No. 709,933.

Patented Sept. 30, 1902.

T. J. SMITH.

ROLLER PRINTING MACHINE.

(Application filed Apr. 15, 1902.)

(No Model.)

2 Sheets—Sheet 1.

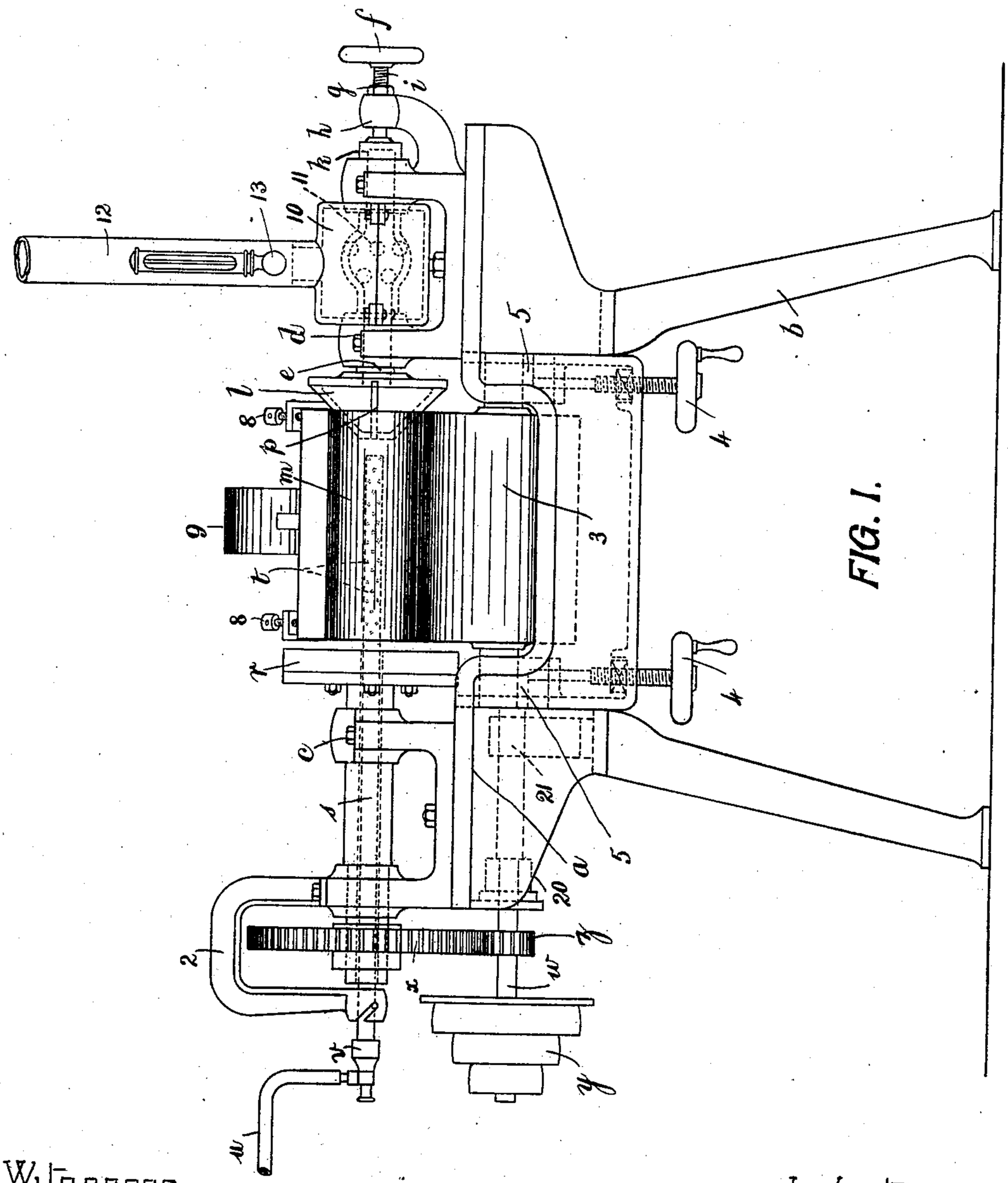

FIG. 1.

Witnesses

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(No Model.) 2 Sheets—Sheet 2.

