(No Model.) 2 Sheets—Sheet 1.

W. H. BOLES.

BURNISHER.

No. 438,601. Patented Oct. 21, 1890.

Fig. 1.

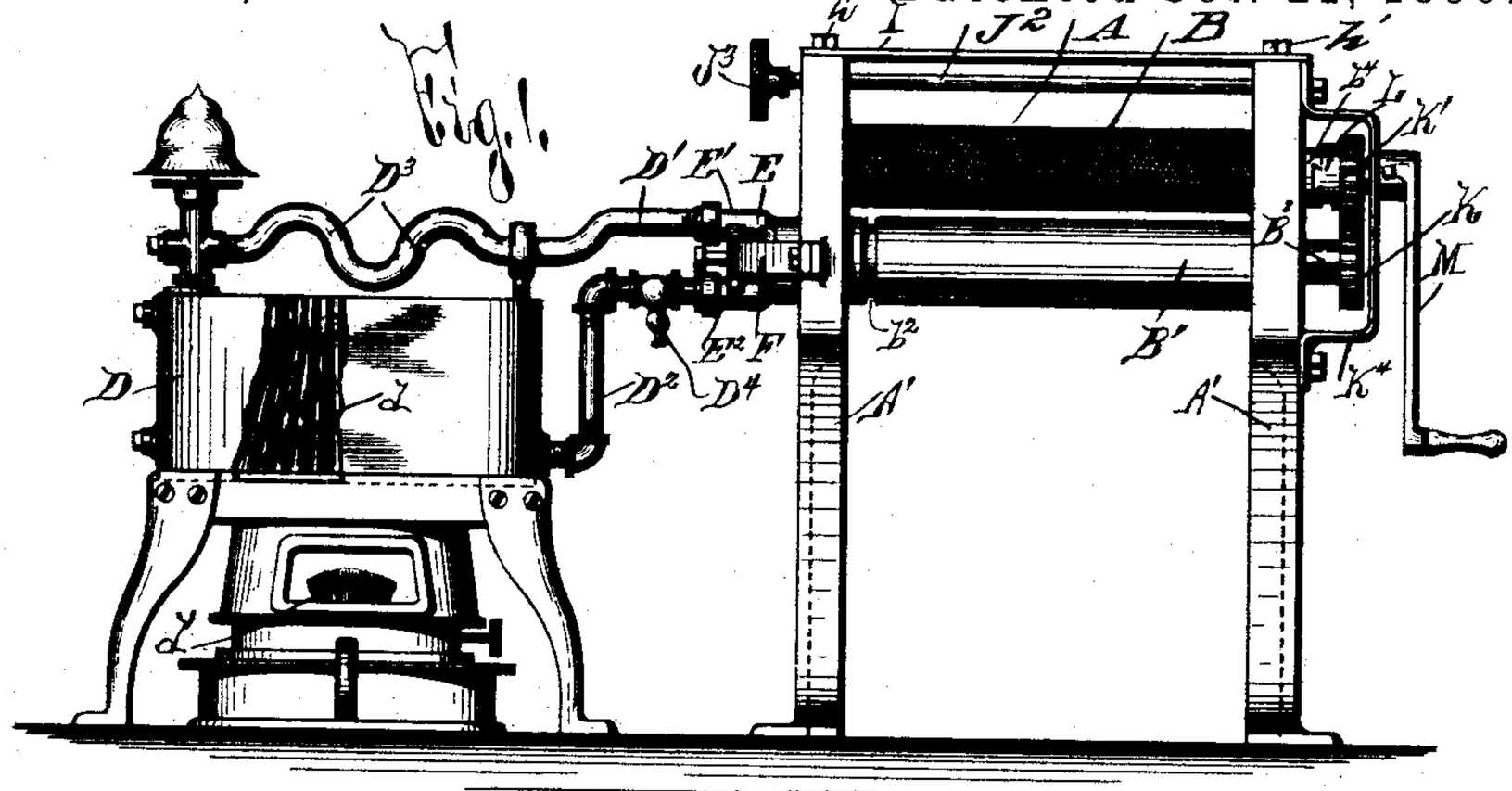
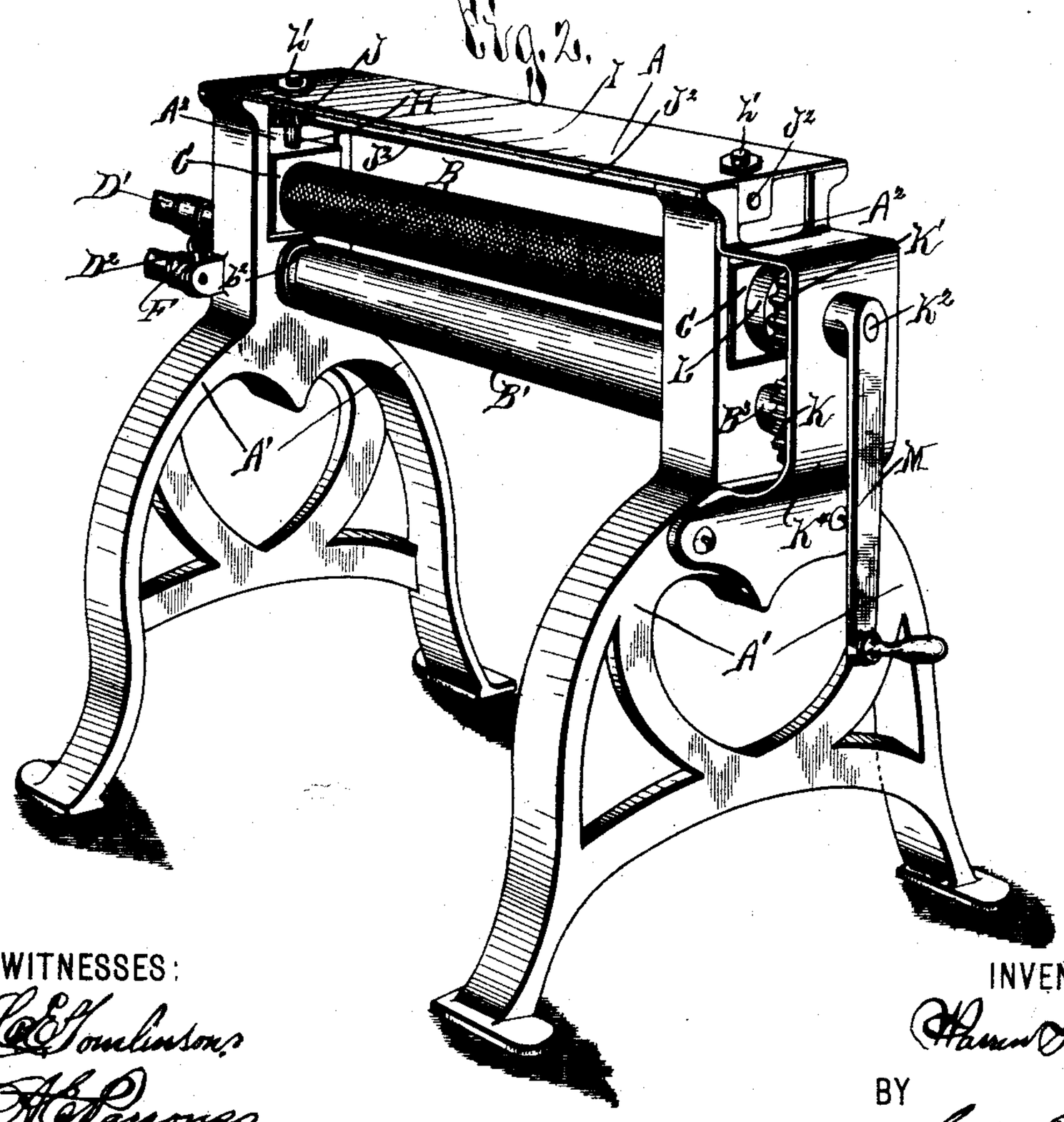


