

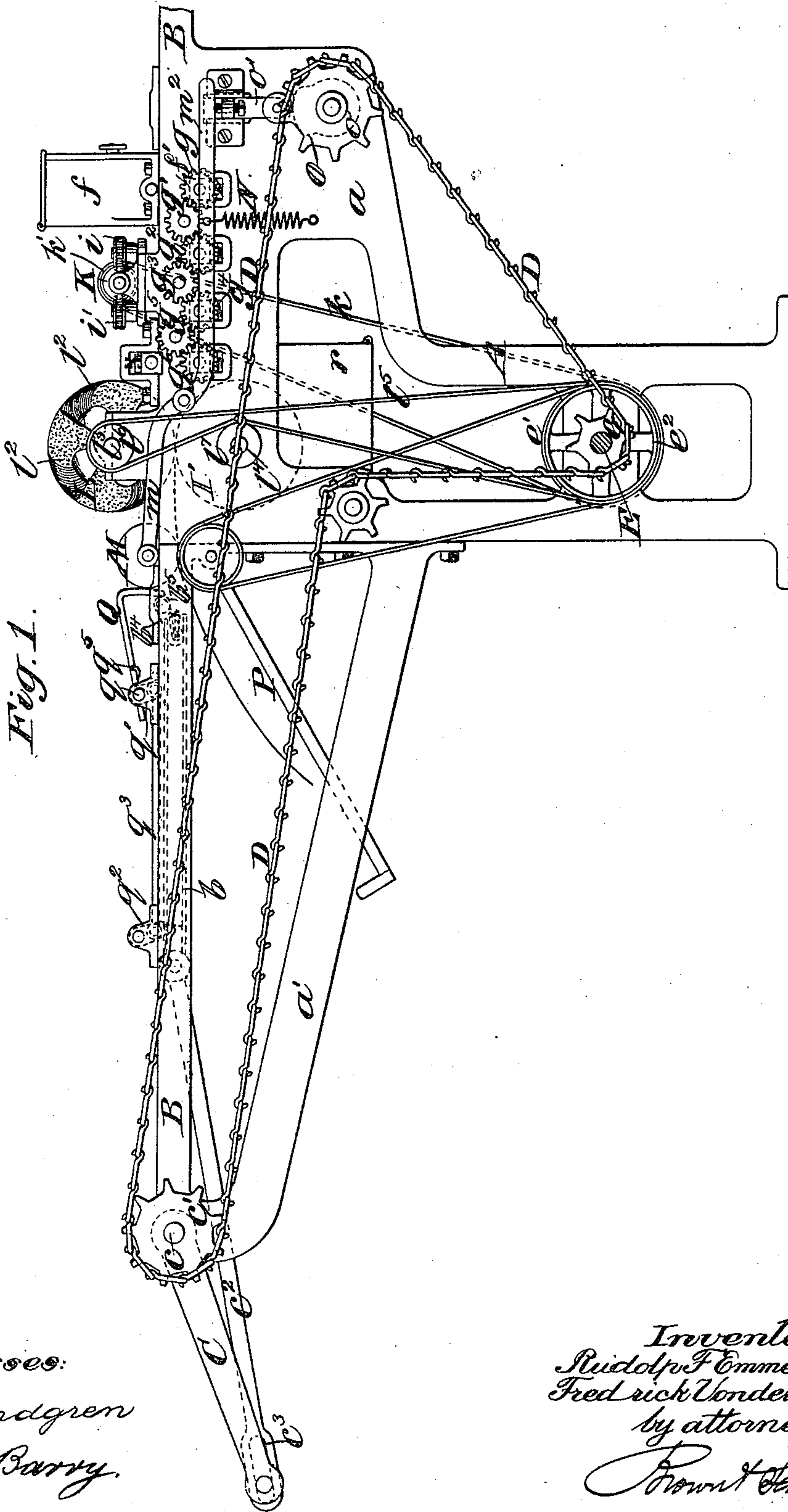
(No Model.)

3 Sheets—Sheet 1.

R. F. EMMERICH & F. VONDERLEHR.
BRONZING MACHINE.

No. 464,754.

Patented Dec. 8, 1891.



