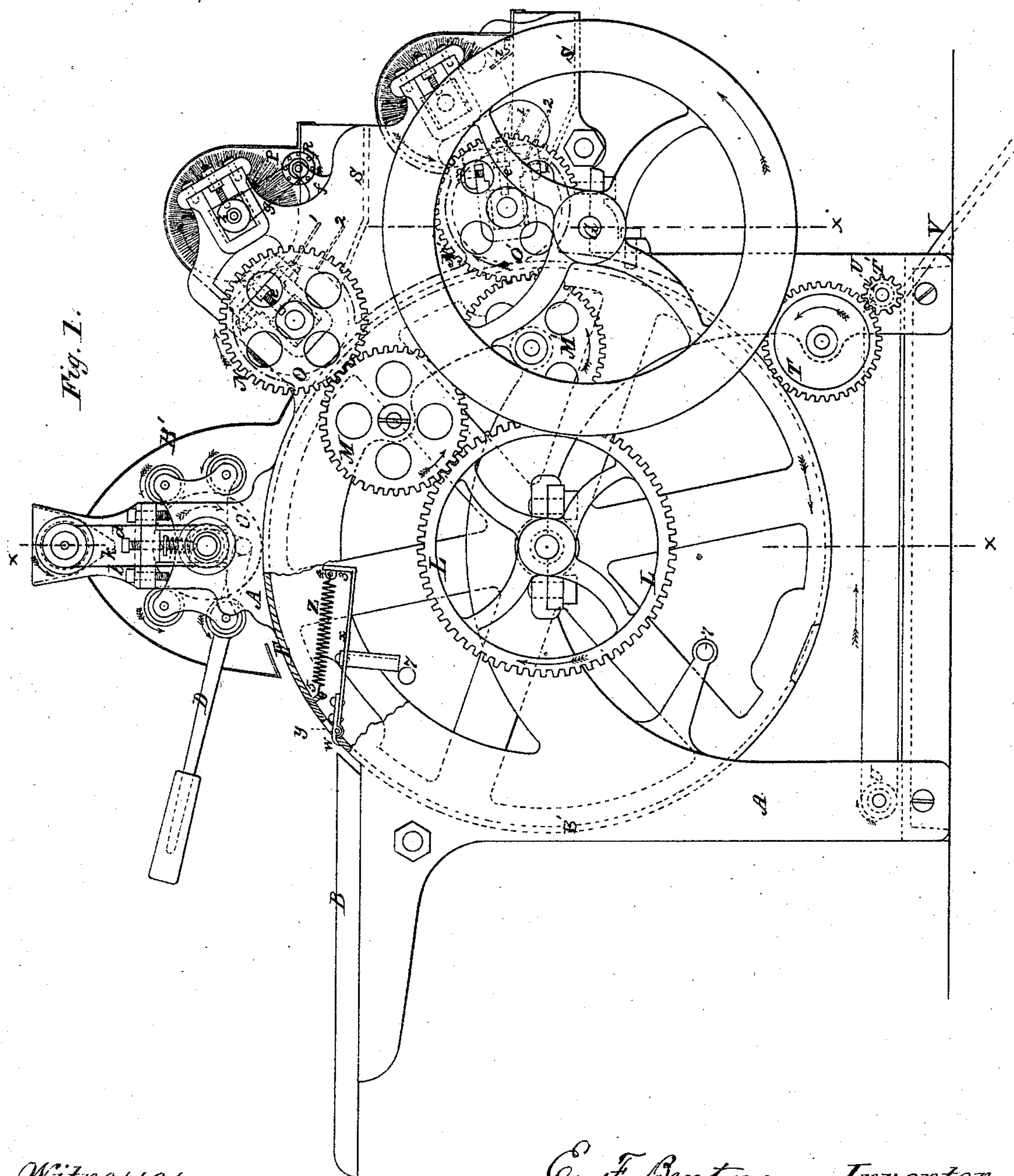


E. F. BENTON.

Improvement in Bronzing Machines.

No. 122,216.

Patented Dec. 26, 1871.