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

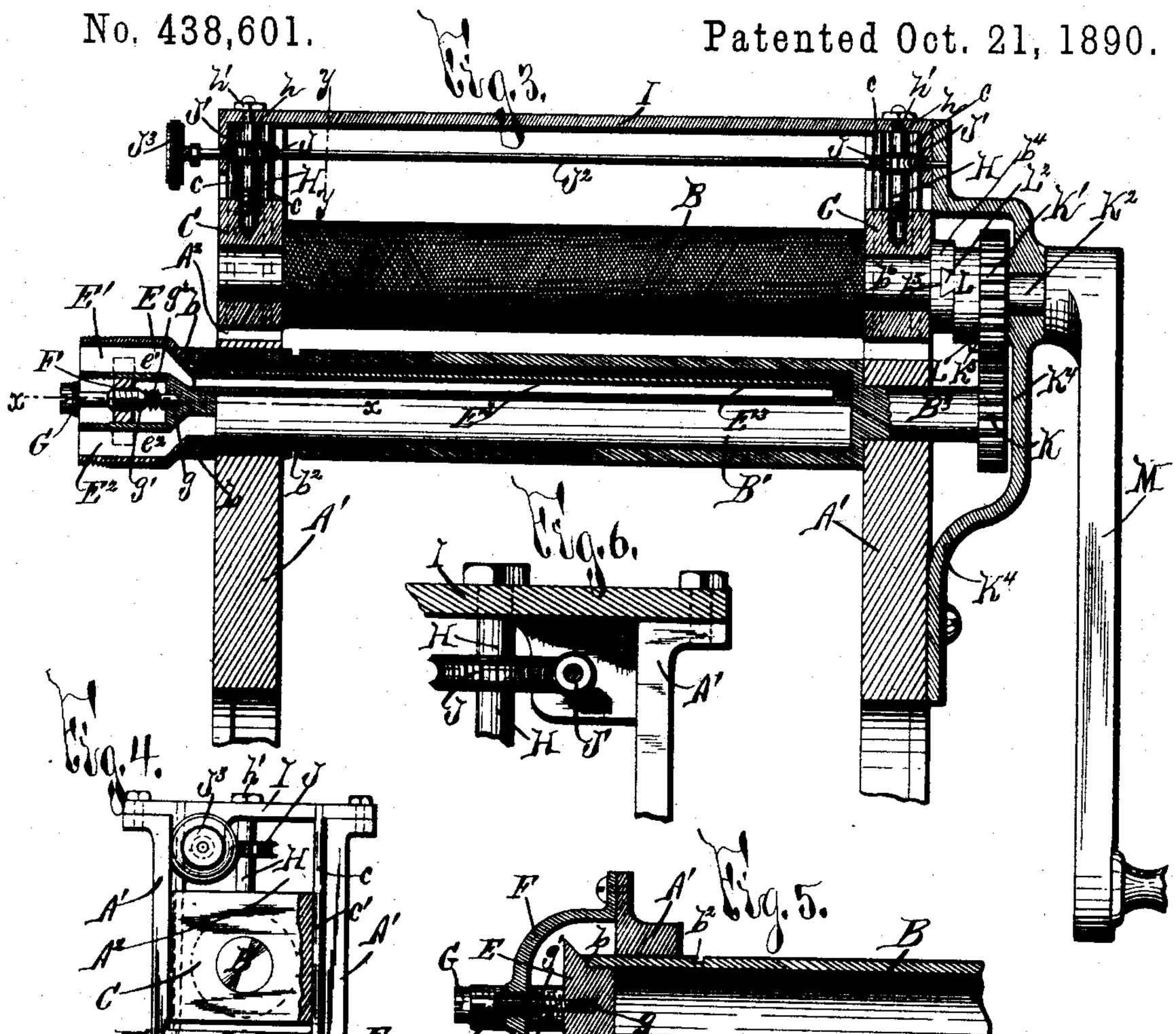


Fig. 6.

