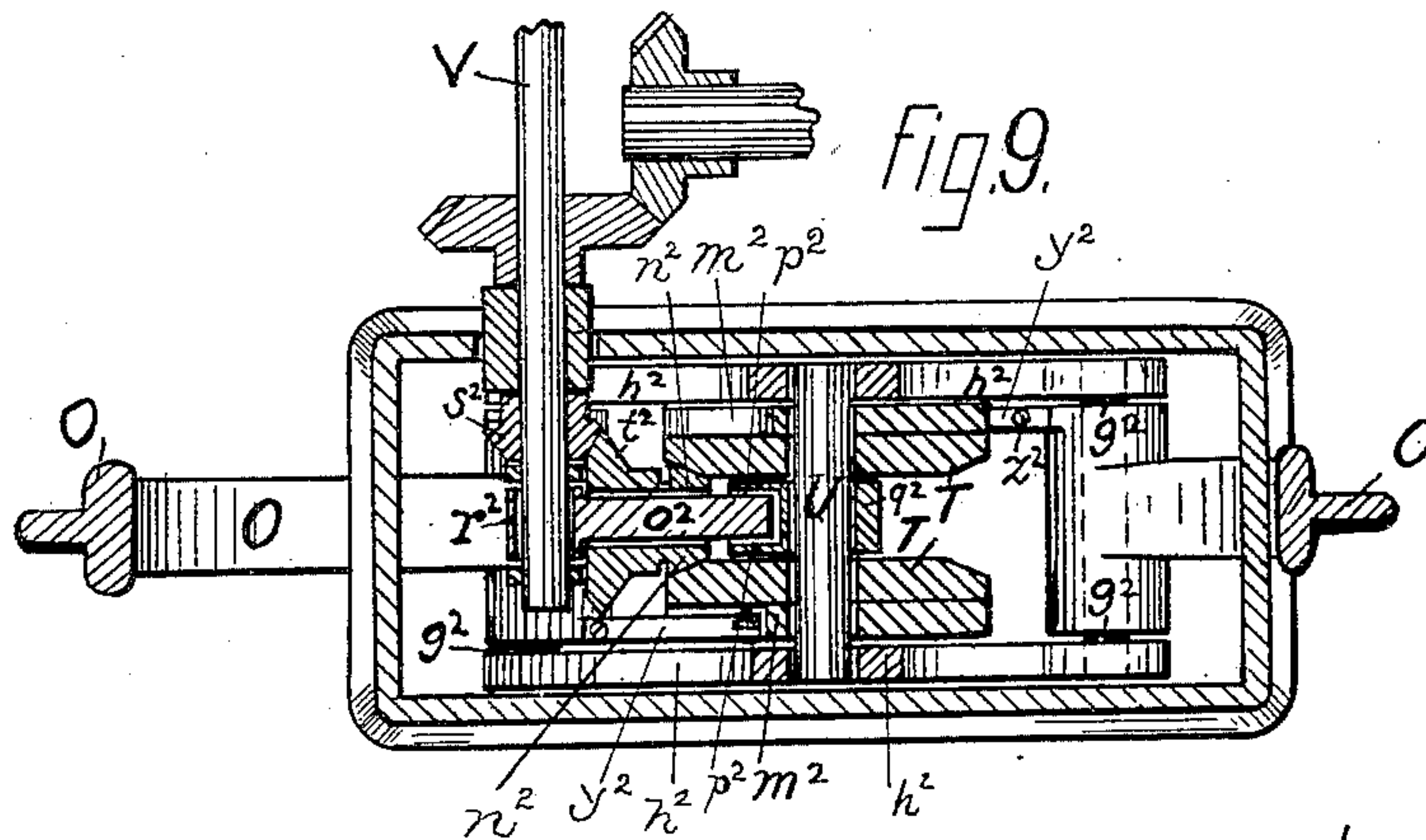
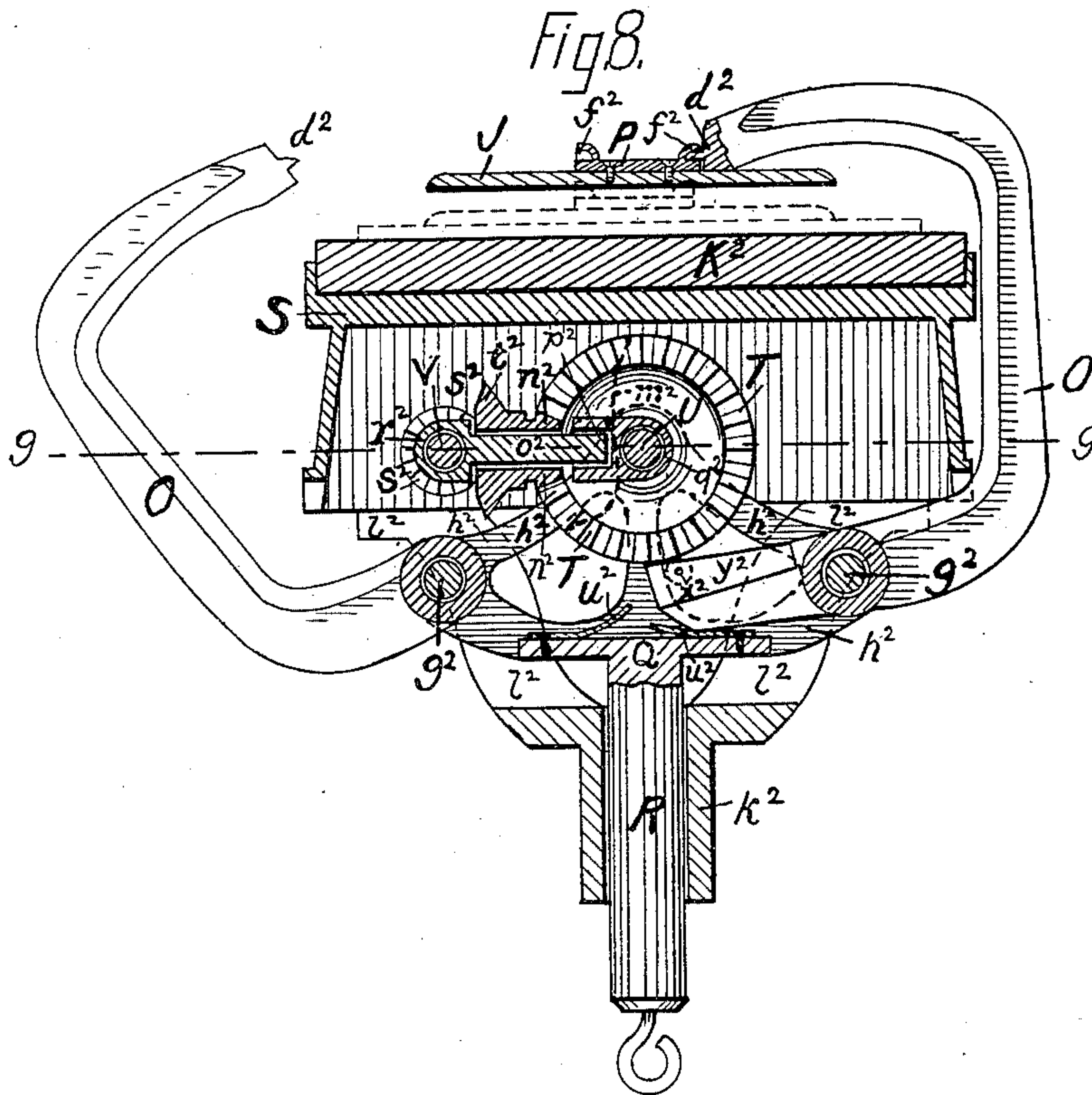
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Witnesses:
Wm. S. Bellows
Marion C. Brown