Witnesses:
J. C. Brecht.
Chas. C. Wilson

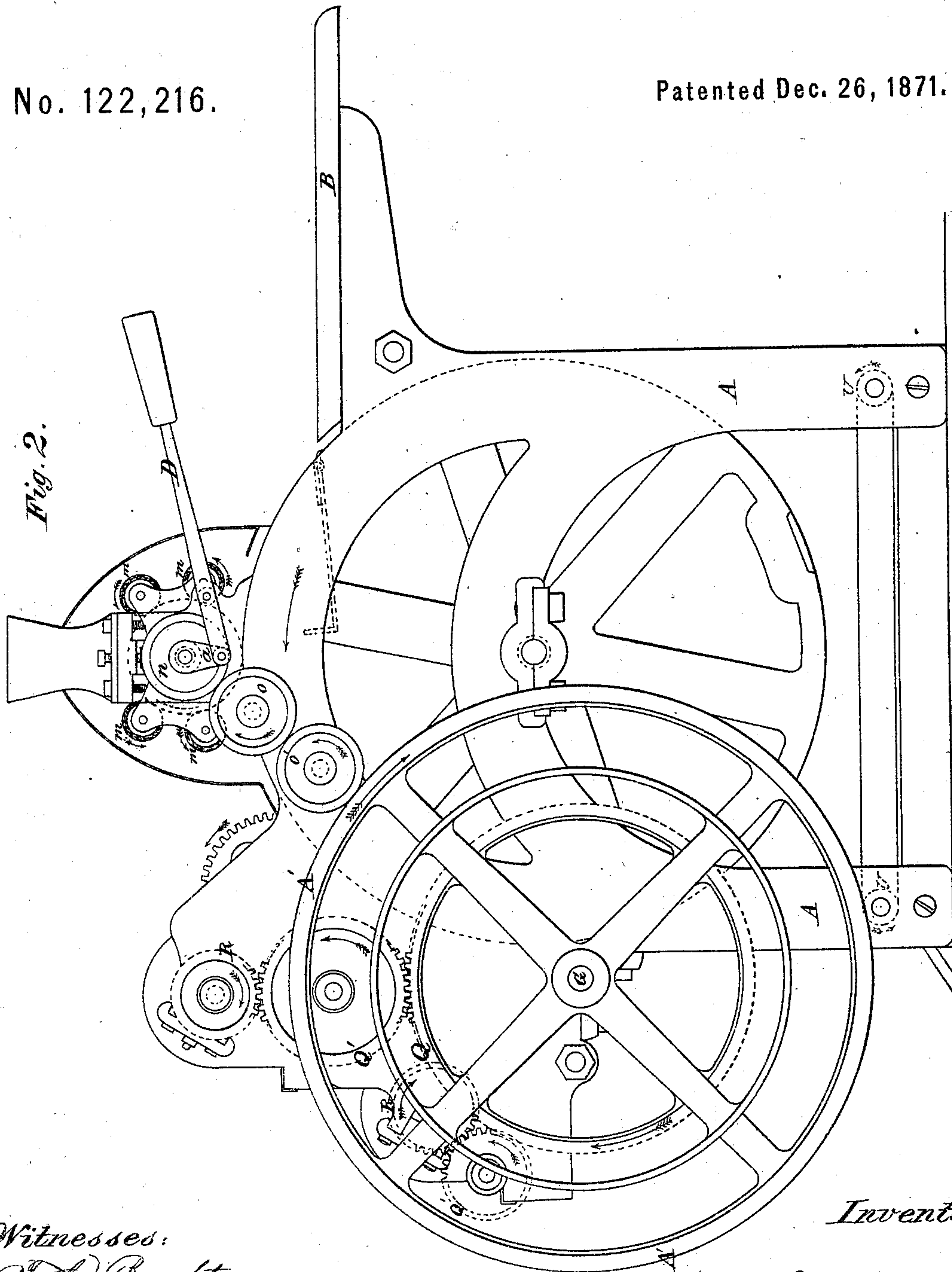
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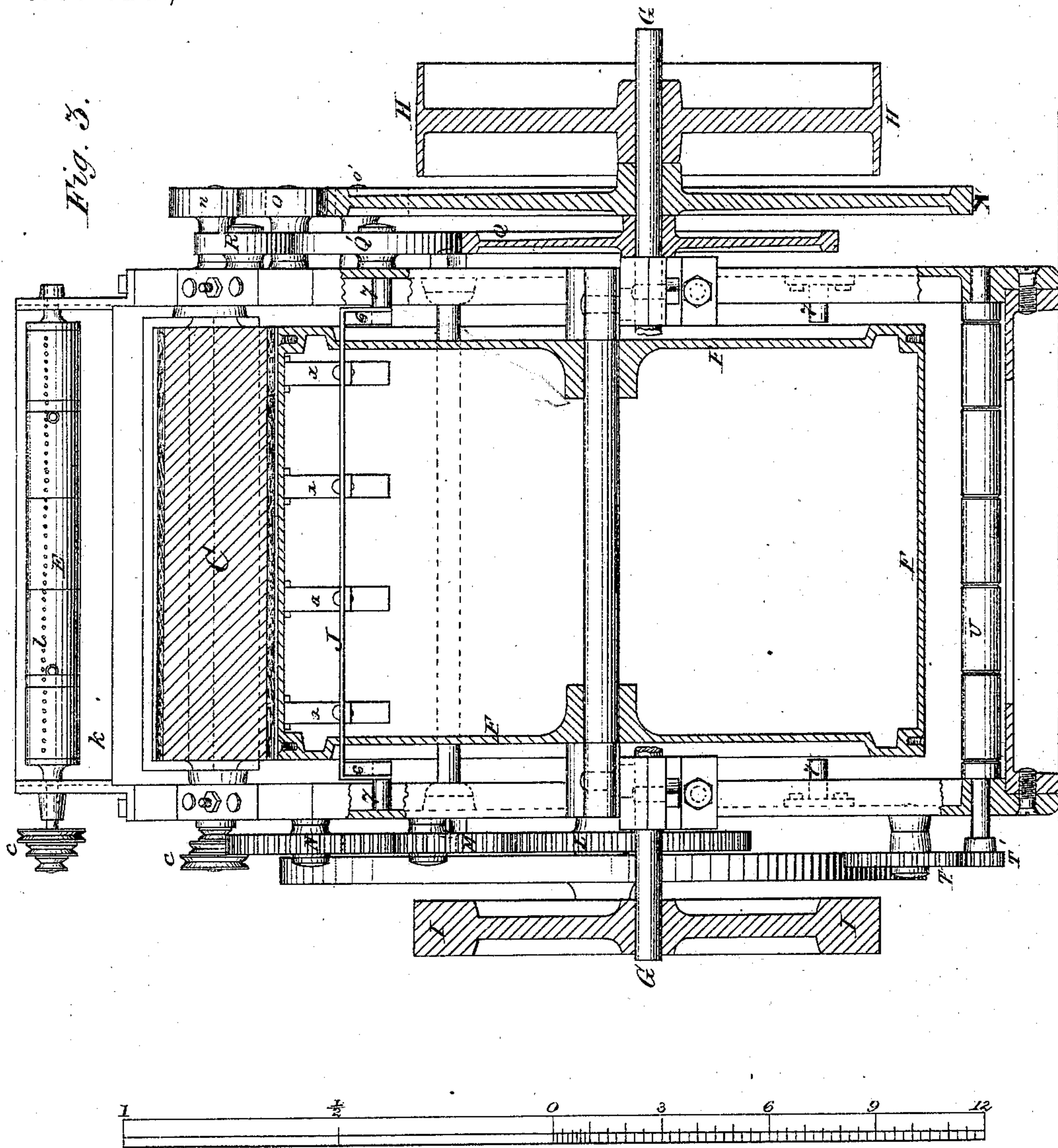
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Fig. 5.