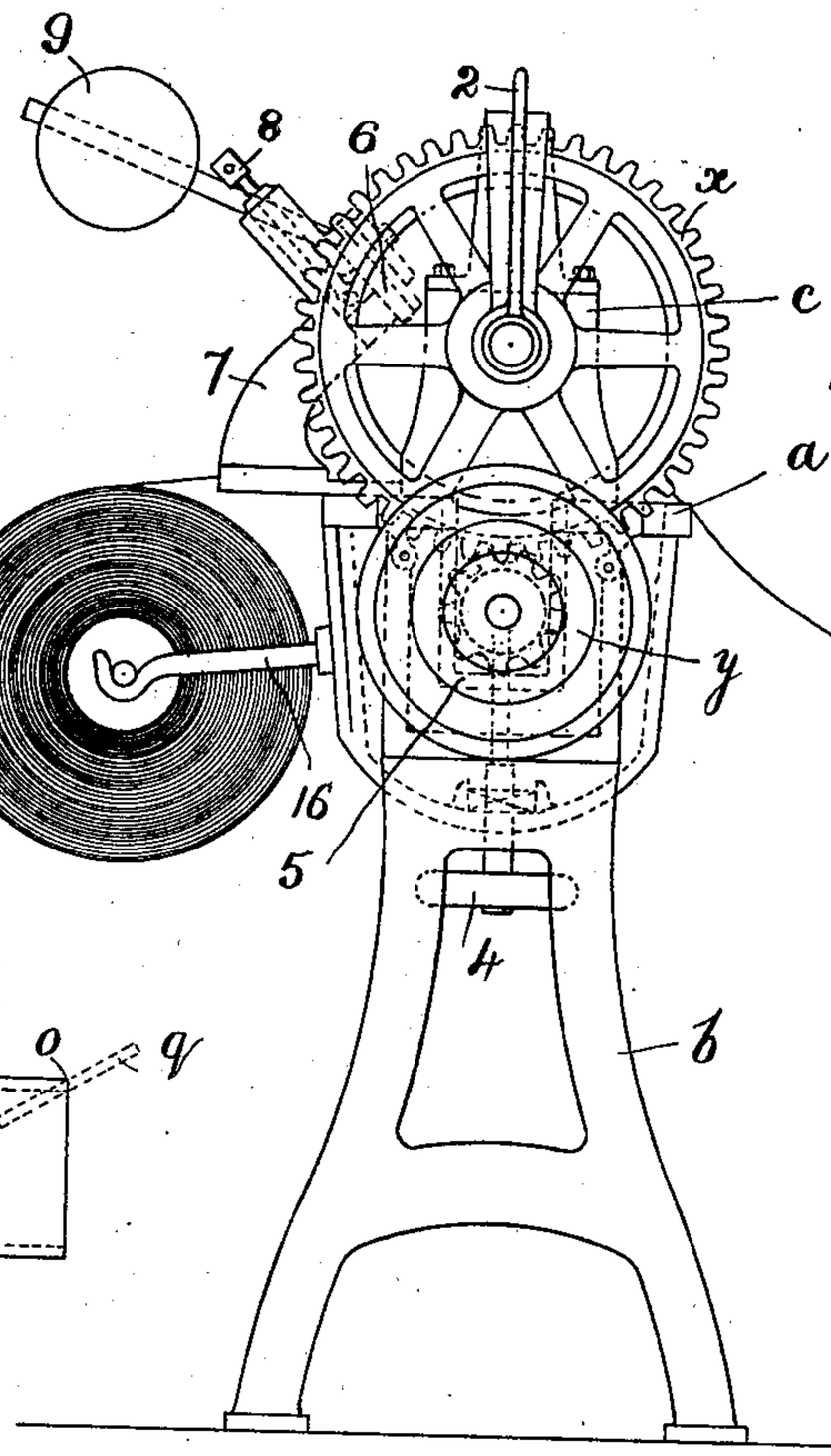

FIG. 2.

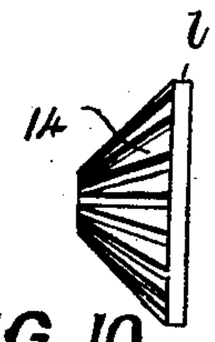

FIG. 10.