PER

Inventor,
JAMES J. BREACH,
Brown Bros.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JAMES J. BREACH, OF SOUTH WEYMOUTH, MASSACHUSETTS.

MACHINE FOR GRADING PATTERNS.

SPECIFICATION forming part of Letters Patent No. 318,539, dated May 26, 1885.

Application filed January 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. BREACH, of South Weymouth, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Grading Patterns, of which the following is a full, clear, and exact description.

This invention pertains to improvements in apparatuses for grading patterns, &c., more especially patterns of boot and shoe soles, or, in other words, for the cutting or marking out of boot and shoe soles in their varying sizes, either as to width or length or as to both width and length, from the use of a common pattern block or former having the proper shape both in width and length for a boot or shoe sole of a size corresponding to such pattern, and for that reason this invention is herein shown and described in reference to such application of it, and although it is so particularly illustrated and described it is intended to apply it to the grading of all patterns and for all such purposes as it may be found adapted.

The present improvements are more particularly designed in relation to an apparatus for grading patterns shown and described in an application for Letters Patent of the United States made by me and filed January 27, 1881, and as to such apparatus they relate exclusively to mechanism connected with the sole or other former, the tracer, the cutter-bar, and the clamp for holding the leather, &c., while being cut or marked.

This invention in substance consists, first, of a tracer made in parts arranged to slide upon each other and adapted the one to bear upon the edge of a stationary sole or other suitable former or pattern, and the other to travel on a stationary guideway about such pattern, in combination with a spring arranged through arms connected therewith to hold the one moving part to its bearing against and upon the edge of the former or pattern, and the other moving part to its bearing upon the guideway, and with a toothed or ratchet bar, connected to one of said moving parts, and arranged for the arm of the spring through which the spring acts upon said moving part, to be engaged with its teeth, all substantially as hereinafter described; second, of the combination, with the sole or other former or pat-

tern, of mechanism constructed and arranged for the location of and for securing said former in position and for releasing it, all substantially as hereinafter described; third, of an arrangement of the carrier for the cutter-bar or marking-tool to be put into and out of its operating position, and to be held in its operating position, all substantially as hereinafter described; fourth, of a clamp for clamping the leather, &c., in position to be cut or marked, composed of two clamping-jaws adapted to be opened and closed and to be held in either of such positions, in combination with mechanism which carries one of said jaws at opposite points thereof, and is constructed and arranged to be attached or connected to and detached or separated from the clamping-jaw which it carries at either one or both of its parts, carrying the jaw at opposite points, and in such attachment and detachment as to either of said parts to be independent of the similar operations of the other of said parts.

The present invention is illustrated in the accompanying plate of drawings. Figure 1 is a plan view. Fig. 2 is a vertical section in the length of the sole-former, and of the mechanism for binding and holding it in place. Fig. 3 is a horizontal section on line 6 6, Fig. 2. Fig. 4 is a horizontal section showing the tracer in plan, with the sole-former removed. Fig. 5 is a vertical section on line 5 5, Fig. 4. Fig. 6 is a front elevation. Fig. 7 is a vertical section on line 7 7, Fig. 1, of the head-stock carrying the mechanism for operating the cutter-bar and for placing it into and out of operating position. Fig. 8 is a vertical section on line 8 8, Fig. 1, through the mechanism for clamping the leather, &c., to be cut or marked. Fig. 9 is a horizontal section of the clamping mechanism of Fig. 8, and on line 9 9 of such figure.

In Figs. 6 and 7 of the drawings the numerals 1 2 3 4 represent four separate carriages, respectively.

L is the sole-former. M is the tracer. *a* is the carrier-rod for cutter-bar *b*. *K*² is the cutting-block.

The tracer M is connected to carriage 1, which is arranged to move upon and lengthwise of carriage 2, which in turn is arranged to move upon the bed or frame-work A of the machine at right angles to the movement of

carriage 1 upon it, and is connected by a radius-bar, N, to carriage 3, in turn arranged to move upon and lengthwise of carriage 2—that is, at right angles to the movement of such carriage on bed A—and connected by radius-bar Y to carriage 4, which has a standard or head-stock, B, for the carrier-rod *a* of the cutter-bar *b*, and is arranged to move upon carriage 3 at right angles to the movement of such carriage on carriage 2. These several carriages 1, 2, 3, and 4, and tracer M, sole-former L, and the radius-bars N and Y are arranged in relation to each other, and each and all are constructed and provided with mechanism to secure a movement of the cutter-bar *b* around the cutting-block from the travel of the tracer around the sole-former L, and a cutting operation of said cutter-bar, substantially as shown and described in my application for Letters Patent of the United States hereinbefore referred to, except in the particulars hereinafter described, and which constitute, in fact, the features of the present invention. This being the case, plainly it is not necessary to herein particularly describe the features above recited, as they make no part of this invention, and therefore it is deemed sufficient herein to refer for a description thereof to the aforesaid application, simply remarking, to make the reference fully intelligible and to avoid all possibility of confusion, that so far as the said features are shown in the accompanying drawings the cutting-block is placed directly in front of the sole-pattern, in lieu of being placed at one end of it, as in said application. This change in the position of the cutting-block and sole-former necessarily causes some changes of position of the other parts, none of which affect, however, in the least degree the principles of their connection, construction, and operation, as fully described in said application.

