(No Model.) 2 Sheets—Sheet 1.

# J. BUDD.

## MACHINE FOR PRINTING GLASS.

No. 516,799. Patented Mar. 20, 1894.

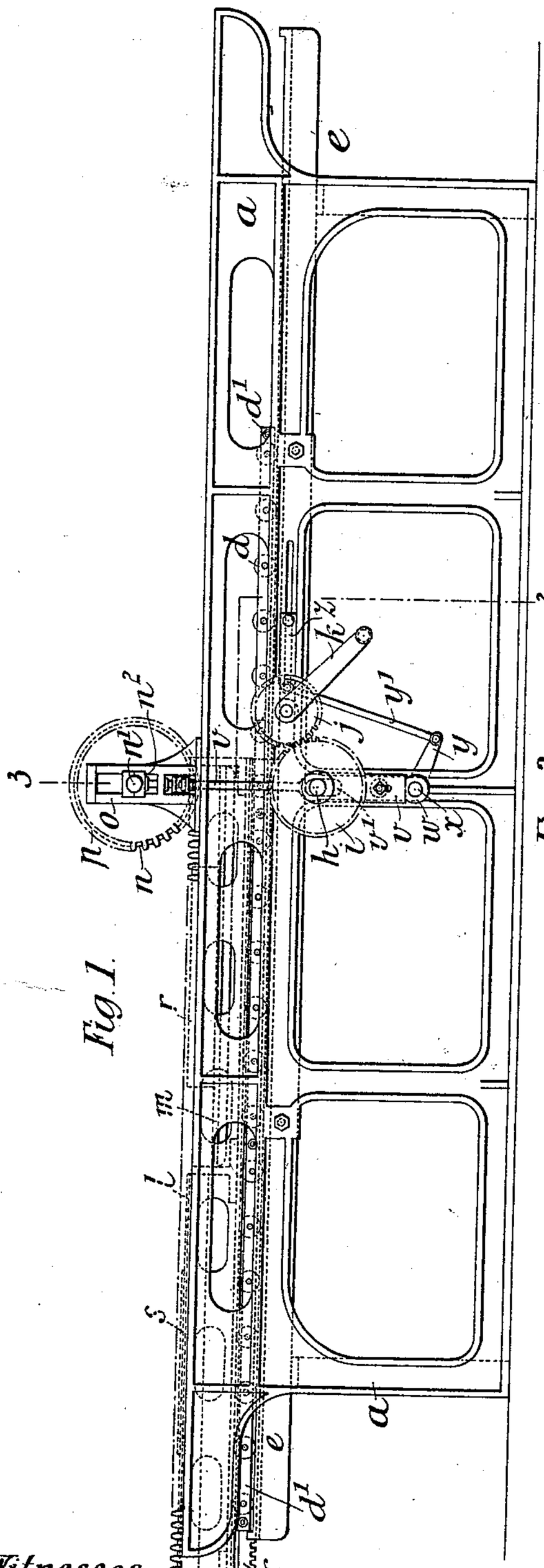

Fig. 1.