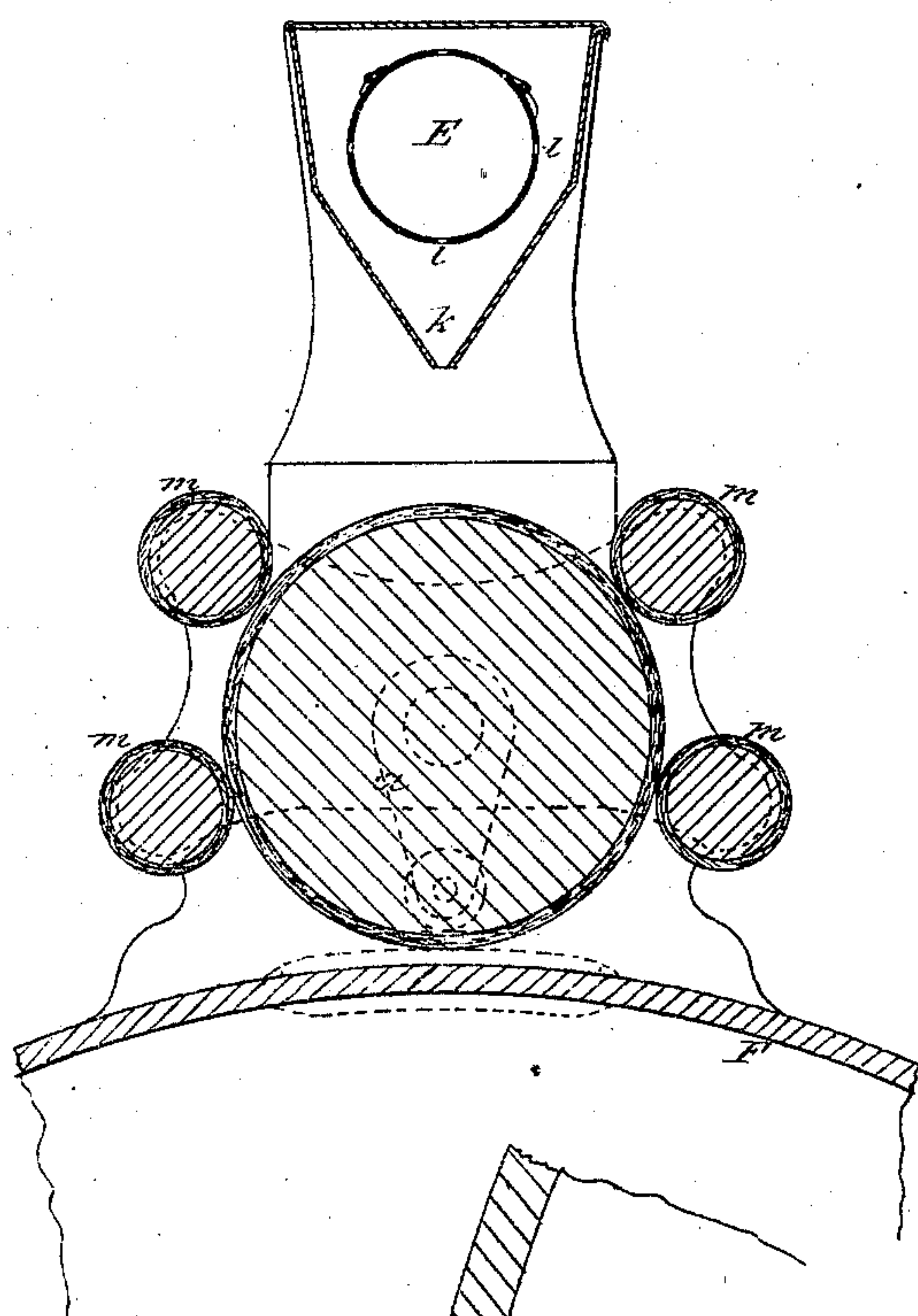


Fig. 4.