Witnesses:
O. Sundgren
George Barry.

Inventors:
Rudolf F. Emmerich
Fredrick Vonderlehr
by attorneys
Brown & Howard

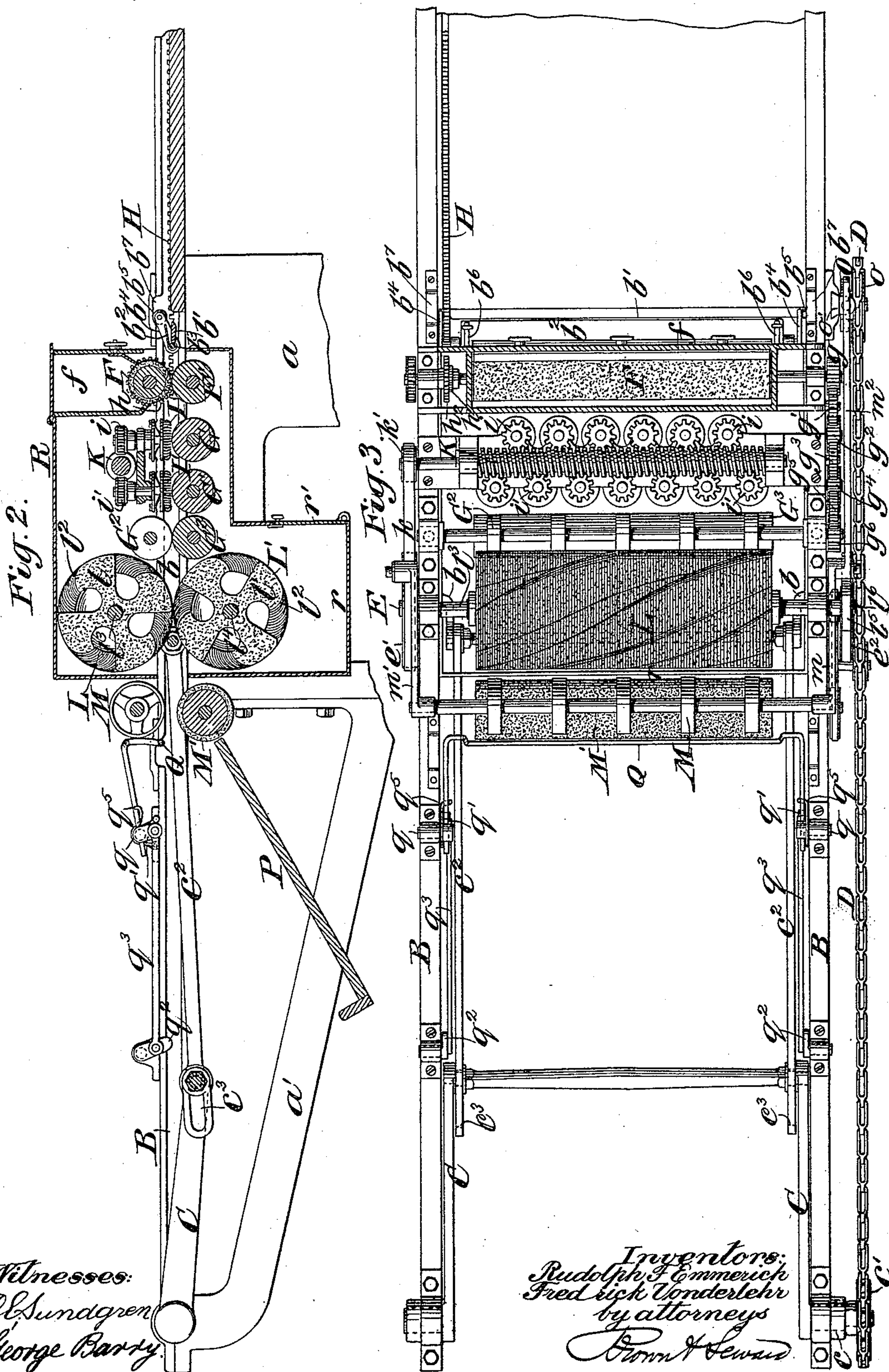
(No Model.)