The tracer M is in two parts, *c* and *d*, adapted to slide one upon the other. The part *c* bears against the edge of the sole-former L, and the part *d* against the inner edge of a guideway, *f*, of the bed or frame-work A, and each part is held to its said bearings by a common spring, *g*.

For the spring *g* to act as above stated it is coiled about and at one end it is attached to a post, *h*, turning in the part *d* of tracer, and at the other end it has a bearing against a pin or stud, *k*, of the part *c* of tracer in a direction to force said part toward the edge of the sole-former. The turning post *h* has an arm, *l*, which engages with a ratchet or toothed bar, *m*, of the tracer part *d*, and through this arm and ratchet-bar the spring *g* acts upon said part *d*, and in a direction outward from the edge of the sole-former, thus confining it (said part *d*) to its bearing against the inner edge of the guideway *f*. The ratchet-bar *m* at one end is pivoted to the tracer part *d*, and it is held engaged with the arm *l* of the post *h* by a bent spring, *n*, which at one end is secured to the tracer part *d*. Thus, as described, the tracer-

spring *g* acts on pin *k* to force the one part, *c*, of the tracer toward the edge of the sole-former, and through the arm *l* to the post *h* to force the other part, *d*, of the tracer outward from the edge of the sole-former, and to confine it to its guideway *f* of the bed A the same as in my application aforesaid; but in the present arrangement of parts the ratchet-bar *m*, with which the arm *l* of the post *h* is engaged, furnishes a bearing for holding such arm to its work, which, while it is practically permanent, yet allows of the engagement of the arm *l* with it to be readily adjusted to secure a greater or lesser degree of tension on the tracer-spring *g*, and as a consequence a greater or lesser pressure upon the respective parts *c* *d* of the tracer in opposite directions, as described.

The sole-former L rests upon the top of a block, C, of the bed or frame-work A. The rest-block C in its length has two vertical stationary pins, *o*, which fit holes *p* in the sole-former L; and, again, said block has a longitudinal vertical slot, *q*, between said pins *o*. *r r* are two angular-shaped levers arranged at opposite ends of the slot *q*, and each to turn upon a separate fulcrum-pin, *s*, of the rest-block C. The levers *r r*, at their lower parts, project toward each other, and at their upper parts each projects through and above the top of the rest-block C, and also through separate holes *t* and above the upper surface of the sole-former L. The upper end of each lever *r* has an offset or horizontal shoulder, *u*, extending the one toward the other, and both situated to be lapped over and to be brought to bear upon the upper surface of the sole-former L by swinging the levers in the proper direction therefor.

D is a pin arranged for a vertical movement between the lower ends of the angular levers *r* and through the bed A. This pin D, at its upper end, has a head, *w*, which rests and bears upon the upper side of the lower parts of the angular levers, and the pin, at its lower end, is hung to a handle-lever, E, arranged to turn upon a fulcrum, *x*, of a stationary post, F, and to project from one side of the bed or frame-work A, and there is provided with a ratchet or toothed bar, G, in position for engaging the lever with its teeth, and thus securing the same against movement.

A construction and arrangement of mechanism and its combination with a sole-former, all as above described, secures, by a depression of the lever-handle E, and through it of the headed pin D, the swing of the angular arms or levers *r* toward each other, and thus the sole-former is bound between the edges *v* of its holes *t* in a line in the direction of the length of the former; and, again, by the offset *u* of each lever the former is also bound in the direction of its thickness upon the block, and by then engaging the lever-handle with the ratchet-bar G this hold of the former is made fast or secure against accidental release. When the lever-handle E is disengaged from

the ratchet-bar G, it is free to be operated to release the angular levers r from their hold upon the sole-former L above described, and to the reaction of the bent springs y , that are applied to them and attached to the rest-block C. The reaction of the springs y places the offset ends of the levers r in position for the sole-former to be removed from them and from the rest-block C.

The clamping mechanism above described for the sole-former may be arranged to hold the former at opposite ends of the line running in the direction of its width, in lieu of in the direction of its length, as particularly shown and described. Again, in lieu of holding or confining the sole-former in either of the directions above stated, the clamping mechanism may be arranged simply to hold or confine the sole-former in the direction of its thickness, and at opposite ends of a line running in the direction either of the length or of the width of the former.