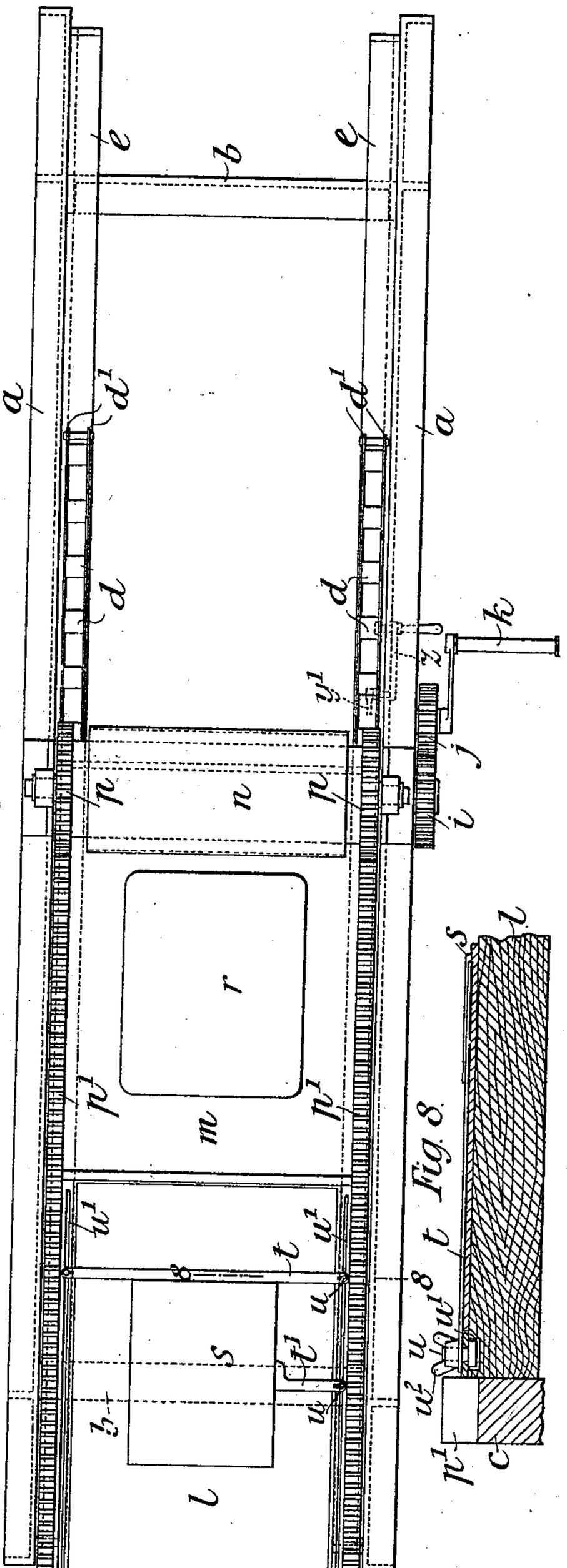

Fig. 2.



Fig. 8.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

# J. BUDD.

## MACHINE FOR PRINTING GLASS.

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Fig. 3.