3 Sheets—Sheet 2.

R. F. EMMERICH & F. VONDERLEHR.
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(No Model.)

3 Sheets—Sheet 3.

R. F. EMMERICH & F. VONDERLEHR.

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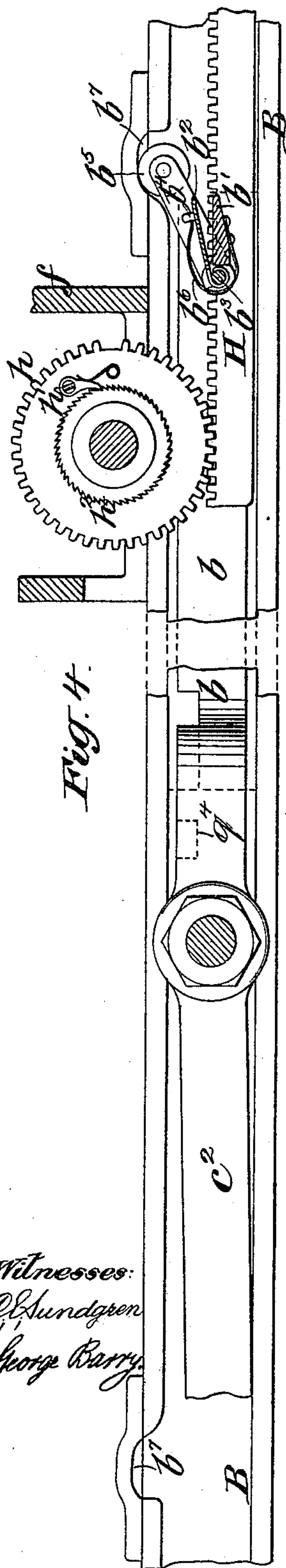


Fig. 4.

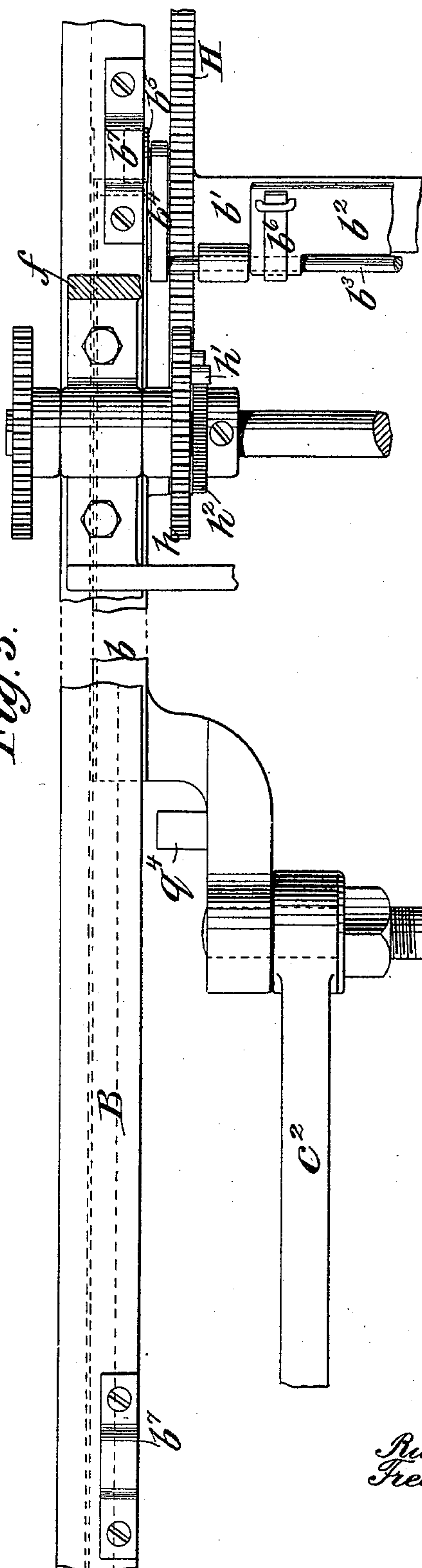


Fig. 5.