The two parts of the clamping mechanism for binding the sole-former in place, as described, when operated by the lever E, work simultaneously and conjointly.

The bent springs y , to throw the angular levers into position for the removal of the sole-former, may be dispensed with.

The pins o of the block C, over which the sole-former fits by its holes p , act as guides in placing the sole-former upon the block, and also assist to a greater or lesser extent in the hold of the sole-former by the clamping mechanism, and they may be dispensed with; but obviously it is preferable to use them.

The cutter-bar b , as shown in Fig. 7, in my former application is arranged to travel through a guide-tube and to cut against a block, K^2 , upon which the leather, &c., is to be placed and held to its action, and to be lifted from said block and put out of operative position; and this invention, as to such part of the machine consists of a cam-lever, H, Fig. 7, which has a fulcrum at z , of the stationary head-stock B, and is arranged to work by its cam-edge a^2 against and upon the upper end of the up-and-down-moving support I for the cutter-bar, and thus to place the cutter-bar in its operative position, and then by its square end b^2 to hold it there and against the action of the spring c^2 , which is used to throw the cutter-bar upward and out of its operative position. In the present case the cutter-bar is released from the spring c^2 by turning the cam H, so as to remove its square end from its bearing on the upper end of the support I, carrying the cutter-bar and its attachments.

The cutting-block K^2 is secured to a stationary supporting-platen, S, and its upper horizontal surface is in position for the operation of the cutter-bar b , all as described in my former application.

The material—such as leather—to be cut or marked in the apparatus is clamped against the upper surface of the cutting-block and be-

tween it and the under surface of a plate, J, which makes one, and the upper jaw of a clamp, to which the cutting-block is the other or lower jaw, for securing and holding the leather in position upon the cutting-block. The plate or upper clamp-jaw, J, is of the general outline of a boot or shoe sole, and of a size considerably smaller than the smallest size of sole to be cut in the apparatus.

The clamp-jaw J, as hereinafter described, is carried upon and between the upper ends of two similar vertical C-shaped arms or levers, O, which are located in a vertical plane, preferably one coincident with the central line of the cutting-block from end to end. The cutting-block is below carriage 2, (see Fig. 6,) and in the position of said carriage, as shown in the drawings, Fig. 1, a portion of the width of the cutting-block, as it is located, is necessarily covered by said carriage. The upper end, d^2 , of each C-lever enters into a socket, f^2 , at and abuts against the ends of a block, P, that is secured to the upper side of the clamp-jaw J, and each lever passes from this block P around opposite ends of the platen S and cutting-block K^2 , below the under side thereof, and toward each other, and there each lever is hung upon a separate horizontal fulcrum-pin, g^2 , both secured in a similar vertical bracket-arm, h^2 , projecting at opposite ends of a block, Q. The block Q has a vertical stem, R, projecting downward from its under side, and it and said stem are arranged to be moved up and down, being guided in such movement by the play of the stem R through a vertical guide-tube, k^2 , of brackets l^2 , which are attached to the under side of the supporting-platen S, to the cutting-block. Each C-lever bears against separate cam-edges m^2 , both of similar shape, but running in opposite directions and each carried by a separate vertical gear-wheel, T. These vertical gear-wheels T turn upon a common horizontal axle-shaft, U, secured at its opposite ends to the fulcrum-brackets h^2 , for carrying the C-levers, and they are driven by a common vertical bevel gear-wheel, n^2 , placed between and engaging with the teeth of each of them. The bevel gear-wheel n^2 turns upon a horizontal center axle-shaft, o^2 , that at one end is arranged to play in and out of a socket, p^2 , in a collar, q^2 , which swivels or rocks upon the axle U of and between the vertical gear-wheels T, and at the other end it terminates in a sleeve, r^2 , arranged to turn or rock upon a horizontal shaft, V, turning in stationary bearings of the bed or frame A, and arranged to be driven from the driving-shaft of the machine in any suitable manner and through a bevel gear-wheel, s^2 , to mesh with a bevel gear-wheel, t^2 , which is carried by the bevel gear-wheel n^2 , hereinbefore described as meshing with the two vertical gear-wheels T, carrying the cam-edges m^2 . The shape of each cam-edge is such that for a portion of the rotation of each cam the cam will hold the C-lever resting against it, engaged with the sock-

