J. JACOBSON & J. TOOKER.

MACHINE FOR TRANSFERRING DESIGNS.

APPLICATION FILED JULY 25, 1904. RENEWED NOV. 2, 1908.

908,267. Patented Dec. 29, 1908.

2 SHEETS—SHEET 1.

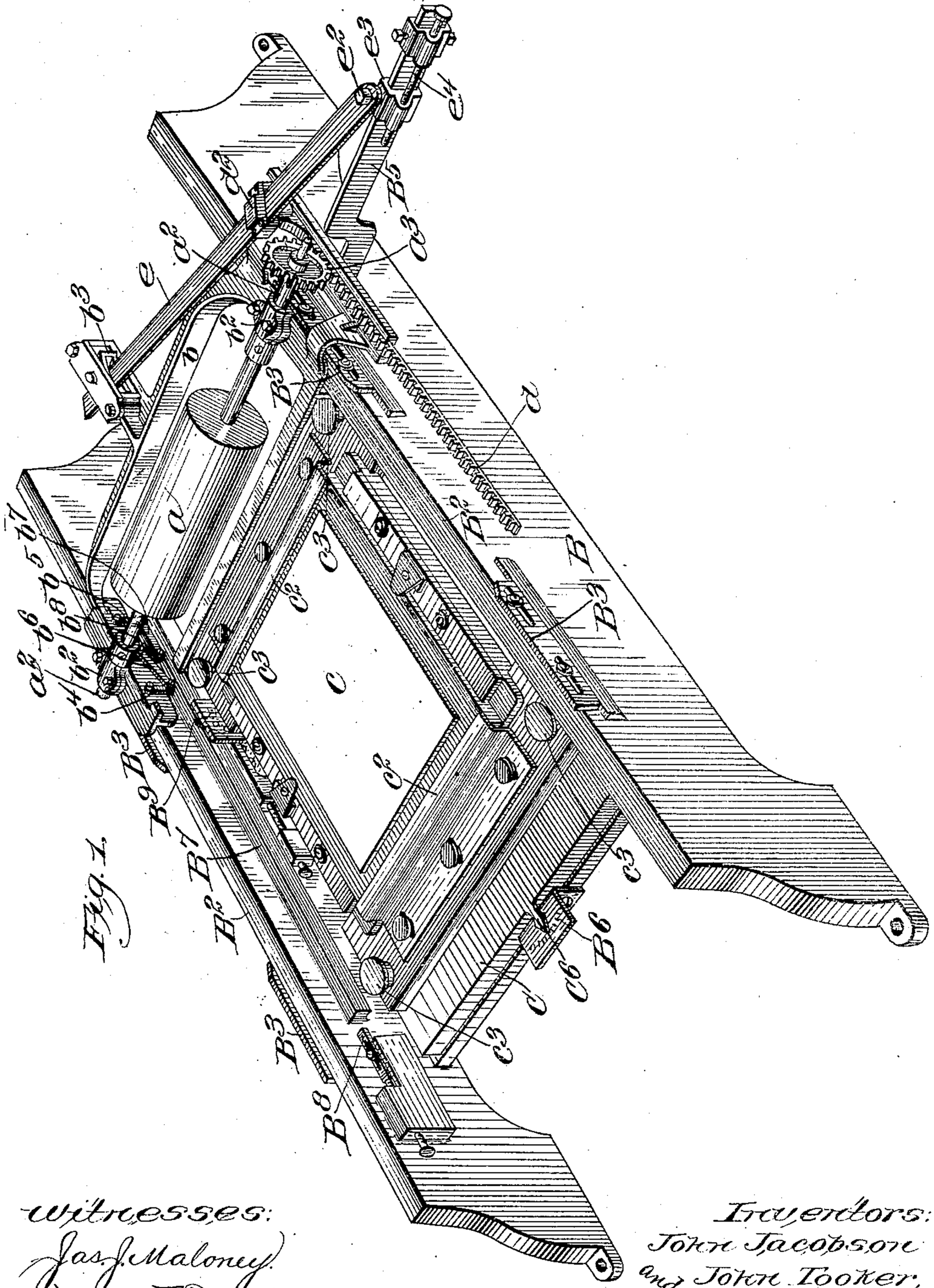

Fig. 1.

