

(No Model.)

4 Sheets—Sheet 1.

T. HARPER.

MACHINE FOR PRINTING TRANSFERS FROM ENGRAVED ROLLS.

No. 509,528.

Patented Nov. 28, 1893.

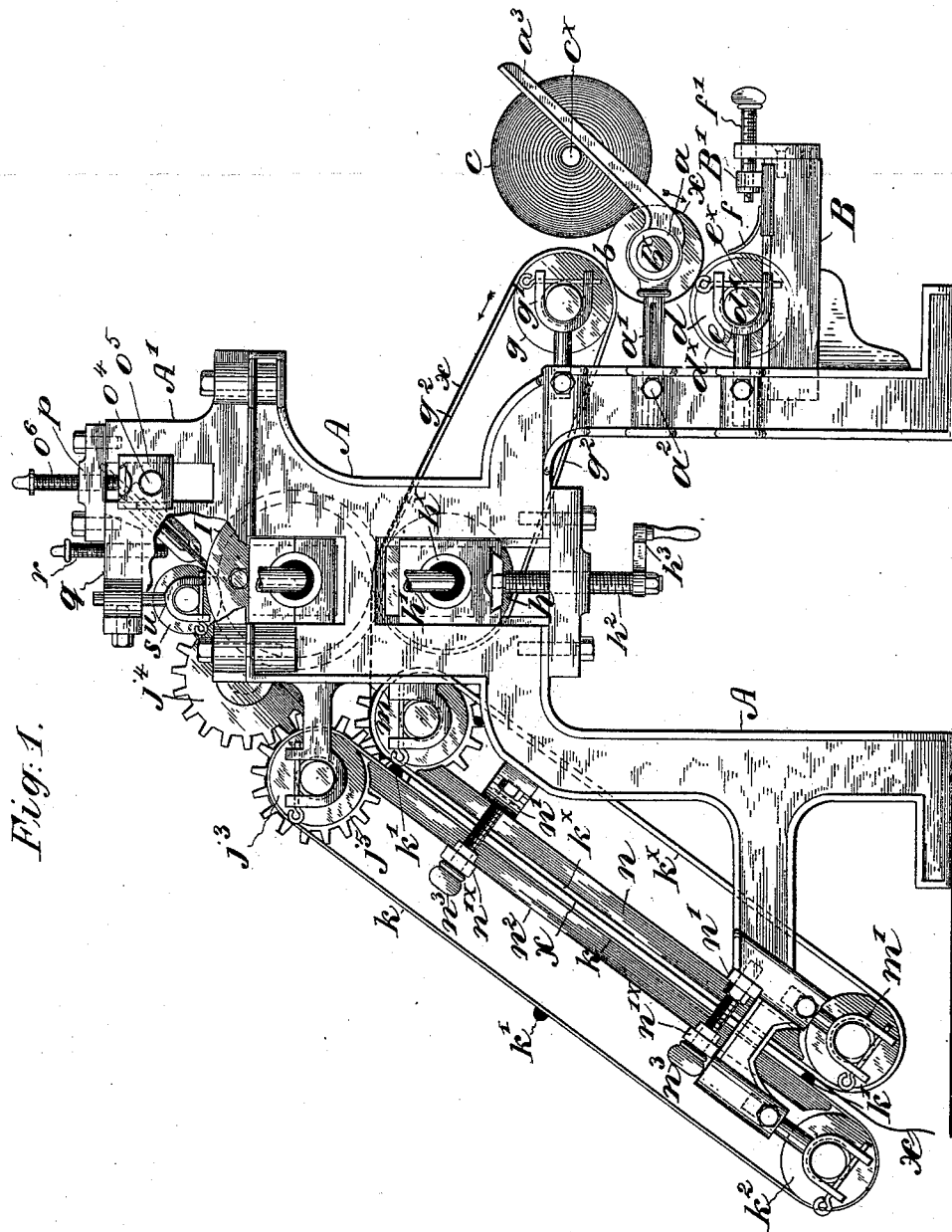


Fig. 1.

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WITNESSES:

Herbert Blossom  
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By

Henry Connelley  
Attorney.

(No Model.)