et f^2 of the upper clamp-jaw, J, and for another portion will allow such arm to be disconnected from such socket and to fall back and away from the cutting-surface of the cutting-block K^2 by the action of a bent spring, w^2 , which is arranged to bear against each C-arm in a proper direction to move it from the upper jaw, as the shaft of the cam allows such movement to occur. The cams m^2 are rotated by the pinion gear-wheel n^2 , which meshes with both of the carrying gear-wheels T of the cams, and is connected to the driving-shaft V, all as has been described. The movements of the C-levers in engaging with and disengaging and moving away from the upper clamp-jaw, J, are intended to be such as to offer no obstruction to the travel of the cutter-bar about the cutting-block, while at the same time one at least of the C-levers will be always engaged with said clamp-jaw.

As the carrying C-arms for the upper clamp-jaw, J, are connected to a common holder or block, Q, adapted to be moved up and down through stationary brackets l^2 of the bed or frame-work, it is plain that by depressing the holder Q the upper jaw can be placed in close contact with the leather, &c., upon the cutting-block K^2 , to secure such leather in position thereon; and, again, by lifting the holder Q the upper jaw can be placed out of contact with the leather, &c., upon the cutting-block, and thus the leather be released for removal. The lowering of the upper clamp-jaw, J, is secured through the depression of a treadle, W, connected by a rod, X, having a spring, Y^2 , intermediate of its length, to the lower end of the downward-projecting stem R of the carrier-block Q for the C-arms of the upper clamp-jaw, and this depression is against vertical spiral springs Z, connected at their upper ends to the stationary brackets l^2 of the bed A, and at their lower ends to a cross-piece, v^2 , of the vertical stem R of the carrier-block Q. The raising of the upper clamp-jaw is from the reaction of the spiral springs Z, and this jaw, when brought into position to clamp the leather upon the cutting-block, is so held by engaging its operating-treadle W with the proper tooth of a stationary ratchet or toothed edge, w^2 , on a post, A^2 , suitably located therefor. In this raising and lowering of the upper clamp-jaw the mechanism for rotating the cam-edges m^2 from a driving-shaft connected thereto at the bevel gear-wheel s^2 not only moves up and down with the upper clamp-jaw, but at the same time keeps its several connections with each other and the driving bevel gear-wheel s^2 intact, because of the rock of the axle-shaft o^2 , which carries the bevel gear-wheels n^2 t^2 upon the driven shaft V, and of the in-and-out play allowed to said axle-shaft o^2 in its rocking support q^2 between the vertical gear-wheels T and upon the axle-shaft U of said wheels, all of which allows said several parts to accommodate themselves to the varying distances between the axes of the driving-shaft V, and of the axle-shaft U, carrying the

vertical gear-wheels caused by the up-and-down movement of the axle-shaft U in raising and lowering the upper clamp-jaw and the carrier-block Q for the arms of suspension for said jaw.

An arrangement of clamping-jaws, such as described, for securing the leather, &c., in position to be operated upon by a cutter or marker of a grading apparatus obviously permits of a continuous movement of the cutter or marker about the leather, &c., held between the clamps without interference between it and the holding devices for the upper clamp-jaw, which are across its path or course, and the upper clamp-jaw is at all times held securely in place at least by one if not by both parts of its said holding devices.

The C arms or levers O, carrying the upper clamp-jaw, as described, are along the length of the clamp-jaw; but plainly they may be as well arranged across the length of the jaw, or, in other words, in the direction of the width of the jaw.

The springs w^2 , for throwing the C-arms O away from the upper clamp-jaws, may be dispensed with and the same result accomplished by weighting said C-arms. Again, the cutting-block, which is the lower jaw, may be arranged to be lifted toward and lowered from the plate J or upper clamp-jaw in a manner, for instance, substantially similar to that described for the upper clamp-jaw—that is, by treadle and springs—and the upper clamp-jaw then either made stationary or arranged to be lifted and lowered, as has been described.

The C-arms O, at their bearing ends or faces upon the cam-edges m^2 , have a friction-roller, x^2 , to run upon said edges, and each roller is carried in a block, y^2 , which is secured in position by a screw, z^2 , and is adapted to be adjusted to place the roller to its proper working position by a set-screw, a^3 , all as is obvious from an inspection of the drawings without further explanation.