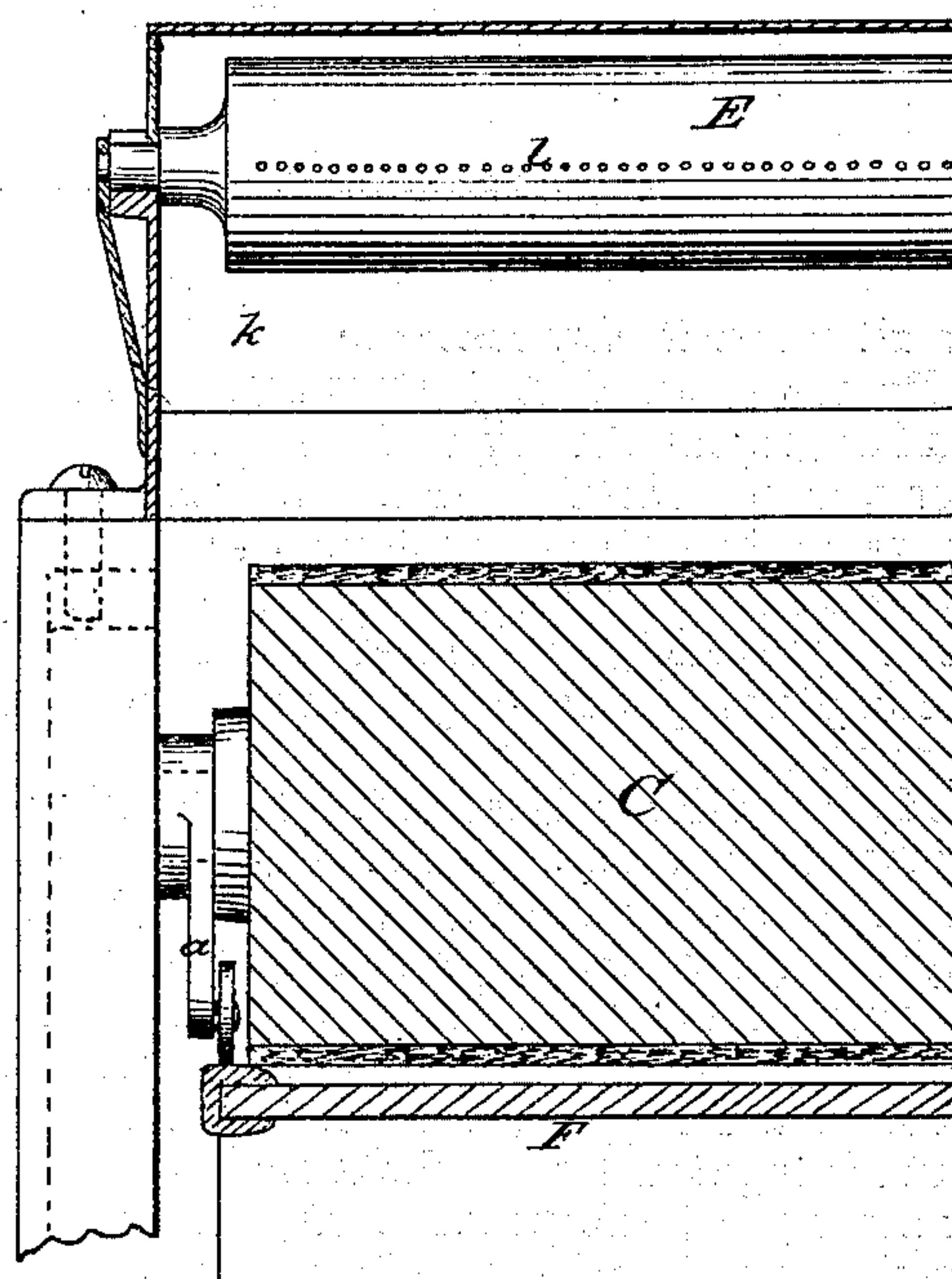
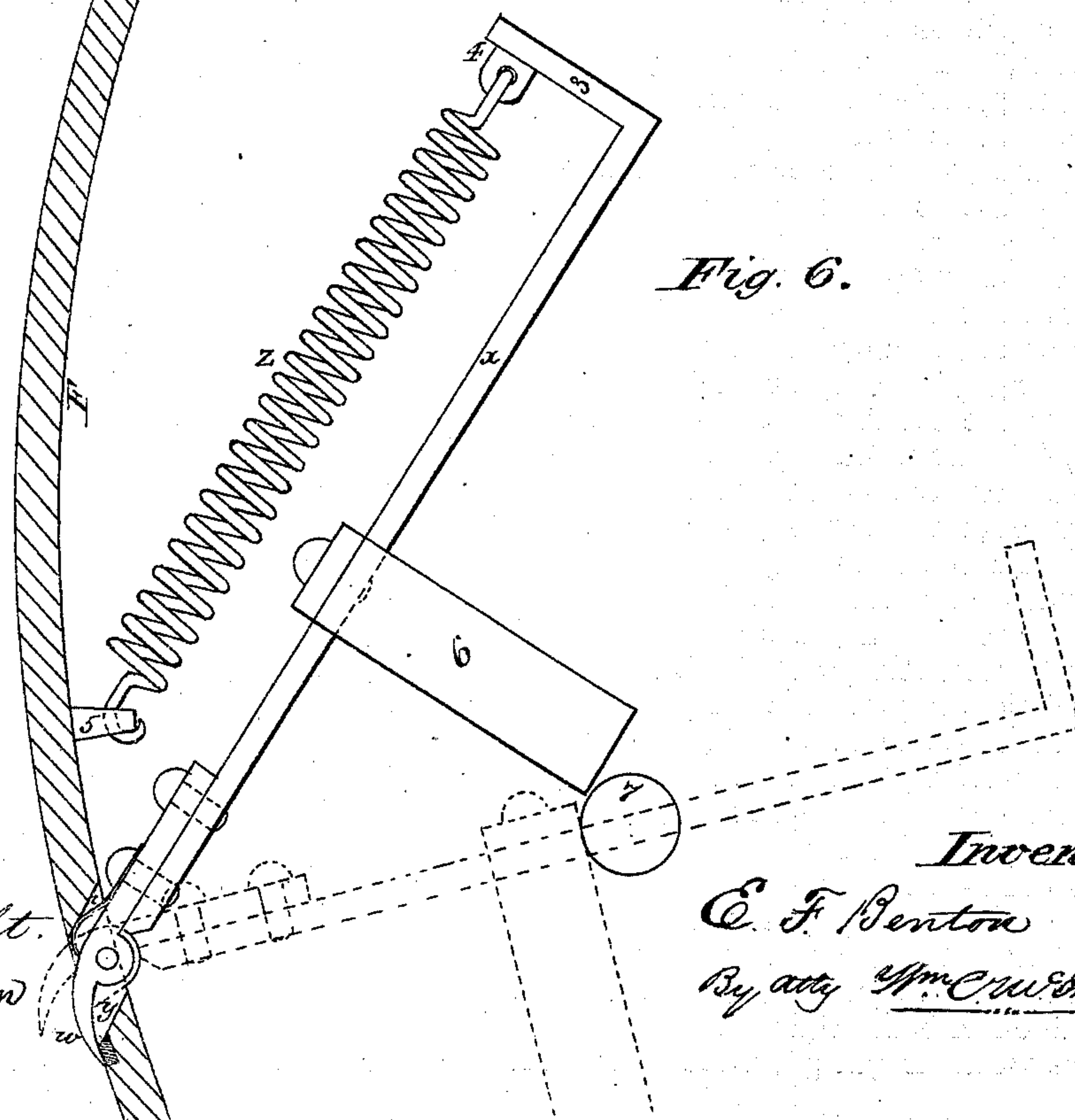


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWARD F. BENTON, OF BUFFALO, NEW YORK.

IMPROVEMENT IN BRONZING-MACHINES.

Specification forming part of Letters Patent No. 122,216, dated December 26, 1871.

To all whom it may concern:

Be it known that I, EDWARD F. BENTON, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Bronzing-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making a part of this application.