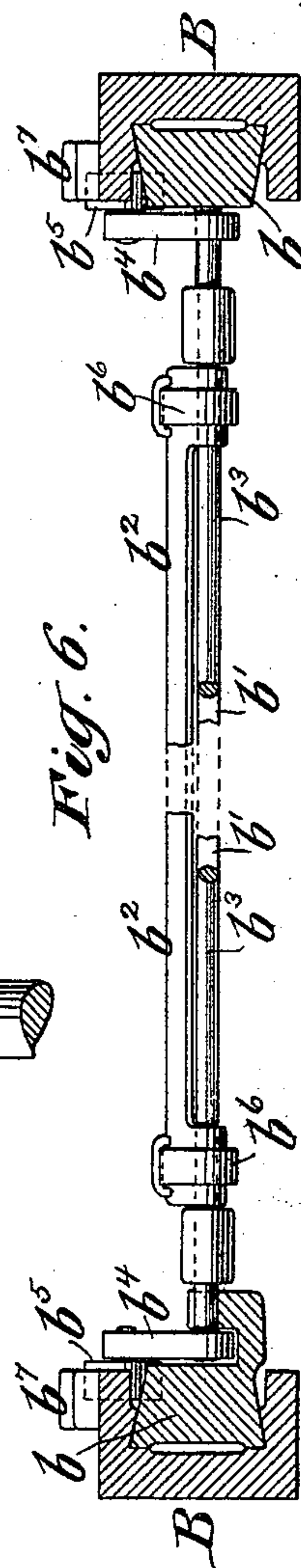


Fig. 6.

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UNITED STATES PATENT OFFICE.

RUDOLPH F. EMMERICH AND FREDRECK VONDERLEHR, OF NEW YORK, N. Y.

BRONZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,754, dated December 8, 1891.

Application filed August 7, 1891. Serial No. 401,966. (No model.)

To all whom it may concern:

Be it known that we, RUDOLPH F. EMMERICH and FREDRECK VONDERLEHR, both of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Bronzing-Machines, of which the following is a specification.

Our invention relates to an improvement in bronzing-machines, in which the sheet to be bronzed is conducted along a plane and operated upon by the polishing and cleaning brushes.

A practical embodiment of our invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the machine in side elevation. Fig. 2 is a longitudinal vertical section through the upper portion of the machine, showing the casing which incloses the polishing and cleaning brushes in position. Fig. 3 is a top plan view with the casing removed. Fig. 4 is an enlarged view in detail of a portion of the feeding mechanism. Fig. 5 is a partial top plan view of the same, and Fig. 6 is a transverse section of the same, showing the gripper in side elevation.

The sheet provided with its sizing or suitable adhesive material is secured to a reciprocating carriage and conveyed by it into engagement with a device for spreading the bronze upon the sheet, and thence into position to have its surface operated upon by rotating polishing brushes, thence to a cleaning-brush for removing the superfluous bronze from the surface, and is then released from the carriage and grasped between a pair of delivering-rolls, which conduct it onto the receiver in a finished state. As soon as the sheet is delivered the carriage is automatically returned to receive a new sheet and in turn convey it into position to receive the same treatment as that just indicated.

The frame of the machine is here represented as consisting of a supporting-standard A, provided with a superstructure extending to the right and left of the standard, that to the right being denoted by a and that to the left by a' , for supporting the mechanism immediately connected with the carrying and treatment of the sheet.

The upper portion of the supporting-frame

is provided with a pair of ways B, (see Fig. 6,) in which the sides b of the carriage are adapted to slide. A transverse bar b' , connecting the sides b of the carriage, serves as the lower or fixed jaw of a gripper for engaging the edge of the sheet, the upper or movable jaw being represented by b^2 . The latter is secured to a rock-shaft b^3 , secured in suitable bearings fixed to the carriage and carrying upon its opposite ends a pair of arms b^4 , provided at their free ends with anti-friction rollers b^5 . Springs b^6 , secured to the fixed jaw b' and having their free ends loosely engaged with the swinging jaw b^2 , have a tendency to hold the jaw b^2 normally away from the fixed jaw b' . The ways B are provided at intervals corresponding to the points where the sheet is to be grasped and where it is released with recesses b^7 , into which the rollers b^5 on the arms b^4 may be received, and thereby allow the jaw b^2 to be swung away from the jaw b' under the tension of the springs b^6 . Intermediate of the recesses b^7 the rollers b^5 engage with the upper wall of the groove in the ways B, and thereby swing the shaft b^3 in the direction to hold the jaw b^2 pressed toward the jaw b' , and hence the sheet inserted between them firmly grasped.