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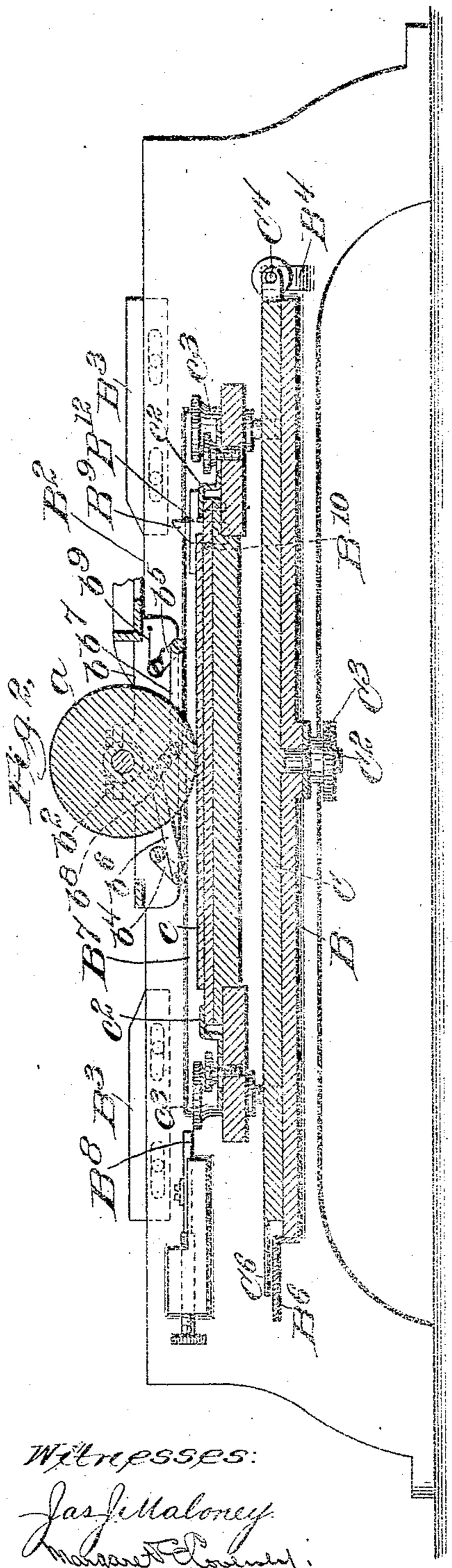