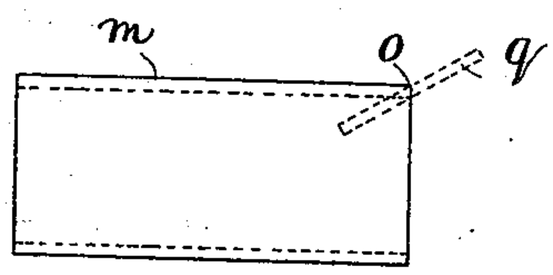

FIG. 8.

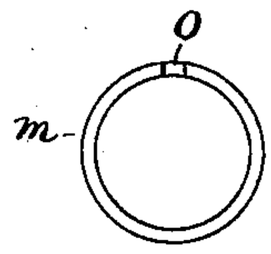

FIG. 9.

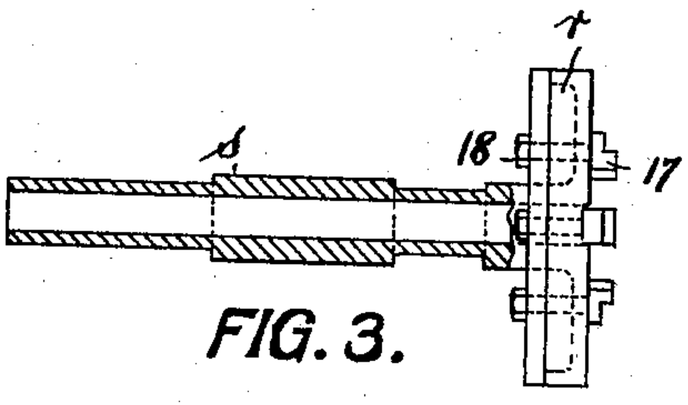

FIG. 3.

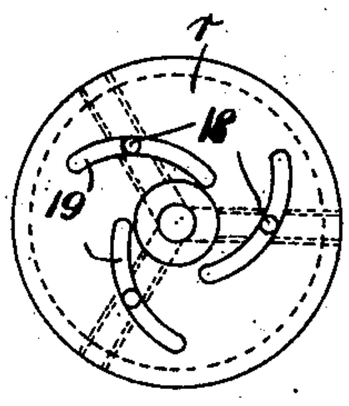

FIG. 4.

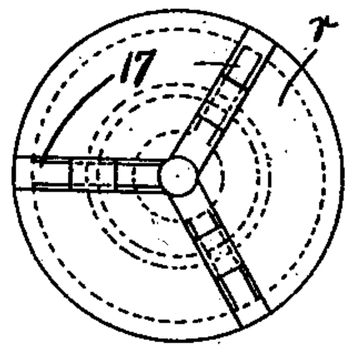

FIG. 5.

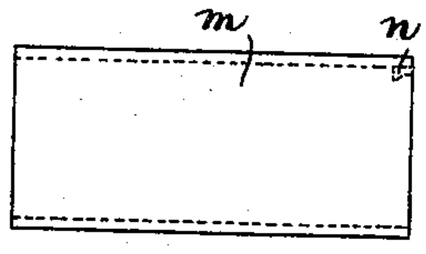

FIG. 6.

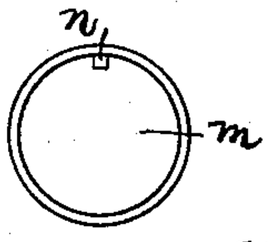

FIG. 7.

Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS JOHN SMITH, OF SHELTON, STOKE-UPON-TRENT, ENGLAND.

ROLLER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,933, dated September 30, 1902.

Application filed April 15, 1902. Serial No. 102,996. (No model.)

To all whom it may concern:

Be it known that I, THOMAS JOHN SMITH, mechanical engineer, a subject of the King of Great Britain, residing in Shelton, Stoke-upon-Trent, in the county of Stafford, England, (whose full postal address is Craigmore House, Shelton, aforesaid,) have invented certain new and useful Improvements in Roller Printing-Machines for Printing Transfer-Paper for Ornamenting Pottery, also for Printing Calico and other Materials, (for which application has been made in England, No. 19,235, and dated September 26, 1901,) of which the following is a specification.

This invention relates to the construction of roller printing-machines for printing transfer-paper for ornamenting pottery, also for calico-printing and analogous purposes.

The object of the invention is to obviate the necessity of using mandrels for affixing the printing-cylinders and to substitute therefor a chuck-and-clutch arrangement whereby cylinders of all common sizes and lengths can be accommodated and worked on the machine with very little adjustment and without the necessity of procuring a mandrel to fit each separate cylinder.