The carriage is reciprocated by means of an arm C, fixed to rotate with a shaft c , journaled in the portion a' of the main frame, and having fixed thereto a sprocket-wheel c' , connected by a sprocket-chain D with a sprocket-pinion e , fixed upon the drive-shaft E, the latter journaled in the base portion A of the frame. The arm C has its free end connected with the carriage by a connecting-rod c^2 , the connection of the rod c^2 with the end of the arm C being of the slot-and-pin type, as shown at c^3 , by means of which there is a delay at two opposite points in the rotation of the arm C, the duration of the delay depending upon the length of the slot c^3 . The delays in the present instance occur when the carriage is in position to receive the sheet and immediately after it has released the sheet, the former allowing time for the insertion of a new sheet and the latter allowing time for the discharge of the sheet just released. As the sheet, with its front edge gripped, is drawn forward by the carriage it passes first be-

tween a bronzing-roller F and a pressure-roller F', geared to rotate together. The bronzing-roller F consists, preferably, of a felt-covered roller, having its upper side exposed to a supply of the powdered bronze in a supply-receptacle *f*. The pressure-roller F' is mounted in yielding bearings *f'*, (see Fig. 1,) so as to allow the rollers to separate to permit the gripping device to pass between them. After passing between the rollers F F' the sheet passes over the supporting-rollers G G' and thence between the feed-rollers G² G³, the former consisting of a series of disks spaced apart, as clearly shown in Fig. 3. The rollers G, G', and G³ are mounted in yielding bearings, similar to those in which the roller F' is mounted, and are caused to rotate in the direction to advance the sheet by means of a chain or gear *g*, *g'*, *g*², *g*³, *g*⁴, *g*⁵, and *g*⁶, the several gear-wheels fixed to the roller-shafts being connected by intermediate gear-wheels to keep their direction the same. The rotation of the bronzing-roller to distribute the bronze upon the sheet is caused by a rack H, carried by the sheet-supporting carriage and arranged to engage a spur-wheel *h*, loosely mounted upon the shaft of the bronzing-roller and carrying a pawl *h'*, adapted to engage a ratchet-wheel *h*², fixed on the shaft of the bronzing-roller. The arrangement is such that when the carriage is advanced the rack will turn the wheel *h* in the direction to cause the ratchet-wheel *h*² to be rotated therewith by the engagement of the pawl with the ratchet-teeth, and hence will cause the bronzing-roller to rotate and distribute the bronze upon the sheet. When, however, the carriage is returned for a new sheet, the wheel *h* will rotate in the direction to carry the pawl over the ratchet-teeth without engaging therewith, and hence the bronzing-roller will remain stationary. As the sheet passes from beneath the bronzing-roller over the carrying-rollers G G' its bronzed face is operated upon by a series of rotary polishing-brushes I I', mounted in a suitable support and arranged transversely of the machine, the said brushes being provided with worm-gears *i* *i'* upon their stems and adapted to engage the opposite sides of a worm K, by which motion is transmitted simultaneously to the two series. The worm K is driven by a belt *k*, leading from a pulley *k'* on the worm-shaft to a drive-pulley *e'* on the drive-shaft E. As the polished sheet passes from between the rollers G² G³ it is acted upon by a pair of rotary cleaning-brushes L L', the one arranged to act upon its bronzed surface and the other upon its back, for the purpose of removing any loose particles of bronze or other foreign matter from the sheet. The brushes L L' are of peculiar structure, being formed of a series of disks of muslin or other suitable fabric placed side by side to form a roll sufficiently long to extend transversely across the sheet. The disks represented at *l* and *l'*, respectively, have deep recesses cut