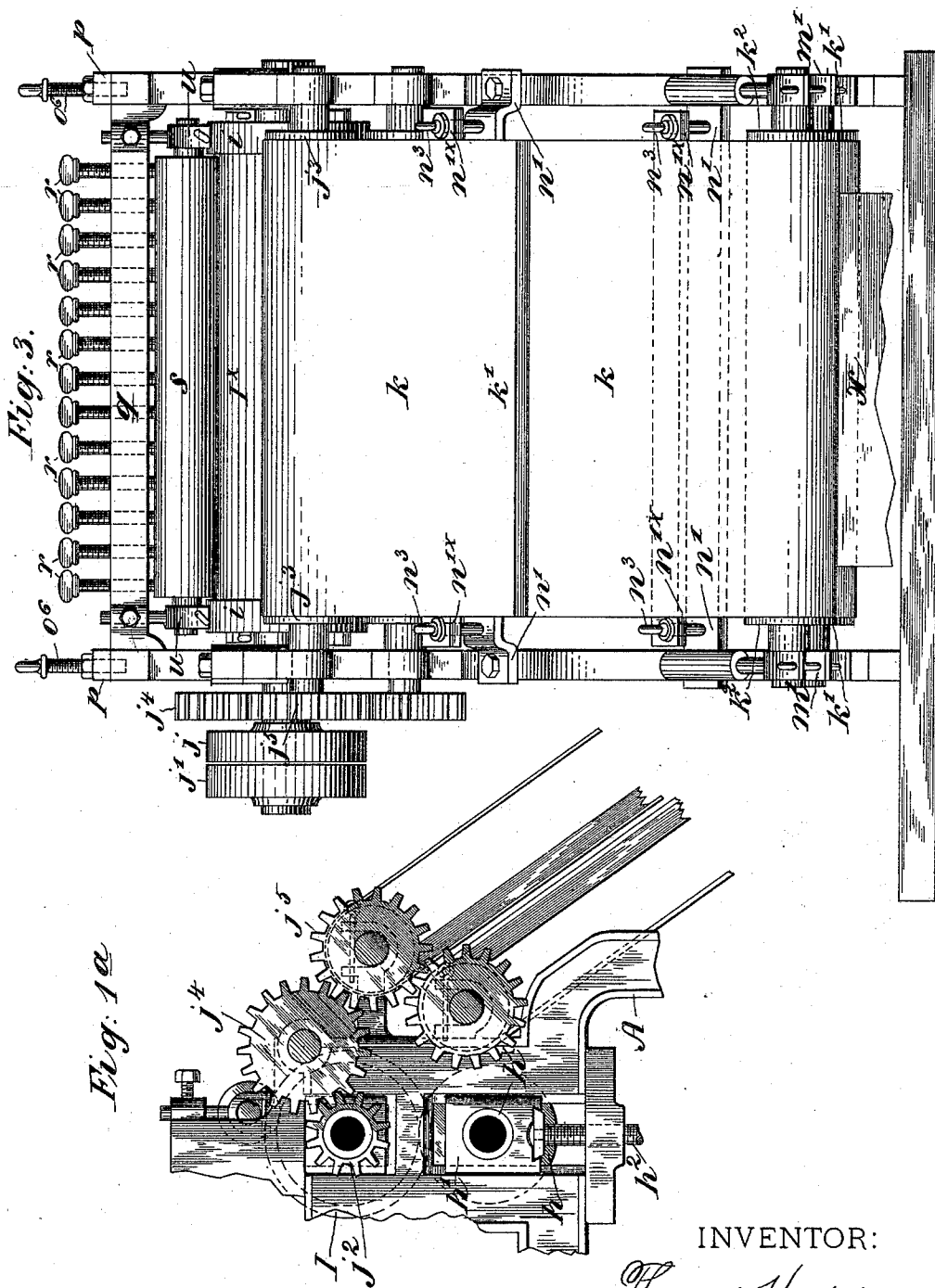
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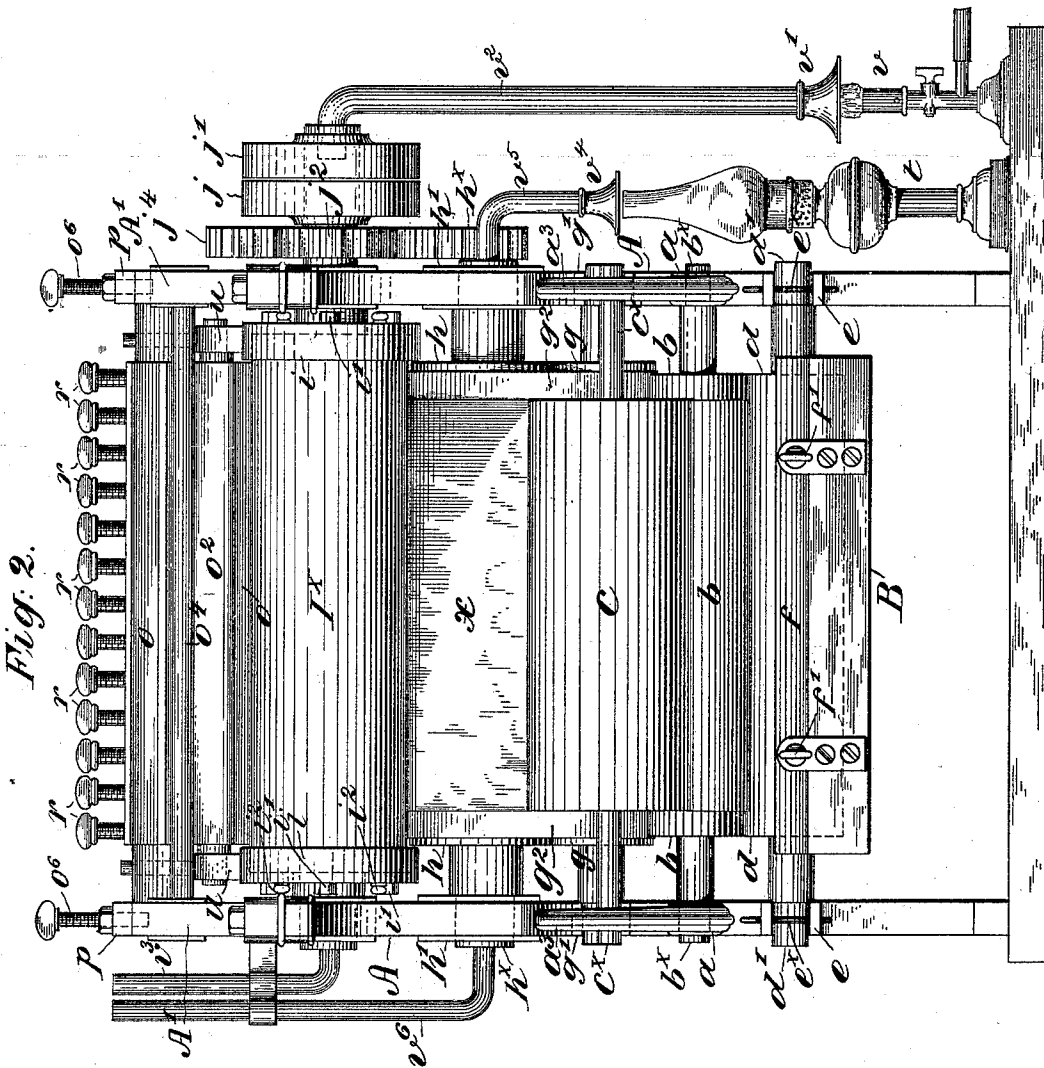
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INVENTOR:

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Fig. 4.

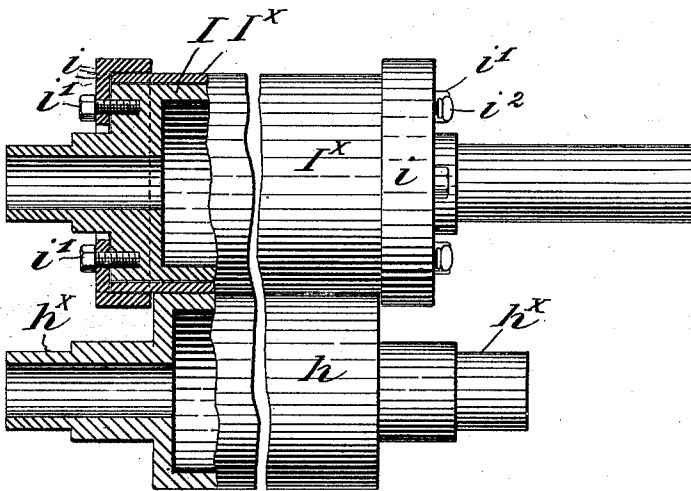


Fig. 5.

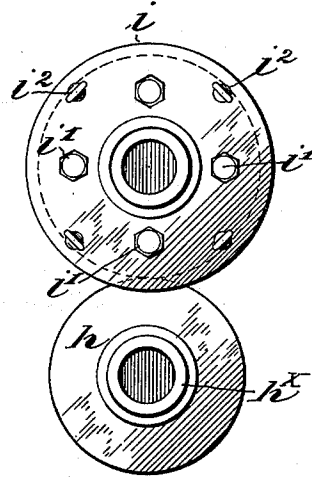


Fig. 6.