Although the clamping mechanism for the former L has been described particularly in connection with a former of a boot or shoe sole, and although the clamping mechanism for the leather, &c., to be cut or marked has been particularly described in connection with the cutting or marking out of soles of boots and shoes, it is plain that such mechanisms are adapted to formers and to the cutting or marking out of other articles, and the same is true of the arrangement of parts for holding the cutting-bar to its operating position and releasing it therefrom, and also of the construction of the tracer, and its combination herein particularly shown and described, and therefore it is not intended to limit the invention in any such respects, and in construing this invention all parts of the description and claims, and the drawings particularly describing and showing a sole former, or the cutting or marking out of soles, are to be considered in the broad sense above indicated.

Having thus described my invention, what I

claim, and desire to secure by Letters Patent, is—

1. A tracer, M, made in two parts, c and d , adapted to slide one upon another, and provided with a coiled spring, g , which has a bearing against each of said parts, in combination with the yielding ratchet or toothed arm m , applied to part d , pattern or former L, and stationary guideway f , all substantially as and for the purpose described.

2. A pattern, L, substantially as described, and adapted, in combination with jaws or levers r , which are constructed, arranged, and applied to the pattern, to confine and hold it at opposite points of the pattern, substantially as set forth.

3. A pattern, L, having holes p , and rest-block C, having pins o , in combination with jaws or levers r , which are constructed, arranged, and applied to the pattern to confine and hold it at opposite points of the pattern, substantially as and for the purpose described.

4. A former or pattern, L, having edges v at opposite points thereof, in combination with levers r , constructed and arranged to bear against said edges v , substantially as described, and for the purpose specified.

5. A former or pattern, L, having holes t at opposite points thereof, levers r , adapted to enter said holes t , and each having an offset, u , to press downward upon said pattern, in combination with a rest-block, C, substantially as and for the purpose described.

6. A former or pattern, L, its rest-block C, pins o , and holes p , in combination with levers r , constructed and arranged to confine and hold the pattern, substantially as and for the purpose described.

7. A pattern, L, and levers r , in combination with an operating-pin, D, for said levers, each and all relatively constructed and arranged for the levers to be engaged with the pattern L and to be operated by the pin D, substantially as and for the purpose described.

8. A cutter-bar, b , carried and guided by a support, I, arranged to be moved up and down to place the operating mechanism for the bar b into and out of connection, in combination with a lever, H, having cam-edge a^2 and end b^2 applied and arranged in relation to said support I, all substantially as and for the purpose described.

9. A clamp composed of jaws K^2 and J, adapted to be opened and closed, in combination with lever-arms O, carrying one of said jaws at opposite points thereof, and mechanism to operate on said levers to place them in and out of connection with said jaw, substantially as and for the purpose described.

10. A clamp composed of two jaws, K^2 J, in combination with levers O, which carry jaw J at opposite points thereof, and are hung upon separate fulcrum g^2 and adapted to bear upon separate rotating cam-edges m^2 , substantially as and for the purpose described.

11. A clamp composed of jaws K^2 J and of lever-arms O, which carry jaw J at opposite points thereof, and are hung upon separate fulcrum g^2 and bear upon separate rotating cam-edges m^2 , in combination with the vertical gear-wheels T of shaft U, each of which gear-wheels carries a cam-edge, m^2 , and with gear-wheels n^2 and t^2 on shaft o^2 , adapted to turn in a loose collar, q^2 , of shaft U upon a shaft, V, having gear-wheel s^2 , substantially as described, for the purpose specified.

12. A clamp composed of jaws K^2 J, adapted to be opened and closed, in combination with lever-arms carrying one of said jaws at opposite points thereof, and mechanism to operate on said levers to place them in and out of connection with and to open and close said jaw, substantially as and for the purpose specified.

13. A clamp composed of jaws K^2 J and of lever-arms O, which carry jaw J at opposite ends thereof, and are hung upon separate fulcrum g^2 and bear upon separate rotating cam-edges m^2 , in combination with the vertical gear-wheels T of shaft U, and each carrying a cam-edge, m^2 , gear-wheels n^2 and t^2 of shaft o^2 , turning in a loose collar, q^2 , of shaft U and upon a shaft, V, having gear-wheel s^2 , and treadle-lever W, having yielding connection with the support for the fulcrum of the lever-arms O, substantially as described, for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES J. BREACH.

Witnesses:

EDWIN W. BROWN,
WM. S. BELLOWS.