My invention relates to that class of machines known as "bronzing-machines," and has for its object to render the operation of bronzing complete in all its details, and to prevent the waste or flying about of the bronze material; and consists, first, in the peculiar construction and operation of the hopper; second, in the combination and arrangement, with the bronzing-roller, of one or more (preferably four) distributing-rollers, operating substantially as and for the purposes hereinafter to be described; third, in making the bronze-roller capable of being automatically or by hand thrown out of gear with the other moving parts of the machine and moved away from the cylinder, and it and the distributing-rollers and hopper-cylinder remain in a state of rest when desired, as will be presently explained; fourth, in the grippers, constructed substantially as described, in combination with the cylinder and releasing-lugs, as will be more fully set forth; fifth, in the closing-springs or their equivalents on the backs of the griper-arms, so constructed and operated as to close the arm-holes in the periphery of the cylinder to prevent the escape into the interior thereof of bronze; sixth, in the combination, with the polishing and cleaning-rollers, of brushes for freeing the same of the bronze they take up from the sheet; seventh, in the combination, with the polishing and cleaning-rollers or any brushes for freeing superfluous bronze, of a reel or comb, as will be more fully set forth; eighth, in combination with the first or upper polishing and cleaning-roller and freeing-brush, of a lower or auxiliary polishing and cleaning-roller and freeing-brush, to more perfectly effect the certain and complete cleaning of the sheet, as will be more fully described; ninth, in the superfluous bronze-receptacles, constructed as described, to effectually prevent any return of bronze to the cylinder or cleaning-rollers; tenth, in providing a rubber seat for the griper-blade to close upon in order that any particle or hard substance which might get under the blade will

be embedded therein and not prevent the said blade from claspings the sheet; eleventh, in the cover or covers, constructed and applied so as to prevent the escape into the room of any bronzing material; twelfth, in the general arrangement of all the parts, as will be fully set forth hereinafter.

To enable those skilled in the art to make and use my improved machine, I will proceed to describe the construction and operation of the same, referring by letters to the accompanying drawing, in which—

Figure 1 is an end elevation of a bronzing-machine embracing my improvements. Fig. 2 is a similar view at the opposite end of the machine. Fig. 3 is a vertical cross-section at the lines *x x*, Fig. 1. Fig. 4 is a longitudinal vertical section in detail, showing the construction of the hopper and its relation to the bronzing-roller and cylinder. Fig. 5 is a vertical cross-section at the line *y y*, Fig. 4; and Fig. 6 is a detail view, showing the construction and operation of the grippers and the springs for closing the arm-holes in the cylinder.

Similar letters of reference denote like parts in the several figures.

A is the frame of the machine, so constructed as to form the proper bearings for all the necessary journals, and adapted to rest upon a table or the floor, according to size of machine, and so formed as to provide supports for the feeding-table B. The bronzing-roller C is hung in adjustable bearings in the upwardly-extended portion of the frame, and on one side of the frame (which is at that end of the roller that is driven by the friction-rollers) is pivoted a raising-lever, D, which is connected, by an arm, *a*, to the shaft of the bronze-roller C, so that depressing the handle of the lever will raise the roller out of gear and away from the cylinder and stop its motion as well as that of the revolving bronze-cylinder E, with which it is connected by a belt, *b*, passing around cone *c* on their respective shafts. To automatically raise the bronzing-roller from the cylinder during the travel of that part of the same not covered by the sheet I provide a raising-platform or rail on the outer edge of the cylinder, (which may be applied in any desirable manner,) and hang from the bronzing-roller shaft or box a leg, 8, provided with a caster-wheel, 9, which, running up onto the raising-platform or rail, lifts the bronze-roller off from the cylinder

and out of gear. The object of the spring-bearings of the bronzing-roller is to admit of this operation as well as varying the distance between the periphery of the bronze-roller and cylinder proper, F, when working sheets of greater or less thickness, in which case, should it be necessary to raise the bronze-roller to such extent as to throw it out of gear with its driving friction-pulley, an extra rubber or friction-tire is sprung onto the bronze-roller pulley. To raise the roller for this purpose the lever is not used, but the adjusting-screw *d*. G is the main driving-shaft, upon which is keyed the main pulley H and the balance-wheel I, and K is the shaft of the cylinder F, on one end of which is keyed the gear-wheel L, which meshes into the intermediate pinions M M', both of which are of the same diameter, and consequently revolve at the same speed. These intermediate pinions M and M' mesh with the gear-pinions N N', which are keyed to the shafts of two cleaning-rollers, which are represented by the dotted lines O O', so that as the cylinder is rotated the cleaning-rollers, both the upper one, O, and the lower one, O', are rotated at the same speed (that is with reference to each other) and in a direction indicated by the arrows, which is the reverse of the line of motion of the cylinder F. The shafts of these cleaning-rollers are mounted in adjustable bearings, which are controlled by adjusting-screws *e e*, and for the same reason that the bronzing-roller is made adjustable and the teeth of the gears are necessarily made quite long to admit of this adjustment without destroying the action of one upon the other. Mounted in the frame A, and somewhat above the center of the cleaning-rollers O O', in similar adjustable bearings, are two cleaning-brushes, P P', which are driven from the other end of the machine by means of a main gear, Q, meshing into two intermediate gears, Q', which, in turn, mesh with pinions R keyed to the shafts of the brushes P P'; and this train of gearing is so arranged with reference to speed as to drive the brushes much faster than the cleaning-rollers O O'. Hung in arms *f* is a reel, R', which is simply two disks joined by horizontal wires arranged in the arc and a central shaft, upon which there is a small pulley, which is run by a belt, *g*, passing around it, and a larger pulley, *h*, on the shaft of the brush. The reel is thereby rotated in a reverse direction to that of the brushes and at a faster speed, and is so located that the bristles of brush will overhang the wires slightly. It will thus be seen that the bronze taken off of the cleaning-rollers O O' by the brushes P P' is effectually "flipped" or knocked out of said brushes and deposited into the receptacles S S', which are a sort of drawer, of the shape illustrated in the drawing, turned up at the rear side and having two shields, 1 2, shown in dotted lines, running the length of the drawer, and secured to the ends thereof. This drawer is made of tin or other suitable sheet metal, and the bottom and shields run up near to the periphery of the cleaning-brushes (leaving just room for them to pass without touching) to prevent the bronze which has been cleaned therefrom flying back onto the