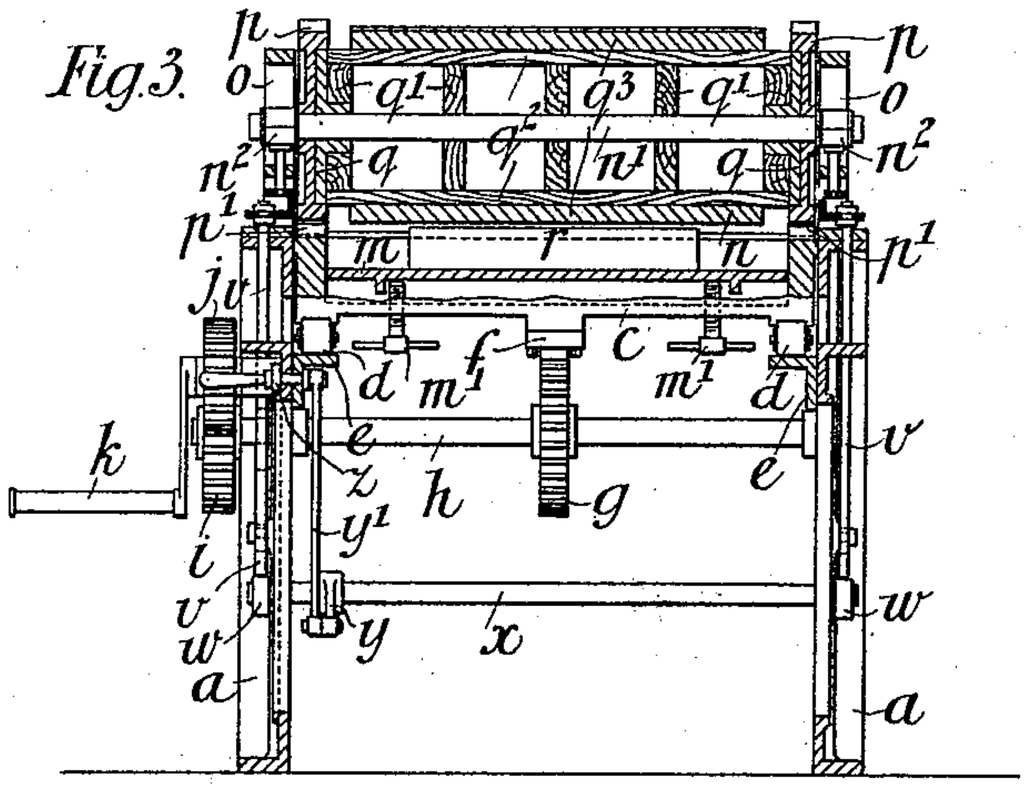



Fig. 4.