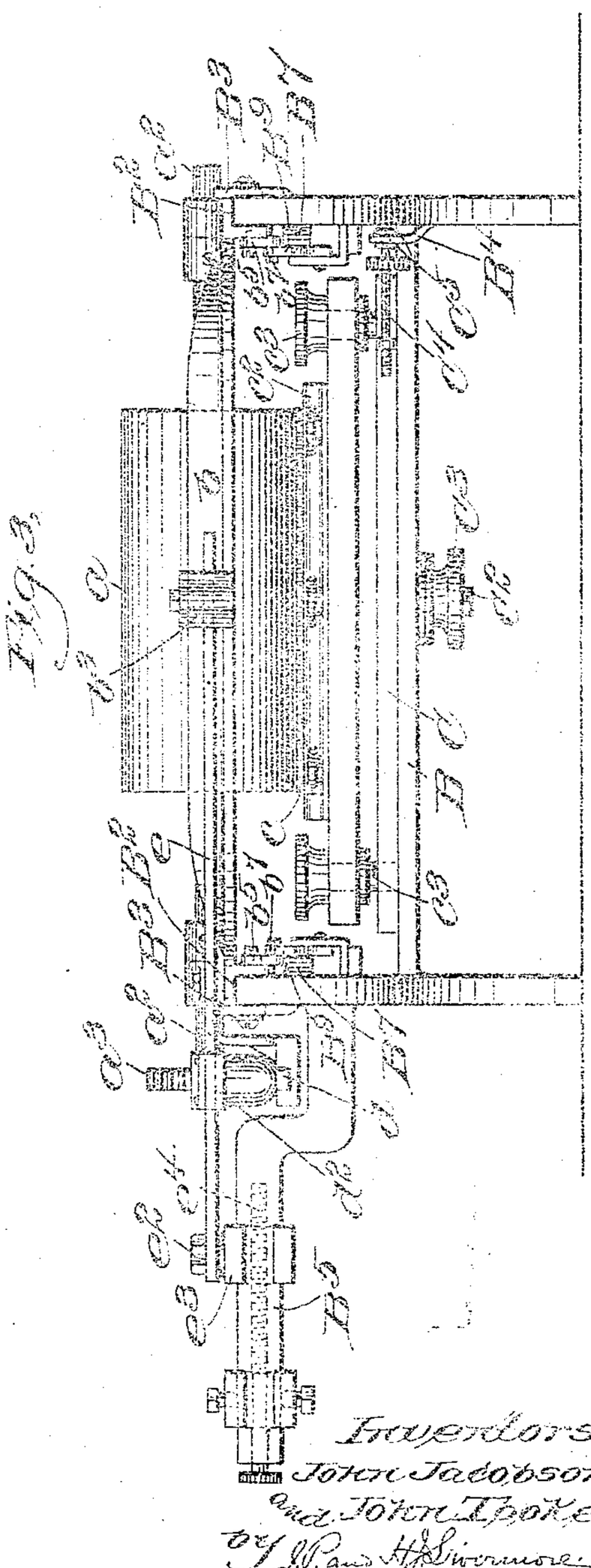

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UNITED STATES PATENT OFFICE.

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MACHINE FOR TRANSFERRING DESIGNS.

No. 908,267. Specification of Letters Patent. Patented Dec. 29, 1908.

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To all whom it may concern:

Be it known that we, JOHN JACOBSON and JOHN TOOKER, both citizens of the United States, and residents of New York, county of New York, and State of New York, have invented an Improvement in Machines for Transferring Designs, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a machine or apparatus for transferring a design from a plane surface to a cylindrical surface, or vice versa, in cases where it is essential that the design transferred from one surface should exactly cover the other surface. The machine is especially intended for use in transferring from a flat printing surface an acid resist to the surface of a roller, so that the roller can be subsequently etched and thereby have a printing surface formed upon it for continuous web printing. It is, of course, necessary, in this case, that the design transferred to the roller should exactly cover the surface thereof, so that the two ends of the design will combine, and not mismatch or leave a blank space between. It is, however, a very difficult matter to make the design on the flat surface of a length exactly equal to the circumference of the roller, so that if a roller is merely rolled across the printing surface, the design transferred, in nearly every case, will either mismatch at the ends, or be separated a slight distance so that the printing surface formed on the roller, if etched, will be incorrect or incomplete. In accordance with the invention, these difficulties are overcome by providing the roller with a controlling device which is capable of varying the peripheral velocity of the roller, increasing or retarding the same, the device being adjustable, so that, by a process of trial, such adjustment can be made as to cause the design to exactly fit the surface of the roller. If, for example, it is found, on rolling the roller over the printing surface, that the ends of the design do not properly combine, the machine can be adjusted so as slightly to retard the peripheral velocity of the roller until it is found that the meeting point of the edges of the design cannot be detected, the slight foreshortening or condensation of the design being even throughout, so as not to be noticeable. If, on the contrary, the edges of the design fail to meet, the peripheral velocity of the roller can be slightly increased beyond the normal to attain the desired result.

In carrying out the invention, the roller is mounted in a traveling frame, and provided with a gear which is arranged to mesh with a rack so that by a movement of said rack relative to the movement of the roller, the peripheral velocity of said roller can be increased or diminished with relation toi ts normal velocity. Assuming, for example, that the gear wheel were equal in circumference to that of the roller, the normal peripheral velocity of the roller would be attained if the rack were stationary, such velocity being retarded if the rack were caused to travel with the roller, and increased if the rack were caused to travel in the opposite direction. Such construction, however, would necessitate connections for causing the rack to travel in two directions, and the construction may be simplified by making the gear wheel of a different circumference from that of the roller, so that a certain amount of travel of the rack is required in order to cause the roller to roll at its normal peripheral velocity, so that by varying the amount of such travel, the velocity of the roller can be varied either way. In the construction shown, the roller is mounted in a traveling carriage, and the rack is connected therewith by means of a lever, so that by varying the position of the fulcrum of said lever, the relative amount of travel of the rack may be varied. By providing the lever with an adjustable screw, therefore, a very delicate adjustment can be obtained without difficulty, and an exact transfer of the design accomplished.