Fig. 4.

Fig. 5.

Fig. 7.

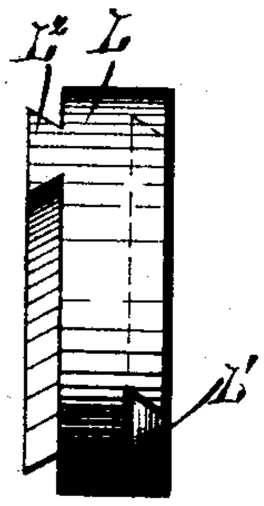


Fig. 9.

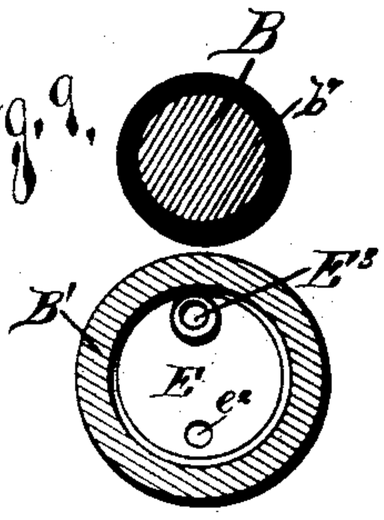
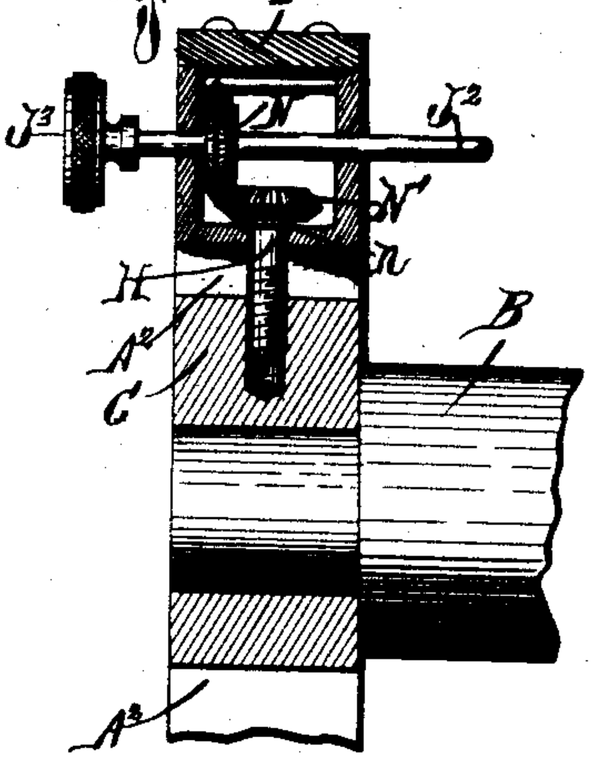


Fig. 8.



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UNITED STATES PATENT OFFICE.

WARREN H. BOLES, OF SYRACUSE, NEW YORK.

BURNISHER.

SPECIFICATION forming part of Letters Patent No. 438,601, dated October 21, 1890.

Application filed May 2, 1889. Serial No. 309,392. (No model.)

To all whom it may concern:

Be it known that I, WARREN H. BOLES, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Burnishers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to an improved burnishing or surfacing machine adapted to provide cards or other articles operated therethrough with a fine finish or smooth gloss-like surface; and it has for its object the production of a simple and effective machine, which shall perform the desired function at a minimum cost of expense for operation, and shall also provide a more even or uniform surface than has heretofore been possible with burnishing or surfacing machines previously devised; and to this end it consists, essentially, in rollers adjustable toward each other, one roller being provided with a frictional surface for feeding the cards or other articles and the other roller being hollow and provided with a polishing-surface heated from the interior of the roller, means for producing a circulation of water, steam, or gas in said hollow roller, and a heater connected to said heating mechanism for continuously supplying water, steam or gas thereto.