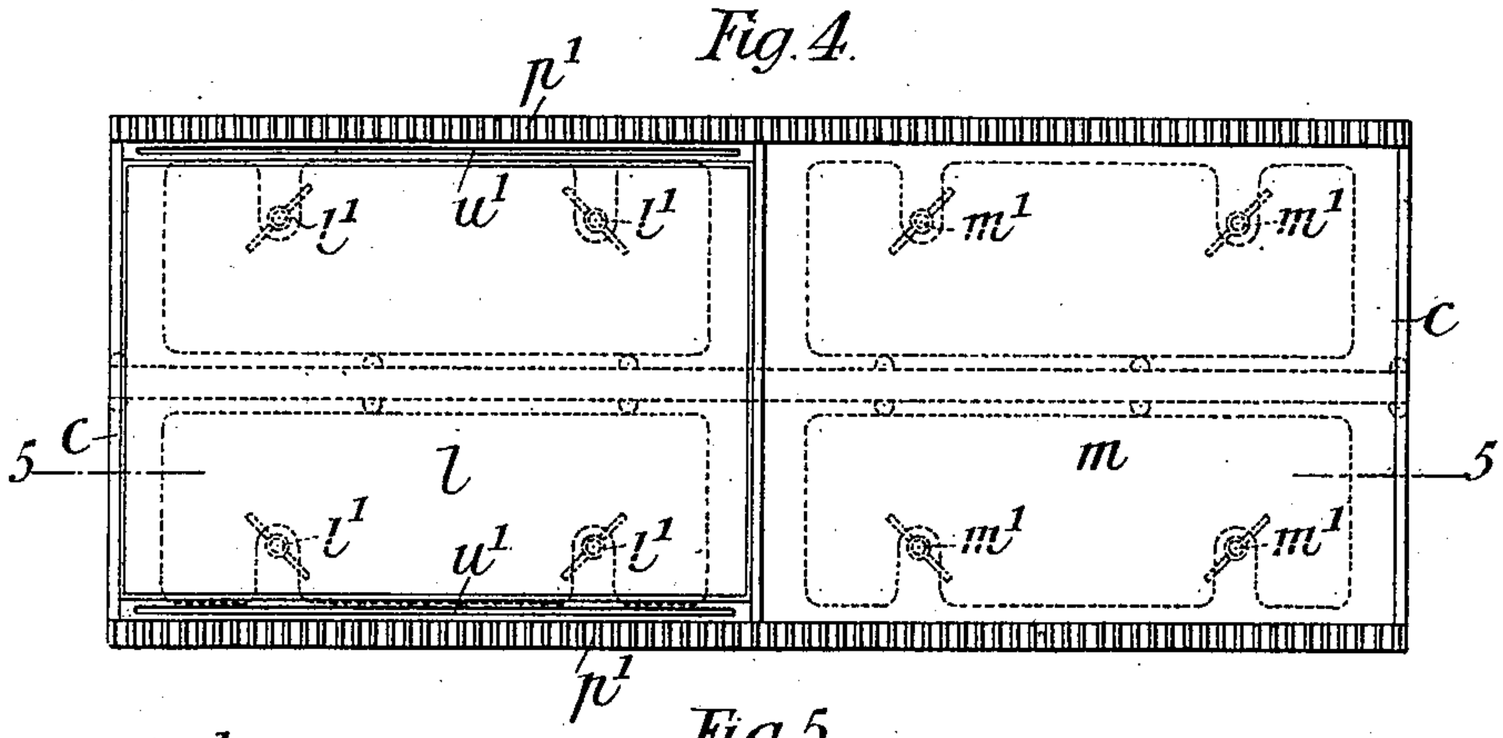



Fig. 5

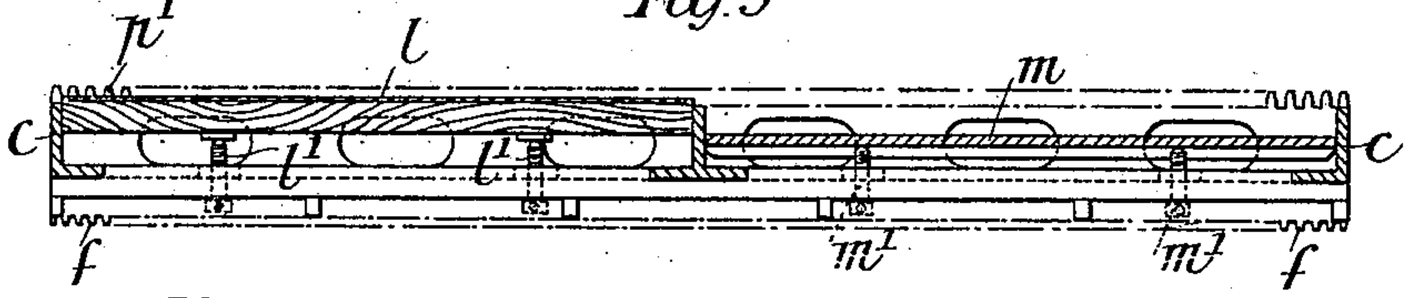



Fig. 7.

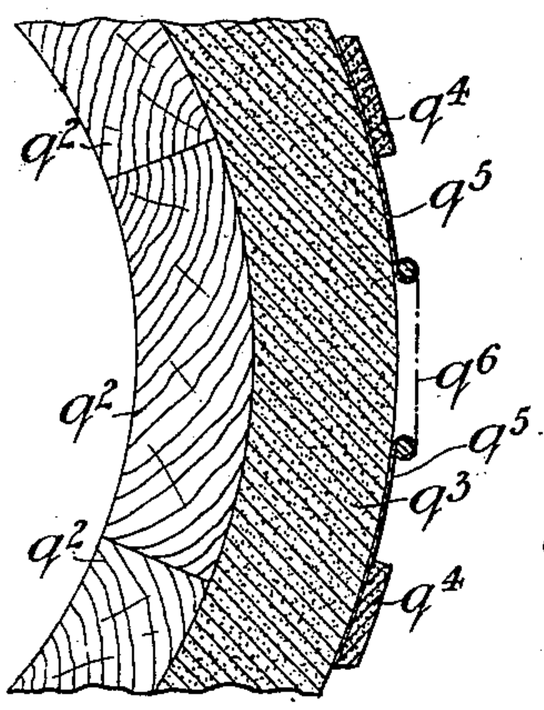
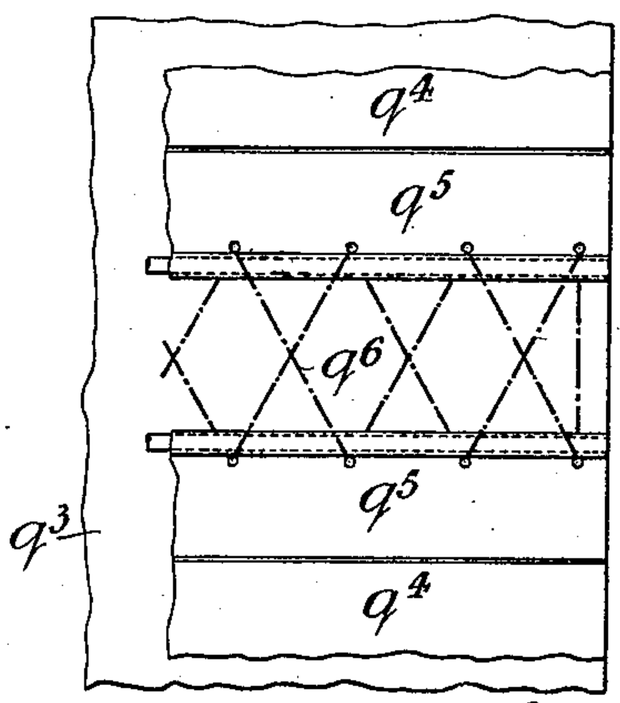