Figure 1 is a perspective view of an apparatus embodying the invention; Fig. 2 is a longitudinal section; and Fig. 3 is an end elevation.

As herein shown, the roller *a* is provided with journals a^2 which run in journal boxes or bearings b^2 in a traveling frame *b* which is arranged to be pushed along over a frame or support B upon tracks B^2 formed along the sides of said support. This table or support is further arranged to hold a printing plate *c*, or a plate upon which a design is to be printed, the plate *c* being herein shown as a printing surface from which a design is to be trans-

ferred to the roller. In the case of transferring an acid resist, this printing surface is of some composition which is more or less yielding, so as to transfer the pigment or resist evenly to the surface of the metal roller. As herein shown, the printing plate *c* is held in position by means of clamping members c^2 and is vertically adjustable with relation to a supplemental table C on the support B by means of adjusting screws c^3. The roller *a*, when in its normal position, is supported above the printing surface *c*, the journals of the roller being shown as resting on supplemental track members B^3 which are longitudinally adjustable with relation to the track members B^2, so that, as the frame *b* is pushed toward the printing surface *c*, the roller *a* may be gradually let down into contact with said printing surface at exactly the proper time. By properly adjusting these track members, the roller may be brought into contact with the plate at a point where the units of the design are exactly complementary to the units of the design where the roller is lifted. In this case, it is unnecessary to have the plate cut to a length equal to the periphery of the roller.

In order to true the plate, *i. e.*, to bring it to an exact right angle to the axis of the roller, the supplemental table C, upon which it is mounted, is capable of rotation with relation to the support B, being shown as provided with a spindle C^2 extending through the support B and provided with a screw clamp C^3 to hold it firmly in position after adjustment. In order to obtain a delicate adjustment, the table C is shown as provided with a threaded lug to receive an adjusting screw C^4, which is held longitudinally stationary in a lug B^4 secured to a part of the support B, by means of flanges C^5. The table C is further shown as provided with an indicator finger C^6, which travels over a scale B^6 on the frame B. In order to vary the peripheral velocity of the roller *a*, the said roller is provided with a gear wheel a^3 herein shown as slightly smaller in diameter than the diameter of the roller itself, the said gear wheel meshing with the teeth of a rack *d* which is arranged to travel with the frame *b*, but at a different velocity. It will be seen, therefore, that if the velocity of travel of the rack *d* is properly proportioned to the difference between the diameter of the gear a^3 and that of the roller *a*, the roller will travel normally, that is to say, at exactly the peripheral velocity at which it would travel if it were merely rolled over the surface *c* without being otherwise influenced. If, however, the velocity of the rack is increased, the peripheral velocity of the roller will be retarded, and vice versa.

As a convenient method of controlling the movement of the rack *d*, the said rack is herein shown as connected with the carriage *b* by means of a lever *e*, having a stationary pivotal support e^2, the rack and the carriage *b* being respectively connected with said lever by means of swivel joints d^2 and b^3. In the construction shown in which the gear a^3 is smaller than the roller *a*, the normal travel of the gear must be less than that of the roller, and the swivel connection d^2 is, therefore, placed between the connection b^3 and the fulcrum e^2, so that the movement of the carriage *b* is multiplied with relation to the movement of the rack *d*. In order to vary the movement of the rack *d* with relation to that of the carriage *b*, and thereby to vary the peripheral velocity of the roller *a*, the fulcrum e^2 of the lever *e* is adjustable, the said fulcrum e^2 being herein shown as formed on a sliding member e^3 mounted on an arm B^5 connected with the support B, the said member e^2, being engaged by an adjusting screw e^4, so that it can be moved along the arm B^5 to vary the relation between the long and short arms of the lever. In order to increase the movement of the rack *d* with relation to that of the arm *e*, the screw e^4 is turned in a direction to move the fulcrum member e^3 towards the right, (Fig. 1), thereby relatively increasing the length of the short lever arm, the reverse operation being performed when the relative movement of the rack is to be decreased.