The invention will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a machine constructed in accordance with this invention as seen from the delivery side. Fig. 2 is an end view of Fig. 1 as seen from the driving end. Fig. 3 is a side view of the head-stock spindle and chuck for the printing-cylinder; and Figs. 4 and 5 are back and front views, respectively, of the chuck itself. Fig. 6 is a side view, and Fig. 7 an end view, of a printing-cylinder. Figs. 8 and 9 are similar side and end views of a slightly-modified form of cylinder, and Fig. 10 is a side view of a modified form of cone.

The bed *a* of the machine is mounted on two standards *b* and carries two head-stocks, of which the one, *c*, is stationary and the other, *d*, longitudinally movable. The spindle *e* of the head-stock *d* may be longitudinally adjusted by means of a hand-wheel *f* and screwed spindle *i*, which passes through a bracket *h* on the head-stock *d*, and may be locked in any required position by a lock-nut *g*. The end *k* of this spindle engages loosely over the end of the spindle *e* of the movable head-stock, so that when the hand-wheel is screwed up pressure is applied to the end of the spindle *e* and it is forced toward the printing-cylinder, the cone *l* entering the end thereof, as will be hereinafter described.

On the end of the spindle *e* is a cone *l*, which is preferably hollow in order to provide an exit for the gases from the interior of the printing-cylinder. The cylinder *m*, which is engraved or provided with a pattern in any suitable manner, engages over the cone *l*, and a small nib *n* or slot *o* is formed in one end of the cylinder on its inner side, as shown in Figs. 6 and 7 or Figs. 8 and 9. A groove *p* is formed in the face of the cone *l*, as shown in Fig. 1, and if the cylinder has a nib *n* this latter engages directly in the groove *p*, or if a slot *o* is formed in the cylinder it is locked to the cone by a loose key *q*, which engages in both the slot and groove. The other end of the cylinder is supported and connected to the driving-spindle by a chuck of any suitable kind. In the drawings a three-jawed expanding chuck *r* is shown; but one of the American scroll pattern might equally well be employed. The driving-spindle *s* is hollow and serves as the passage for the gases for heating the cylinder *m*. This passage plays the part of a Bunsen burner, which is continued into the interior of the cylinder *m*, the end within the cylinder being provided with holes *t* for the escape of the gases. The gas is admitted into the spindle *s* through a pipe *u* and swivel connection *v*, as shown in Fig. 1. This spindle *s* may be driven by any suitable means.

In the drawings a lower shaft *w* is shown provided with stepped pulleys *y* and a pinion *z*, which engages with a toothed wheel *x* on the hollow spindle *s*, the shaft *w* being mounted in bearings 20 21 and being driven by belts engaging over the pulleys *y*. The speed of rotation of the spindle *s* may be thus very much reduced. The swivel gas-admitting connection on the end of the shaft *s* is preferably supported by a U-shaped bracket 2, as shown in Fig. 1.

An impression-roller 3 is mounted below the cylinder *m* and may be raised or lowered, as required, by means of hand-wheels and

screws 4, which raise or lower its bearings 5. The engraved cylinder may be inked or supplied with color by any suitable means. In the drawings an inking-box 6 is shown, which is mounted on brackets 7 and which may be adjusted toward or away from the roller by screw-bolts 8. The weighted arm 9 regulates the flow of ink or color in the well-known manner. This arrangement, however, forms no part of my invention.

In order that the gases of combustion may be taken away from the interior of the cylinder *m*, the end of the cone *l* is perforated, as indicated in dotted lines in Fig. 1, the spindle *e* being hollow and communicating with the passage in the cone *l*. A box 10 is provided in the space between the two bearings of the bracket of the movable head-stock *d*, the spindle *e* being enlarged within this box and being perforated with holes 11, as shown in Fig. 1. A chimney 12 passes out from the casing 10, and a graduated thermometer 13 is fixed above the casing 10 in order to indicate the temperature of the gases of combustion. In place of this arrangement, however, the face of the cone *l* may be provided with grooves 14, as shown in Fig. 10, for carrying off the hot gases.

The air for combustion enters the hollow spindle *s* at any suitable point or points, and it may enter the cylinder *m* through the space between its end and the face of the chuck *r*, thus insuring complete combustion of the gases in the printing-cylinder.