It also consists in a novel adjusting device and a novel connection between the rollers to prevent their adjustment affecting their rotation; and it furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In describing my invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is an elevation of the improved burnishing-machine and a heater operatively connected thereto. Fig. 2 is a perspective of the detached burnishing-machine, illustrating the relative construction and arrangement of its parts. Fig. 3 is a vertical section taken through the upper part of the burnisher, clearly illustrating the construction and arrangement of the parts. Fig. 4 is an end elevation of the upper part of the burnisher, shown in section in Fig. 3. Fig. 5 is a horizontal sectional view taken on line $x\,x$, Fig. 3, illustrating particularly the construction of the open extremity of the hollow roller. Fig. 6 is an enlarged sectional view taken on line $y\,y$, Fig. 3, illustrating particularly the adjusting device for operating the adjustable feeding-roller. Fig. 7 is a detached detail view of the connection between the adjustable roller and its actuating-gear. Fig. 8 is a sectional view illustrating a modified construction of the adjusting device, and Fig. 9 is a vertical section illustrating a modified form of the adjustable roller.

A′ represents the frame of the burnisher A, preferably composed of two like supporting ends or standards of suitable size, form, and construction to provide the desired rigidity.

Journaled in the frame A′ are the burnisher-rollers B B′, of suitable size, form, and construction, and preferably rotated in the same direction by means of connected gearing K and K′, as presently described. These rollers B B′ are adjustable toward each other, and this adjustment is preferably obtained by the upper roller B being mounted in journal-boxes C, having a rectilinear movement in guideways A^2 of the frame A′, thus adjusting the roller B toward or away from the roller B′.

In order to produce a fine finish upon articles to be burnished, it is desirable that the burnishing-surface be heated to the required heat. I accomplish this result by producing a positive circuit of water, steam, or gas through the lower roller B′, which is provided with a smooth-finished surface with which the article to be burnished is contacted.

In suitable proximity to the burnisher A the heater D, having discharge and return pipes D′ and D^2. This heater D may be of any suitable or desirable size, form, and construction, but is here shown as a hollow tank *d*, imposed above the flame of a suitable lamp or other burner, the heat of which ascends therethrough. The heat from the lamp or burner *d*′, after heating the water in the tank *d* and causing hot water or steam to flow through the pipe D′, then ascends and contacts with the bends D^3 of said pipe, which thus form a superheater, further drying the steam and increasing its heat and pressure.

One extremity of the hollow polishing or surfacing roller B′ is open and preferably provided with the beveled edge *b*, bearing against a beveled edge of the disk or filling-piece E. Projecting from the upper part of the disk E is the hollow stud E′, and projecting from the lower part of said disk is a like hollow stud E^2, each of which studs by means of the respective passages *e′* and e^2 open through the disk E to the interior of the hollow polishing-roller B′.

Secured to the frame A′ of the burnisher is the bracket F, which embraces the hollow studs E′ and E^2, and thus prevents the disk E from rotation. The disk E is adjustable toward and away from the beveled edge *b* of the open extremity of the roller B′ by means of an adjusting-screw G, supported in the bracket F and bearing with its inner extremity *g* against the said disk E. Interposed between a shoulder *g′*, provided upon said adjusting-screw, and the adjacent face of the disk E is the spring g^2, which constantly forces the said disk E toward the edge *b* of the roller B′. When the disk E bears with too great a force against the edge *b*, by turning outward the screw G the tension upon the spring g^2 is reduced and the said disk is forced toward the edge *b* with a reduced pressure, and when the pressure of the spring is insufficient to attain the desired result by turning inward the adjusting-screw G the tension upon the spring g^2 is increased. It will be evident that this spring might be dispensed with; but a more desirable pressure is obtained thereby, and consequently in the preferable construction of my machine I deem it advisable to use the same.