In the operation of the machine, the carriage *b* is pushed forward, and as soon as the said carriage reaches the ends of the supplemental tracks B^3, the surface of the roller *a* gradually comes down into contact with the surface of the printing plate *c*, the roller then rolling over the said printing surface at its normal, its increased or its decreased peripheral velocity, according to the adjustment of the rack lever, *e*, thus rolling normally, or with a slight backward or forward slip, so that as it reaches the end of the design, and rides up the corresponding tracks B^3, at the other end, it will have the design exactly transferred to its surface.

It is desirable to restore the carriage and roller, at the end of the operation, in order to readily remove the plate, if the design has been correctly transferred, or to adjust the carriage and wash the roller if the design has been incorrectly transferred. In order that the carriage may be thus restored without having the roller come in contact with the surface of the plate, the said carriage is provided with means whereby it may be raised above the tracks B^2 and supported independently thereof during the return movement. For this purpose, the frame B is provided with supplemental tracks B^7 and the frame *b* is provided with movable supporting members b^4 and b^5, herein shown as arms pivotally connected with the frame *b* and arranged to extend below that portion of the frame *b* which rests on the tracks B^2 when in

a substantially vertical position. The said arms b^4 and b^5 are connected by links b^6 and b^7 with the ends of a lever b^8, also pivotally connected with the frame b, the arm b^5 having a spring b^9 which tends to hold it and the arm b^4 in such a position as to maintain the said arms in a vertical position with the carriage raised. In the forward movement of the carriage b, the arm b^4 is brought into contact with an adjustable stop B^8, so that, as the carriage is pushed forward, the lower end of said arm is forced back until it reaches the vertical position, the arm b^5 also being acted upon through the lever b^8 and links b^6 and b^7, the said arms thus coming into contact with the supplemental tracks B^7, and lifting the carriage b high enough to prevent the roller a from coming into contact with the plate c as the carriage is moved back. Thus, in the normal position at the beginning of the operation, the carriage b is supported above the main tracks B^2, but must be lowered during the forward movement first into contact with the supplemental tracks B^7 from which it is dropped to the surface of the plate. This is accomplished by means of a tripping device B^9, best shown, in Fig. 2, as a trigger having a stop B^{10} which holds it in the position shown, the said trigger being in the path of the lower end of the lever b^8, so that, in the forward movement of the carriage, the said lever b^8 is rocked against the stress of the spring b^9, thus throwing the arms b^4 and b^5 out of their vertical position, and permitting the frame b to drop. The trigger B^9 is shown as pivotally supported and provided with a spring B^{12}, and has an inclined surface on the side first reached in the return movement of the carriage, so that it will not act upon the lever b^8 during such return movement. At the end of the forward movement, the carriage will be lifted through the action of the supporting arms b^4 and b^5, and, in the return movement, will be supported by said arms on the supplemental tracks B^7 so as to be out of contact with the surface of the plate.

It is not intended to limit the invention to the specific construction and arrangement herein shown and described, since modifications may be made without departing from the invention.

What we claim is:

1. The combination with a cylindrical surface, of means for rolling said cylindrical surface along a plane surface; and means for varying the peripheral velocity of said cylindrical surface from its normal rolling velocity relative to the plane surface with which it is in contact, substantially as described.

2. In an apparatus for transferring a design from a plane surface to a cylindrical surface, or the reverse, the combination with the cylindrical surface, of a traveling frame for said cylindrical surface; a gear rotatably connected with said cylindrical surface; a movable rack meshing with said gear; and means for varying the movement of said rack with relation to that of said traveling frame, substantially as described.

3. The combination with a frame or support, a roller, and a traveling frame provided with journals therefor; of a gear connected with said roller to rotate therewith; a rack meshing with said gear; a lever having an adjustable, pivotal support or fulcrum; and means for connecting said carriage and said rack with said lever at different points, substantially as described.

4. The combination with a frame or support; of a supplemental plate-holding table rotatable on a vertical axis with relation to said frame; an adjusting device for moving said table on its axis; and a roller-supporting frame movable along said frame, as set forth.

5. The combination with a support; of main and supplemental tracks formed on said support; a roller-carrying frame adapted to travel on said main tracks; a supporting member pivotally connected with said roller-carrying frame; and means for moving said member on its pivot into engagement with said supplemental tracks to raise and support the roller-carrying frame out of engagement with said main tracks as set forth.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN JACOBSON.
JOHN TOOKER.

Witnesses:
H. GRATTAN COLVIN,
EMIL STOPFF.