cleaning-rollers after it has been "flipped" or knocked out of the brushes by the reel. This is important, as the cleaning-rollers must be kept perfectly clear of bronze. The lower cleaning-roller O' and its attendant brush are merely auxiliary to remedy any possible defect in the cleaning by the upper one, O; and, as a small quantity (if any) of bronze is taken up by this roller, a simple comb, *i*, may be arranged to clean this brush. A large gear-wheel on the outside of the frame is secured to the cylinder-shaft, said wheel being of equal diameter with said cylinder, and meshing into a gear-hub on the main shaft G. The proper motion and speed are thus imparted to the cylinder F. Meshing into this same cylinder-gear is an intermediate gear, T, which meshes with a smaller one, T', on the shaft of one of two small drums, U, over which are passed several tapes, which form a skeleton apron for carrying off into a receptacle at the foot of the machine, seen at V, the finished sheets as they are automatically deposited thereon, as will be presently explained. At one or more proper points on the periphery of the cylinder F a groove is cut longitudinally of slight depth, and then filled up with rubber to form an elastic bed for the edge of the griper-blade to close against. The griper is shown at W, Fig. 1, as closed, and on a larger scale at Fig. 6 in an open and a closed position. This griper W is composed of a blade the same length of the cylinder F, secured to any desirable number of arms *x x x x*, which are passed from the interior of the cylinder through arm-holes *y*, and secured to the blade, when they are drawn back and pivoted to the interior surface of the cylinder, forming a fulcrum, upon which the griper is moved. The rear or inner ends of these arms *x x x x* are turned up at right angles, as seen at 3, and have a pierced ear, 4, into which one end of a spiral spring, Z, is secured, while the other end is fastened to a similar ear, 5, secured to the interior of the cylinder; the tendency, therefore, of this spring is to keep the griper closed down upon its elastic bed or seat; and the object of making this bed of rubber is that should any particle or hard substance get under the griper-blade at any point it will be embedded in the rubber, and not prevent the griper from coming down and clasping the paper it is designed to hold. Running along, and secured to these arms *x*, back of their centers, is a stiffening-rod, J, passing entirely through, and having its ends turned at a right angle, as seen at 6, which part, coming in contact with lugs 7, projecting from the frame of the machine and at the proper points, opens the gripers. In the drawing I have represented these lugs so located as to open the griper, to permit a sheet to be fed under it from the feed-table, (after which it closes,) and to again open when the sheet has been finished to drop it on the skeleton apron for conveying it to a proper receptacle. The arm-holes *y* are necessarily elliptical, in order that the proper movement of the arms may be allowed; and were there no means provided to prevent it, these holes, when the gripers are closed, would allow bronze to drop through the cylinder. To ob-

viate this difficulty, and avoid every possibility of escape of bronze in any manner whatever, I arrange on the back of the griper-arms small flat springs *t*, curved as shown, so that when the griper is closed they will effectually fill up or close the arm-hole back of the gripers and supply the break in the periphery of the cylinder; and when the gripers open these springs will flatten up against the back of the arms and between them and the back edge of the arm-holes.

