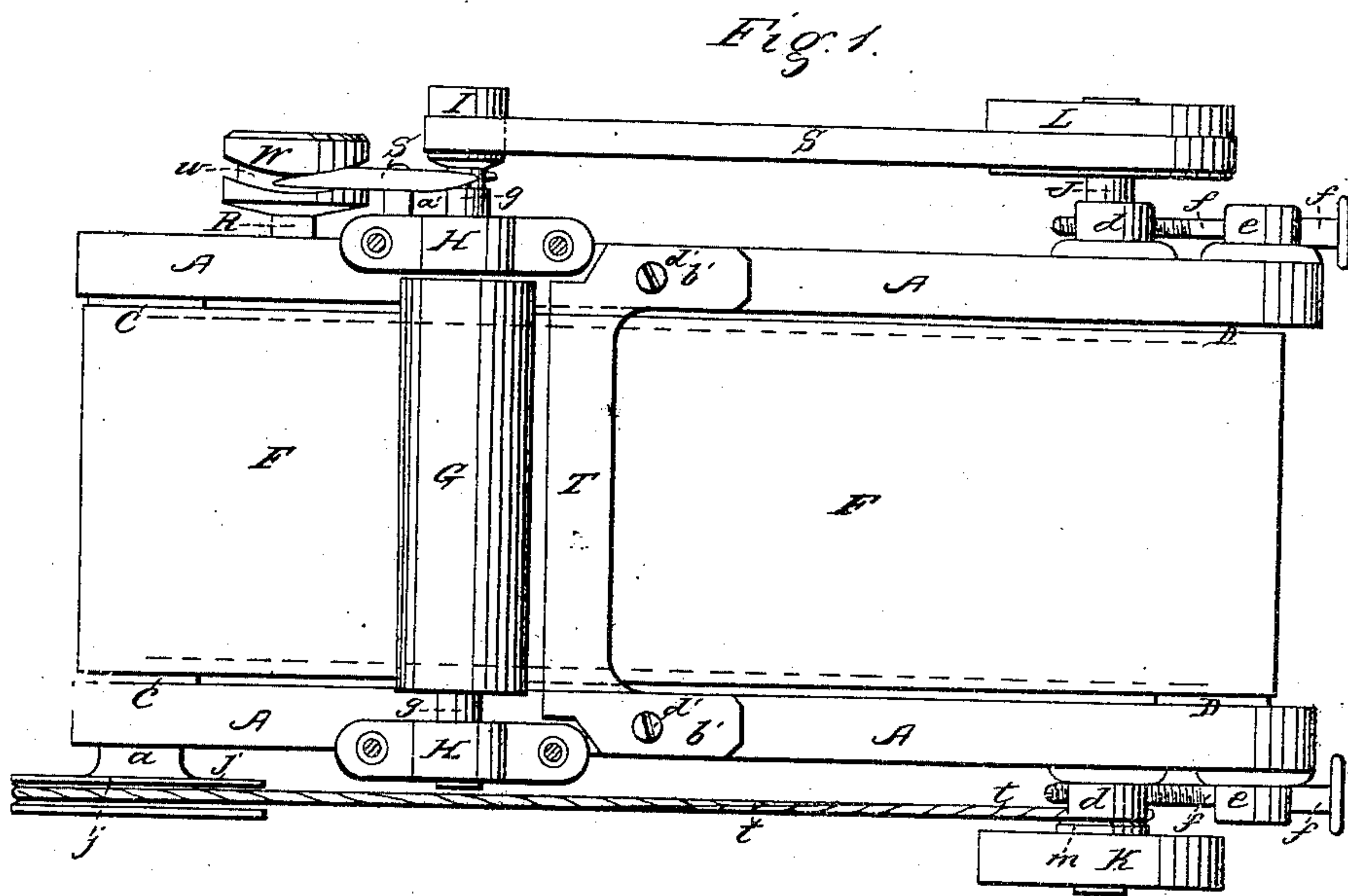