Fig. 6




Witnesses.
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Inventor.
James Budd

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# UNITED STATES PATENT OFFICE.

JAMES BUDD, OF LONDON, ENGLAND.

## MACHINE FOR PRINTING ON GLASS.

SPECIFICATION forming part of Letters Patent No. 516,799, dated March 20, 1894.

Application filed April 5, 1893. Serial No. 469,120. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES BUDD, a subject of the Queen of Great Britain, residing at London, England, have invented a new and useful Machine for Printing on Glass or Analogous Surfaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

According to my invention the sheet of glass or other like material to be printed is laid upon a yielding bed and the design is transferred thereto from a lithographic stone or an engraved or other printing surface by means of a transfer roller, the surface of which is composed of a soft or yielding material capable of taking the ink from the stone and of transferring it to the glass. In practice I prefer that the bed for the glass and the lithographic stone should be arranged upon a sliding table adapted to move beneath the transfer roller.

To enable my invention to be fully understood I will describe the same by reference to the accompanying drawings, in which—

Figures 1 and 2 are a side elevation and plan respectively of a machine for printing glass according to my invention. Fig. 3 is a section on the line 3—3, Fig. 1. Fig. 4 is a plan of the sliding table; and Fig. 5 is a section of the same on the line 5—5. Figs. 6 and 7 are an elevation and sectional view drawn to an enlarged scale of a portion of the transfer roller, illustrating the construction of the same. Fig. 8 is a section on the line 8—8, Fig. 2, drawn to an enlarged scale.

In constructing my machine I provide a cast iron framework comprising two side frames *a*, *a* suitably connected together, for instance by means of two cross-frames *b*, *b*.

*c* is the table for carrying the elastic bed and the lithographic stone or printing surface, the said table sliding between the side frames *a*, *a* and being supported by means of rollers *d*, *d* upon the angle bars *e*, *e* secured to the said side frames. The rollers *d*, *d* are carried between bars *d'*, *d'*, as shown most clearly in Fig. 2, and the part of the under side of the sliding table in contact with the said rollers is grooved, as shown most clearly in Fig. 3, so that the said rollers shall maintain their proper positions relatively with the table. Motion is imparted to the said table by means of a rack *f* on its under side with which engages a gear-wheel *g* mounted upon a shaft *h* having secured to one end a wheel *i* engaging with a wheel *j* having a crank-handle *k* fixed to it in such a manner that when the said crank-handle is rotated the sliding table will be reciprocated.

*l* is the elastic bed upon which the sheets of glass to be printed are laid. As shown in the drawings, this elastic bed is composed of a piece of wood covered with elastic material such as printer's composition, the said bed being carried between the sides of the table and supported upon screws *l'*, *l'*, the adjustment of which enables the said bed to be accurately fixed. *m* is a platform which is also carried between the sides of the sliding table and upon screws *m'*, *m'* in a similar manner to the bed *l*, the said platform serving to carry the lithographic stone or other printing surface from which the design is to be transferred.