from their peripheries in toward their centers, so as to form a series of yielding arms. For the purpose of utilizing, as far as feasible, the periphery of the disk and at the same time afford it plenty of opportunity to yield we form the outer portion of the arms of the disk of greater width than the portion nearer the center, and in order that they may admit of the free passage of the gripping device between them we find it desirable to round the advancing edge of the arm, as shown at *l*². We further find it desirable to arrange the disks so that their arms shall form spiral wings longitudinally of the brush-shafts *l*³ and *l*⁴. The brushes L L' are driven in a direction opposite that in which the sheet is advanced by means of a belt *l*⁵, which engages pulleys *l*⁶ *l*⁷ on the shafts of the brushes, and leads thence to a drive-pulley *e*² on the drive-shaft E. As the sheet advances from the brushes L L' its forward edge passes between a pair of discharging-rollers M M', the former being preferably formed by a series of disks spaced apart. The roller M is journaled in swinging arms *m* *m'*, pivotally secured to the main frame, one of which *m* is extended beyond the pivotal point, as shown at *m*², and is acted upon by a spring N, the tension of which tends to rock the arms in a direction to hold the roller M away from the roller M' to permit the free passage of the gripping device. As soon, however, as the gripping device has passed through between the said rollers M M' and the sheet has been released the roller M will be forced toward the roller M' into contact with the sheet by means of a cam O, fixed to rotate with a sprocket-wheel *o*, which engages a lifting-slide *o'*, which in turn pushes upwardly upon the arm *m*² of the lever in which the roller M is mounted. The cam *o* holds the lifting-slide *o'* elevated for a time sufficient to allow the sheet to be discharged from between the rollers M M' onto the receiver P. The wheel *o* is driven by the sprocket-chain D, hereinbefore referred to. As the gripping device reaches the recess *b*⁷ and allows the movable jaw to open and release the sheet a discharging-arm Q, secured to a short rock-shaft *q*, drops into position to engage the front edge of the sheet and positively removes it from the opening jaws as they continue to advance. The shaft *q* is rocked to throw the discharging-arm Q into engagement with the sheet by means of a crank *q*¹, fixed thereto and connected at its free end with a swinging trip-arm *q*² by a connecting-rod *q*³, the free end of the trip-arm *q*² resting in position to be engaged by a pin or lug *q*⁴ on the carriage as the latter passes it. The discharge-arm Q is returned promptly to its normal position, out of engagement with the sheet, by means of a spring *q*⁵.

A casing R surrounds the polishing and cleaning rollers and is provided with a depending portion *r* for the accumulation of the particles of bronze that may be brushed from

the sheet. A door *r'* admits of access to the lower portion of the casing for the purpose of removing the accumulated dust.

What we claim is—

5 1. In a bronzing-machine, the combination, with a reciprocating carriage and means for securing the sheet to be bronzed to the carriage, of bronze-distributing mechanism, polishing-brushes, and rollers for supporting the
10 sheet as it passes beneath the polishing-brushes, substantially as set forth.

2. In a bronzing-machine, the combination, with a reciprocating carriage provided with a gripper for the attachment of a sheet thereto,
15 and means for distributing the bronze upon the sheet, of carriage-operating mechanism, the connection between the carriage and its operating mechanism being such that the carriage is allowed to rest at the beginning and
20 end of its stroke, substantially as set forth.

3. In a bronzing-machine, the combination, with the reciprocating carriage and the gripper for the attachment of a sheet thereto, of a discharging-arm under the control of the
25 moving carriage for releasing the sheet from the carriage, and means for distributing the

bronze upon the sheet as it is moved by the carriage, substantially as set forth.

4. The combination, with the means for conveying the sheet and for distributing the
30 bronze thereon, of a finishing or cleaning brush consisting of a series of radial wings composed of soft fibrous material and having their outer portions wider than the portions nearer the axis of the wings, substantially as
35 set forth.

5. The combination, with the reciprocating carriage and the gripper at its end adapted to engage the forward edge of a sheet for advancing it, of the means for distributing the
40 bronze upon the sheet, the finishing mechanism, means for releasing the sheet from the gripper, and a pair of discharging-rollers having movements toward each other at predetermined intervals for completing the pas-
45 sage of the sheet after it has been released from the carriage, substantially as set forth.

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Witnesses:

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