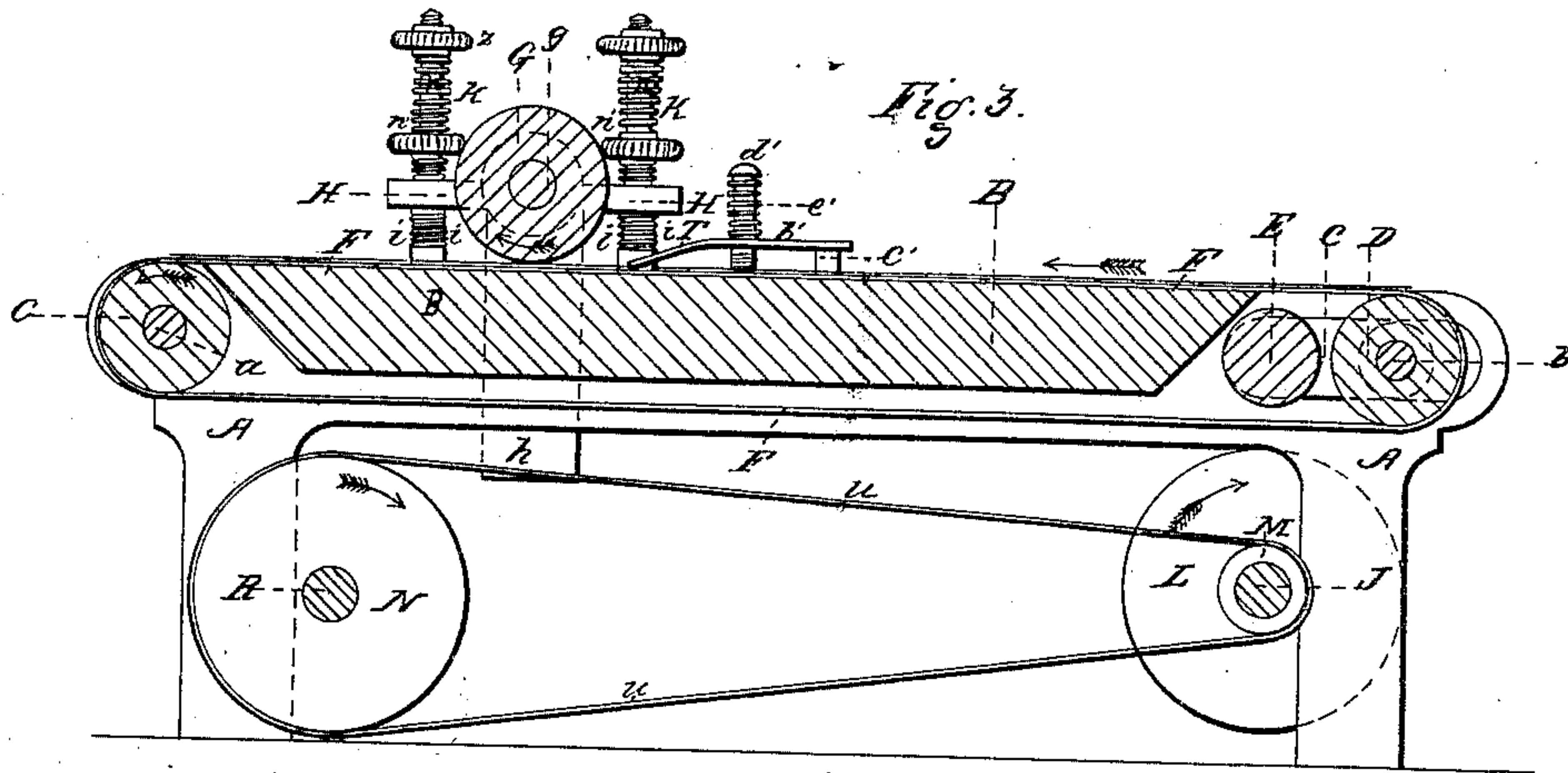