The discharge or steam pipe D′ of the heater D is connected to the hollow stud E′, and the steam is discharged from said pipe into said stud and thence conducted through the passage *e′* and through a pipe or tube E^3, secured at the discharge-opening of said passage *e′*. This pipe E^3 is in the extreme upper part of the polishing-roller B′ and extends to almost the rearward extremity thereof, so as to allow of the ready discharge therefrom of the water, steam, or gas. The passage e^2, connected to the passage of the hollow stud E^2, is in the lower part of the roller B′, and thus the water, steam, or gas is drawn from the forward extremity of the roller B′ at the lower part thereof and passes through the stud E^2 and the return-pipe D^2 back into the heater.

In the return-pipe D^2, I provide the blow-off cock D^4, which, when first starting the heater, is opened, in order that the air contained in the roller B′ and the heater system D′ and D^2 may be readily blown off, and the passage of the steam thereby facilitated.

From the foregoing description and an examination of the drawings it will thus be seen that by extending the pipe E^3 to a point just short of the rearward extremity of the roller at the upper part thereof and withdrawing the water, steam, or gas from the opposite extremity in the lower part thereof a positive circuit is formed through the roller B′, causing live steam to be continually passed therethrough, thereby heating the same to the required heat. This arrangement also prevents the clogging of the discharge-pipe of the heater by the water of condensation which takes place in the roller B′, since the water condensed in said roller is not returned through the steam-pipe, but leaves the roller by means of the return-pipe D^2. In order to more thoroughly allow of this driving off of the water of condensation, I preferably form the standard A′, in which the open end of the roller B′ is journaled, of slightly less height than the opposite standard, thus inclining the roller.

In burnishers heated by the direct flame or heat from a lamp or other burner experience has demonstrated that there is a liability of the cards or other articles becoming scorched or burned. This difficulty is, however, entirely obviated by the use of steam. Moreover, by the direct heat of a lamp or other burner the burnisher-rollers are caused to sweat; but where the roller is heated by steam its sweating is entirely obviated, and accordingly the cards or other articles can be run through the machine immediately after the desired heat is reached, while with the other plan of heating it is necessary to continually wipe off the rollers until the sweating thereof has ceased.

The steam on the interior of the roller B′ will constantly exude between the edge *b* of the roller B′ and the adjacent beveled edge of the disk E, serving to lubricate this metal joint, preventing wear thereof, and obviating the necessity of packing, since by means of the adjusting-screw G the said edge of the disk may be forced toward the edge *b* with any desired pressure.

To prevent any liability of the oil of the journal-bearing of the open extremity of the roller B′ running along the burnishing-surface of the same and contacting with the article to be burnished, I form thereon the annular recess b^2.

The rectangular movement of the feeding-roller B is accomplished by means of an adjusting-screw H, mounted in the upper part of the frame A and preferably in a cross or tie bar I, connecting the upper parts of the standards A′. This screw is prevented from longitudinal movement by means of a shoulder *h*, drawn tightly against the underneath surface of the tie-bar I by means of a nut *h′*, bearing upon the upper face of said bar.

Provided upon the screw H is the worm-wheel J, engaged by the worm J′, mounted on a shaft J^2, also preferably supported by the tie-bar I and journaled in a lug depending therefrom.

Upon the shaft J^2 is provided the hand-wheel or other turning means J^3, and to secure an even movement of the said roller B

I extend the shaft J^2 to the opposite journal-box for said roller and provide upon said extremity of the shaft J^2 a like worm J′, meshing with a like worm-wheel J′, mounted upon a like adjusting-screw J, engaging said opposite journal-box.

As the said screws H engage the journal-boxes C and are prevented from longitudinal movement in the frame A′ and are rotated by means of the worm J′ and worm-wheel J, it will be seen that both extremities of the said roller are drawn upward with a uniform movement, readily adjusting the roller to the desired height. By this means a very uniform adjustment can be secured and a consequent fine finish provided on the article operated upon, and any desirable friction obtained thereby.