*n* is the roller for transferring the design from the lithographic stone to the glass, the shaft *n'* of the said roller being carried in bearings $n^2$, $n^2$ adapted to slide in vertical slots in brackets *o*, *o* upon the side frames *a*, *a*. Motion is imparted to the said roller from the sliding table *c* through the medium of the gear-wheels *p*, *p* fixed to the shaft *n'* and engaging with the racks *p'*, *p'* formed upon the upwardly projecting edges of the sliding table *c*, as shown in Figs. 4 and 5. The said transfer roller or cylinder is advantageously constructed in the following manner, that is to say, upon the spindle *n'* are fixed two disks *q*, *q* which for convenience sake are preferably fitted inside the wheels *p*, *p*, as shown most clearly in Fig. 3, and between the said side-pieces *q*, *q* are arranged a number of wooden disks *q'*, *q'* to which are fastened wooden bars $q^2$, $q^2$, Fig. 7. Upon these bars $q^2$ is laid a coating $q^3$ of soft material such as printer's composition, the said material being preferably cast in a mold. As the surface of this coating $q^3$ would generally be more or less defective (for instance owing to the presence of air bubbles therein) and thus unfit for transferring the design from the printing surface to the glass,

I advantageously lay over the surface of this cylinder a thin layer $q^4$ of specially prepared printer's composition, the said layer $q^4$ being fixed to a canvas backing $q^5$, the edges of which, when the said backing is wrapped around the cylinder, are connected, for instance by lacing $q^6$, as shown in Fig. 6.

$r$ indicates a lithographic stone fixed upon the platform $m$, and $s$ indicates a sheet of glass to be printed, the said sheet being fixed in position upon the yielding bed $l$ by means of the gages $t$, $t'$. The gage $t$ is in the form of a bar, the two ends of which are adapted to be fixed by bolts $u$ sliding in slots $u'$ in the bed $l$ and having thumb-nuts $u^2$; the side gage $t'$ is also fixed by means of a bolt $u$, sliding in one of the slots $u'$, and a nut $u^2$.

The operation of the apparatus as thus far described is as follows:—Assume the sliding table to be in the position shown in Figs. 1 and 2, that is to say, to the left hand side of the transfer roller $n$ with the lithographic stone $r$ upon the platform $m$ and the sheet of glass $s$ upon the yielding table $l$, the said stone and piece of glass being so adjusted by means of the screws $l'$, $l'$ that as they pass under the roller $n$ they will come in contact with the transfer roller. The lithographic stone being properly inked the crank-handle $k$ is rotated to move the table $c$ to the right hand side of the roller $n$, whereby as the lithographic stone passes under the roller $n$ the ink is taken therefrom by the said roller and as the movement continues the glass $s$ passes under the said roller $n$ so that the ink upon the said roller is transferred to the glass.

In order that on the return movement of the table the transfer roller $n$ shall not come into contact with the lithographic stone and the glass sheet, I provide for lifting the said roller. As shown in the drawings this is accomplished by arranging at the sides of the machine rods $v$, $v$, the upper end of each of which bears against one of the bearings $n^2$ of the shaft $n'$ while the lower end rests upon a cam $w$, the said rods being slotted at $v'$ to pass over the shaft $h$. The cams $w$, $w$ are fixed on the two ends of a shaft $x$ to which is also fixed a lever $y$ attached by a link $y'$ to a slide $z$ moving in a groove in one of the frames $a$. When the roller $n$ is in position to come into contact with the lithographic stone $r$ the ends of the rods $v$, $v$ are in contact with the flat sides of the cams $w$, $w$, as shown in Fig. 1. When it is desired, however, to raise the said roller the slide $z$ is moved to the right, whereby the shaft $x$ and the cams are rotated sufficiently to bring the curved portions of the said cams beneath the rods $v$.

The sheets of glass printed in the manner hereinbefore described may be dusted over with mineral colors for the purpose of tinting and then fired in a kiln.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination with a suitable frame work, a reciprocating table divided into two parts, a yielding surface adjustably supported at one end of said table, and an adjustable platform $m$ for the printing surface at the other end and a transfer roller arranged above said table, substantially as described.

2. In combination with the table carrying the printing surface and article to be printed, a roller for transferring the design from said surface to the article comprising a series of disks, bars secured to the peripheries of the disks, a coating of soft material surrounding said bars and an outer covering of canvas having its outer face suitably coated encircling the soft material, substantially as described.

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