Shepherd & George. *Sheet 1, of 2, Sheets*
Calendering & Polishing.
N^o 56,457. Patented Jul. 17, 1866.



Witnesses:

J. M. Coombs
 G. W. Reed

Inventors:

J. Shepherd
 A. M. George

UNITED STATES PATENT OFFICE.

S. SHEPHERD AND A. M. GEORGE, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN MACHINES FOR POLISHING ENAMELED PAPER.

Specification forming part of Letters Patent No. 56,457, dated July 17, 1866.

To all whom it may concern:

Be it known that we, SAMUEL SHEPHERD and AMMI M. GEORGE, both of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Machines for Polishing Enameled Paper; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan or top view. Fig. 2 is an end elevation. Fig. 3 is a central vertical longitudinal section.

Similar letters of reference indicate corresponding parts in all the figures.

This invention consists in the combination of a burnishing-roller revolving at any required velocity with a suitable supporting-table, and with an endless carrying-apron moving at a lower velocity than the burnishing-roller, in such manner that the paper being carried underneath the burnishing-roller has its enameled surface subjected to the frictional rubbing action of the said roller, whereby it is polished or burnished much more rapidly and efficiently than by the means ordinarily employed.

The invention also consists in certain novel means of insuring the proper position of the paper during its passage to the burnishing-roller and of preventing the formation of ridges or creases therein during the operation of polishing the same.

The invention further consists in a novel means of securing an efficient bearing of the burnishing-roller upon the paper during the polishing operation.

To enable others to understand the construction and operation of our invention, we will proceed to describe it with reference to the drawings.

A is the frame which supports the working parts of the machine, and on the upper side or top of which is secured the flat horizontal table B, which occupies the entire central part of the aforesaid top of the frame A. At the rearmost end of this table B, with the ends of its shaft *a* working in suitable bearings in the sides of the frame A, is a transverse roller, C, upon one end of the shaft of which is fixed a pulley or belt-wheel, *j*, while situated at the opposite or front end of the said table is a similar transverse roller, D, which has the ends of its shaft *b* working in sliding journal-boxes,

which are placed in suitable longitudinal slots or recesses *c*, formed one in each side of the frame A, at the front end thereof.

E is a transverse bar situated behind the roller D, and the ends of which project outward through the aforesaid slots *c*, as shown at *d* in Fig. 1. *e* are two knobs or brackets situated at the front end of the frame A, one at each side thereof. A horizontal screw, *f*, passes through a suitable hole in each of the brackets *e*, and back through the outwardly-projecting ends *d* of the transverse bar E, and, inasmuch as the ends of the transverse bars E are situated behind the sliding bearings of the roller D, it follows that by turning the screw *f*, so as to bring the transverse bar E forward or outward, the aforesaid sliding bearings, and consequently the roller D, will be brought forward, while by turning the said screws in a contrary direction the bar E, and consequently the roller D, will be allowed to move inward toward the table B.

Placed upon the rollers C D, and with its upper part resting upon and supported by the table B, is an endless apron, F, which is made of india-rubber, felt, velvet, or other elastic material, and the tension of which is adjusted by means of the screws *f* and bar E, as just hereinbefore explained.

G represents the burnishing-roller, which may be made of iron with a chilled surface, or of steel, and which is situated transversely near one end of the table B, over the said table, and, of course, above the uppermost surface of the endless apron F. The ends of the shaft *g* of the burnishing-roller G work in yielding and adjustable journal boxes or bearings H, which are situated one at each side of the frame A. A vertical quadrangular stem, *h*, projects downward from the center of each bearing H into a suitable vertical slot in the side of the frame A, and serves to steady the bearing. Passing through each end of each bearing, and with its lower extremity resting upon the upper surface of the side of the frame A, is a hollow screw, *i*, while passing down through each hollow screw *i*, with its lower end screwed into the frame A, is a solid screw, *k*, while placed around each of the screws *k*, between the head thereof and the top of the hollow screw through which it passes, is a spiral spring, *n*. The appurtenances of the bearings H being thus arranged, the height of the burnishing-roller with reference to the

upper surface of the endless belt F may be adjusted by turning the hollow screws *i*, while the downward pressure of the springs *n*, to press the said roller upon the upper surface of the paper as it is carried underneath it by the endless apron F, may be adjusted by turning the screws *k*. The length of the burnishing-roller G is less than the distance between the bearings H, in order that sufficient room may be allowed for the reciprocating movement of the said roller, as will be presently further explained. One end of the shaft *g* of the burnishing-roller projects outward beyond its bearing, and has fixed upon it a pulley, I, and formed around the said end of the shaft *g*, at the inner end of the pulley I, is an annular groove, *r*.