In order to reduce to a minimum the friction occasioned by the movement of the journal-boxes C, and also the cost for producing an even sliding movement of said boxes, I form the same a little scant of the sides of the guideways A^2, so that the sides of the journal-boxes do not bear thereupon, but slide freely between them. Secured in the base of the guideway for the journal-boxes are the guide-rods *c*, which are preferably formed round, and are supported at their upper extremity by the tie-rod I. The journal-boxes C are provided with grooves *c*′, embracing the rods *c*, and thus end motion of the journal-boxes is obviated and the friction incidental to their operation is reduced to a minimum, while the planing of the guideways is obviated, it being only necessary to have a bearing-surface upon the guide-grooves *c*′ thereof. Moreover, by reason of the reduced friction the movement of said journal-boxes is rendered very easy, and there is no liability of the parts rattling by reason of friction enlarging the guideways A^2, as is the case when the journal-boxes closely fit said guideways.

The journal-spindle B^3 of the roller B′ is extended to the outside of its supporting-standard A′, and secured thereto is the gear K, meshing with a like gear K′, supported on a spindle K^2, journaled in a bracket K^4, secured on the outside of the said supporting-standard.

It has been customary in machines of this character to secure the actuating-gears, as K and K′, directly to the rollers, and when the rollers are adjusted it will be seen that the teeth of the gears engage with more or less backlash, causing rattling and also creating a wave-like surface upon the card-board or other article. In my device, however, the gears are fixed, and consequently always revolve with the same certainty, and thus all liability of a wave-like surface upon the article operated upon is obviated.

I adapt the machine to its adjustment by means of the connection L, which is formed with a groove L′, preferably of dovetailed shape, engaging a flange K^5, provided upon the gear K′. Formed upon the opposite surface of the connecting disk or plate L is the shoulder L^2, also preferably of dovetailed shape, which shoulder engages a recess b^5, provided in a shoulder or disk b^4 on the outside of the standard A′ and secured or formed upon the journal-spindle b^6 of the roller B. It will thus be seen that as the roller is elevated by means of the connecting-disk L, formed with the shoulder L^2 and the groove L′, motion is conveyed from the gear K′ to the said shoulder or disk b^4 and thence to the roller B, irrespective of the adjustment of said roller, since the said plate or disk can slide either up or down, accordingly as the roller B is adjusted toward or away from the roller B′. This adjustment could be derived if the plate or disk L were rigidly secured to the gear K′ and then connected, as described, to the shoulder or disk b^4; but when the said shoulders L^2 and the groove b^5 were in a horizontal plane it would be impossible to adjust the device without first turning the same out of said plane. However, by forming the groove L′ and the shoulder L^2 on the plate or disk L at substantially right angles to each other the adjustment is readily taken up by means of said disk, irrespective of the point to which it is rotated. This feature of adjustment is one of great advantage and absolutely prevents the production of a wave-like surface upon the article operated upon, and also renders the rollers capable of a greater adjustment.

Motion is transmitted to the gear K′ by means of a suitable handle M or other actuating means mounted upon the spindle K^2, and when said spindle is rotated it will readily be seen that both rollers will revolve in the same direction and the card or other substance be drawn between them.

The periphery of the feeding-roller is serrated or knurled, in order that the card or other article may be the more readily engaged thereby, and to obtain the necessary friction in feeding said articles through my machine I either form the rollers thereof of different sizes or else form the gear K′ with a greater number of teeth than the gear K.

At Fig. 8 I have shown a modified construction of the adjusting device, in which, instead of a worm and worm-wheel, I provide beveled gears N and N′, mounted, respectively, upon the shaft J^2 and the adjusting-screw H. This device is not, however, my preferable construction; but the operation is precisely the same, and the screw H is in this case prevented from longitudinal movement by means of a supporting-shoulder *n*, preventing downward movement, and by means of the gear N, preventing upward movement.