Having described the construction of the machine, beginning from the feed-table and traveling in the line which the sheet would take in being bronzed and cleaned back to the feed-table, I will now describe the construction of the hopper and spreading-rollers. The hopper is composed of an outer case or box, *k*, converging at the bottom and leaving a narrow longitudinal slit or opening for the passage of the bronze, hung in the proper bearing. In the ends of this box or case are the journals of the rotating bronze, hollow cylinder *E*. This cylinder, which holds the bronze, is provided with a longitudinal door, through which the bronze is received, and the said door is fastened in any convenient manner. Several rows of little holes, seen at *l*, Fig. 3, running from end to end of this cylinder, and parallel to the axis, are made in the face of the same, which are designed to drop the bronze as each successive row of holes arrives in a vertical line over the bronze-roller, and the speed of this bronze-cylinder, and consequently the amount of bronze dropped in a given time is regulated by a cone-pulley on the shaft and run by the belt *c*, as heretofore explained. One or more slides are arranged within the hopper to regulate the flow of bronze according to the width of sheet. Arranged around the periphery of the bronzing-roller *C* are four (more or less) spreading-rollers, *m m m m*, which effectually and evenly spread the bronze which is dropped from the hopper on the periphery of the plush-bronze roller, and they at the same time prevent the bronze from being thrown off at a tangent, as has heretofore been the case. The bronze-roller is driven through the medium of the friction-wheel *n* on its shaft, and the two intermediate ones, *o o'*, the latter running in contact with the large friction-wheel *A'* on the main shaft *G*. A sheet-metal cover, *B'*, made in sections, is so constructed as to completely cover the working parts, and its shape and course may be particularly followed by reference to Fig. 1. Those parts obscured by the frame of the machine are indicated by the dotted lines composed of alternate dashes and dots, and it will be seen that any escape whatever of bronze onto any of the working parts of the machine or out into the room is prevented in the most perfect manner.

To fully understand the direction in which the several parts of the machine move, special reference is made to the arrows marked thereon.

Having described the construction, I will now describe the operation. The operative, standing in front of the feed-board, feeds the sheet under the griper, which is open when on a level with the feed-table, and closes just before passing un-

der the cover, clamping the sheet against the rubber bed on the periphery of the cylinder. The sheet, having been previously sized, is carried under the bronze-roller, (which receives its supply from the hopper and has it evenly spread on its periphery by the four spreading-rollers,) when it is completely rubbed over by said roller, the bronze adhering perfectly to the sized portions of the sheet and lying loosely on the balance. It is then carried under the upper wiping or cleaning-roller, which is traveling about the same speed (which is slow) with the cylinder, and the sheet is slowly and surely wiped and polished. All the superfluous bronze is carried up on the periphery of the cleaning-roller in a direction reverse to that of the cylinder's motion, and is brushed off the cleaning-roller by the rapidly-revolving brush, which in turn is cleaned by the reel, which revolves in a reverse direction and with a still faster motion, the bronze dropping down into the receptacle. The sheet then passes down to the lower or auxiliary cleaning or wiping-brush, where the same operation is performed, so that, where the character of the work requires a large amount of bronze to be used, which might not be perfectly wiped off and polished by the upper wiping-roller, then the defect would be remedied by this lower one. The quantity of bronze wiped by this roller being comparatively small, a simple comb is used for cleaning the brush. The sheet having now been thoroughly cleaned and polished, is carried around until the griper is opened by contact with the lower lug 7, when the sheet is dropped onto the skeleton apron and carried along and deposited in the receiver *V*. As before stated, the speed and lines of motion of the various shafts are under control, and they are regulated at the will of the builder of the machine, as experience will dictate.

Having described the construction and operation of my improved bronzing-machine, what I claim as new, and desire to secure by Letters Patent, is—

1. The hopper, constructed as described, when arranged with the lifting-frame of the dusting and spreading-rolls, in the manner and for the purpose set forth.

2. The combination and arrangement, with the bronzing-roller, of one or more (preferably four) distributing-rollers, operating substantially as and for the purposes hereinbefore described.

3. The bronze-roller, constructed as described, in combination with the raising-lever or automatic lifting device, substantially as described, for the purposes set forth.

4. The gripers, constructed as described, in combination with the cylinder and releasing lugs, for the purposes set forth.

5. The closing springs or their equivalent on the back of the griper-arms, so constructed and operating as to close the arm-holes in the periphery of the cylinder to prevent the escape into the interior thereof of bronze.

6. The combination, with the polishing and cleaning-rollers, of the brushes for freeing the same of bronze they take up from the sheet, when arranged to operate as shown and described.

7. The combination, with the polishing and cleaning-roller, or any brushes, for freeing superfluous bronze, of a reel or comb for cleaning the same, substantially as described.

8. The combination, with the first or upper polishing and cleaning-roller and freeing-brush, of a lower or auxiliary polishing and cleaning-roller and freeing-brush, to more perfectly effect the certain and complete polishing and cleaning of the sheet, as hereinbefore set forth.

9. The bronze-receptacles, constructed as described, with two or more shields to prevent the return of bronze to the cylinder or cleaning-rollers.

10. The rubber seat on the periphery of the

cylinder for the griper-blade to close upon, as and for the purposes set forth.

11. The cover or covers, constructed and applied, as shown and described, so as to prevent the escape into the room of any bronzing material.

12. In a cylinder bronzing-machine, the general arrangement of all the parts, as hereinbefore shown and described.

Witness my hand to the foregoing specification this 1st day of November, 1871.

In the presence of—

E. F. BENTON.

WM. C. MCINTIRE,
JOHN TYLER.

(54)