J is a transverse shaft which is situated in the front or forward end of the frame A, and which is furnished at one end with a driving-pulley, K, and also with a small pulley, *m*, and at the other with a pulley, L, which is connected by a belt, *s*, with the pulley I of the burnishing-roller G, while a band, *t*, extends from the small pulley *m* to the pulley J on the rearmost roller, C. Situated in the center of the shaft J is a small band-wheel, M, which is connected by a belt, *u*, with a larger band-wheel, N, which is fixed in the center of a transverse shaft, R, situated in the rearmost end of the frame A, at the lower part thereof. One end of this shaft R projects out beyond the side of the frame A, and has fixed upon it a thick wheel or disk, W, in and around the circumference of which is a cam-groove, *w*.

S is a lever, which is pivoted at or near its center upon a pin, *a'*, which projects out from the side of the frame A. The upper end of this lever S is forked and fitted into the groove *r* in the shaft of the burnishing-roller G, while the lower end, being also forked, is fitted into the cam-groove *w* in the circumference of the wheel W in such manner that the rotation of the said wheel W, by vibrating the lever S, communicates a longitudinal reciprocating movement to the burnishing-roller G.

T is an elastic pressing plate or blade, which is placed transversely over the endless apron F, in front of the roller G, and in an inclined position, as shown more clearly in Fig. 3. Projecting forward from each end of this pressing-plate T is a flat arm, *b'*, the forward extremity of which rests upon a stud or spur, *c'*, while near the inner end thereof is a hole, through which is passed a fixed vertical screw, *d'*. Between the heads of these screws *d'* and the upper sides of the arms *b'* are spiral springs *e'*, which press the rear or lower edge of the pressing-plate T down upon the paper as it passes to the burnishing-roller, as will be presently further set forth. A small roller may be attached lengthwise to the rear or pressing edge of this pressing-plate, if desired, to diminish its friction upon the paper.

Instead of making the endless apron F elastic, as set forth, the said apron may be made of non-elastic material, and the upper

surface of the table B may be made elastic, whereby a proper bearing of the burnishing-roller G upon the surface of the paper is obtained in the same manner as when the apron is itself elastic. Furthermore, the said burnishing-roller may be rotated, if desired, in a direction opposite to the movement of the endless apron F with the same result as when moving in the same direction as the said apron.

The paper, in the form of long sheets or pieces, is placed with its enameled surface upward upon the forward portion of the endless apron F, and is carried back, first, under the pressing-plate T, which spreads it out evenly upon the said apron, and then under the burnishing-roller G which, being pressed down upon the paper by the springs *n*, and revolving at a much higher velocity than that of the paper as it is carried back by the apron F, polishes or burnishes the upper and enameled surface thereof by the friction of its rapidly-moving surface upon the said enameled surface of the paper. The elastic nature of the endless apron F causes the paper to bend somewhat around the under side of the burnishing-roller G, as it passes underneath the same, and thus keeps it in contact with a much greater proportion of the surface of the said roller than if the paper were kept perfectly flat and straight while passing under the same, whereby a more efficient action of the said roller upon the paper is obtained. At the same time the reciprocating movement of the burnishing-roller, produced simultaneously with its rotary motion by means of the cam-wheel W and lever S, as hereinbefore explained, prevents the formation of ridges or creases in the paper, which would be likely to occur if such reciprocating movement of the roller were dispensed with.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination of the metallic burnishing-roller G, endless apron F, and table B, when the burnishing-roller revolves at a higher velocity than that of the endless apron, substantially as herein set forth, for the purpose specified.

2. Providing an elastic bearing for the paper under the burnishing-roller by making either the apron or the table elastic, substantially as herein set forth.

3. Giving the burnishing-roller G a reciprocating movement transversely to the endless apron simultaneously with its rotary motion, substantially as herein set forth, for the purpose specified.

4. The pressing-plate T, applied, in relation with the burnishing-roller G, endless apron F, and table B, substantially as herein set forth, for the purpose specified.

SAMUEL SHEPHERD.

A. M. GEORGE.

Witnesses:

B. F. GEORGE,
W. W. BAILEY.