The paper or the like for receiving the impression passes from a roll 15 between the rollers *m* and 3, and if the pattern is to be placed upon a tile the impression upon the paper sheet is subsequently transferred to the tile in any suitable manner. The roll 15 is supported in brackets 16 at the rear of the machine.

The operation of the machine will be evident without further explanation. The printing-cylinder *m* is placed in position between the chuck *r* and cone *l*, and the jaws 17 of the chuck are then adjusted so as to hold the cylinder centrally upon its axis of rotation, the jaws being locked in position by the bolts 18, which pass through expanding slots 19. The cone *l* is then screwed up by the hand-wheel *f* until it is pressed tightly into the end of the cylinder *m*, the nib *n* or key *o* engaging in the groove *p* in the cone.

It will be evident that any ordinary size of cylinder can be accommodated in this machine, as all that is necessary is to adjust the chuck *r* and cone *l* to hold it in position, the impression-roller 3 being adjusted until it exerts the required pressure on the cylinder.

In place of gas for heating the cylinder steam may be employed, the arrangement being practically the same, the steam entering the end of the spindle *s*, passing out into the cylinder *m*, and being exhausted through the cone *l*.

By observing the thermometer 13 the temperature may be seen and the amount of gas or steam passing may be regulated so as to keep the temperature of the cylinder approximately constant. The thermometer may be graduated so as to show the correct temperatures for different sizes of cylinders.

I declare that what I claim is—

1. In a cylinder supporting and actuating device for printing-machines, the combination with a hollow printing-cylinder of a driving-spindle, a chuck having adjustable jaws on the end of said spindle, said jaws being adapted to engage in the end of the hollow printing-cylinder, a second spindle at the opposite end of the cylinder, a cone on the end of said spindle, and means for adjusting said second spindle and cone longitudinally so as to press the cone into the end of the cylinder.

2. In a cylinder supporting and actuating device for printing-machines, the combination with a hollow printing-cylinder of a driving-spindle, a chuck having adjustable jaws on the end of said spindle, said jaws being adapted to engage in the end of the hollow printing-cylinder, a second spindle at the opposite end of the cylinder, a cone on the end of said spindle nearest to the cylinder, and a screw device having a bearing adapted to engage with the end of said second shaft, whereby the cone may be pressed into the end of the printing-cylinder to hold it in position.

3. In a cylinder-supporting device for printing-machines the combination with a hollow printing-cylinder, of a chuck adapted to engage in one end of said cylinder, a cone adapted to engage in the other end of said cylinder, means for pressing said cone into the cylinder end, a groove in the face of the cone, and a key adapted to engage in said groove and with the cylinder whereby the cone may be keyed to and caused to revolve with the cylinder.

4. In a supporting, and heating device for printing-cylinders, the combination with a hollow cylinder of a hollow spindle, a chuck on the end of said spindle adapted to engage in the cylinder end, bearings for said spindle, means for admitting gas to the interior of said spindle, a perforated burner-tube extending into the printing-cylinder from the end of said spindle, a cone adapted to engage in the other end of said cylinder, a hollow spindle upon which said cone is carried, a passage through said cone communicating with the interior of said spindle, and means for withdrawing the waste gases from said spindle.

5. In a supporting, actuating and heating device for printing-cylinders, the combination with a hollow cylinder of a spindle, means for actuating said spindle, a chuck on the end of said spindle adapted to engage in the cylinder end, a burner-tube formed within said spindle and extending within said cylinder, means for admitting gas to the interior of said spindle, means for supporting the other

end of said cylinder, and means for taking off the waste gases from the latter end of said cylinder.

6. In a supporting, actuating and heating device for printing-cylinders, the combination with a hollow cylinder of a hollow spindle, means for actuating said spindle, a perforated tube extending from said spindle into the cylinder, means for admitting gas to said hollow spindle, a hollow shaft at the other end of said cylinder, means for supporting the cylinder upon said shaft, means for drawing off the waste gases from said hollow shaft, and a graduated thermometer whereby the temperature of the gases in the printing-cylinder may be seen and regulation of temperature faciliated.

In witness whereof I have hereunto signed my name, this 4th day of April, 1902, in the presence of two subscribing witnesses.

THOMAS JOHN SMITH.

Witnesses:

FREDERICK BANATT,

JOHN H. COPESTAKE.