While this machine has been described as a burnishing-machine, it will be understood that the hollow roller thereof, having a circuit of water, steam, or gas therethrough, can be readily utilized in machines for mangling and planishing, and also for surfacing leather and other substances.

At Fig. 9 I have shown a modified construc-

tion of the roller B, the same being provided with a face b^7 of yielding material, allowing the surfacing or polishing of substances of different thicknesses—as, for instance, laundry articles and leather—since the yielding face b^7 will allow the thick parts of said articles to be pressed therein, and thereby an even pressure will be distributed upon the whole surface.

It will also be understood that if desired the roller B might also be formed hollow and a circuit of hot air, water, or steam might be forced therethrough.

The operation of my invention will be readily perceived from the foregoing, and it will be understood that considerable change may be made in the relative construction and arrangement of the parts thereof without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a steam or hot-water heater, a burnishing-roller having an interior cavity, a steam or hot-water inlet pipe connected to said heater and connected to the burnishing-roller for discharging into one extremity thereof, and an outlet-pipe for withdrawing the steam or hot water from the opposite extremity of said roller and returning the same to the heater, whereby a continuous current of steam or hot water is produced within said heater, substantially as specified.

2. The combination of a surfacing-roller, an interior cavity in said roller having one extremity open, a filling-piece for closing the open extremity, inlet and outlet openings in said filling-piece for admitting and withdrawing steam or hot water into and out of said roller, a pipe or tube connected to said inlet-opening for conducting said steam or hot water to the opposite extremity of said cavity, whereby a continuous current is produced therein from end to end, a steam-lubricated joint between said filling-piece and the contacting surface of the burnishing-roller, and an adjusting device for varying the approximation of said contacting surfaces of the filling-piece and burnishing-roller, substantially as set forth.

3. In a burnisher, the combination of a hollow surfacing-roller having one extremity open, a filling-piece for closing said open extremity, a stationary yoke or bracket secured to the frame of the said roller and engaging said filling-piece for preventing the rotation of the filling-piece, and a device interposed between said bracket and the filling-piece for adjusting the same toward and away from the said open extremity of the surfacing-roller, substantially as and for the purpose specified.

4. The combination of adjacently-mounted rollers, an interior cavity in one of said rollers, outlet and inlet passages opening into said cavity for passing from end to end in said cavity, a continuous current of steam or hot air, sliding journal-boxes for one of said rollers, screws for engaging said boxes, and a connection between said screws for operating them uniformly at the same time, substantially as set forth.

5. In a burnisher, the combination of a burnishing-roller, a supporting-frame for said roller, guideways in said frame, a feeding-roller, journal-boxes for said roller, of less width than that of the said guideways in the frame, a pair of guide-grooves in the opposite sides of said boxes, and guide-rods supported in said frame and registered with said guide-grooves for guiding said sliding journal-boxes, substantially as and for the purpose specified.

6. The combination of adjacently-mounted rollers, one of which is adjustable toward the other, a gear K, mounted upon the journal-spindle of the fixed roller, a gear K′, engaging the gear K, having its spindle fixed, a shoulder or disk b^4, secured to the journal-spindle of the adjustable roller, and a connecting-disk L between said shoulder or disk b^4 and the gear K′, substantially as and for the purpose set forth.

7. The combination of adjacently-mounted rollers, one of which is adjustable toward the other, a gear K, mounted upon the journal-spindle of the fixed roller, a gear K′, engaging the gear K, said gear K′ having its spindle fixed and provided with a shoulder K^5, a shoulder or disk b^4, secured to the journal-spindle of the adjustable roller and provided with a shoulder b^5, and a connecting disk or plate L, interposed between the gear K′ and the shoulder or disk b^4 and provided with shoulders engaging the shoulders of said parts, substantially as and for the purpose described.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 29th day of April, 1889.

WARREN H. BOLES.

Witnesses:
CLARK H. NORTON,
ARTHUR E. PARSONS.