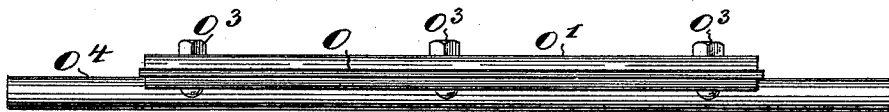


Fig. 8.

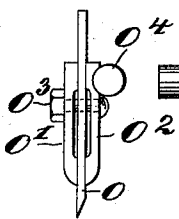
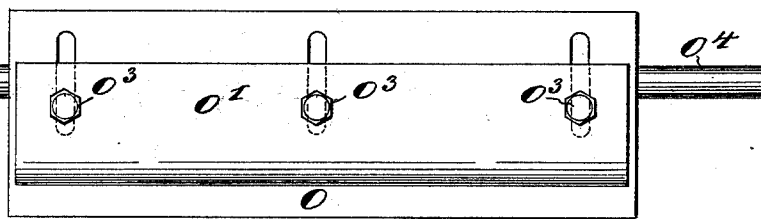


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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LERT, OF NEW YORK, N. Y.

## MACHINE FOR PRINTING TRANSFERS FROM ENGRAVED ROLLS.

SPECIFICATION forming part of Letters Patent No. 509,528, dated November 28, 1893.

Application filed July 16, 1892. Serial No. 440,191. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS HARPER, a citizen of the United States, and a resident of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Machines for Printing Transfers from Engraved Rolls, of which the following is a specification.

My invention relates to a machine for printing transfers such as are commonly employed in ornamenting glass, ceramic ware and the like, and the object of my invention is to produce a simple and efficient machine for this purpose having certain novel features which will be fully described hereinafter and specifically defined in the claims.

In the accompanying drawings serving to illustrate my invention—Figure 1, is a side view of a machine embodying my invention, as seen from the left in Fig. 2; and Fig. 1<sup>a</sup>, is a fragmentary view of the opposite side, showing the train of gears. Fig. 2, is a rear or back view of the machine. Fig. 3, is a front view of the machine. Fig. 4 is a view of the printing and impression rolls, detached and partly in section; and Fig. 5, is an end view of the said rolls. Figs. 6, 7 and 8, are views of the doctor, detached.

A, A, are the two side-frames of the machine. As herein shown these frames are connected together with suitable ties in a manner well understood. The frames A, are alike, or may be alike, and the shafts and rolls of the machine have bearings at their respective ends in said frames, or in brackets and the like on the same; hence a description of the mountings at one side of the machine,—for example as seen in Fig. 1,—will suffice to explain the construction. In a socket in the end-frame is set the stem of an adjustable bearing bracket *a*, a longitudinal groove in the stem, *a'*, being engaged by a set screw, *a''*; this device prevents the cylindrical stem from turning in the socket. In the bracket is a bearing for the journal *b'*, of a roll *b*. On or forming a part of the bracket *a*, is an inclined way, *a''*, on which rests a shaft, *c'*, about which is wound a roll of tissue paper, *c*. The weight of the roll causes its peripheral surface to al-

ways press on the roll *b*. The web of paper, 50 designated by *x*, unwinds from the roll *c*, and passes around roll *b* in the direction of the arrows in Fig. 1. Below the paper carrying roll *b*, is a dampening roll, *d*, which has a covering *d'*, of felt, flannel, or the like, and which is adapted to press peripherally against the paper about the roll *b* with a moderate degree of firmness. The journal, *d'*, of roller *d*, has a bearing in an adjustable forked bracket *e*, and is retained in said fork by a pin, *e'*, to permit of the convenient removal of the roll *d*. The stem of the bracket *e*, is secured adjustably in a socket in the frame A in the same manner as described with reference to the bracket *a*, and this permits the roll *d*, to be set up to the roll *b* conveniently.

B, is a box, trough, or reservoir which contains the dampening liquid to be applied to the paper *x* by the roll *d*, which latter dips into the said liquid. The liquid may be of the usual or any kind suitable for sizing or for dampening paper already sized, in order to make perfect transfers. Mounted on the box B, is a slide B', carrying a "squeegee" *f*, adapted to press on the absorbent covering 75 of the roller *d* and remove therefrom the surplus liquid taken up from the box as the roller revolves. The adjustment of the squeegee toward or from the roller *d* is effected by means of a screw or screws, *f'*, which screw through 80 lugs on the box B, and have collared bearings in the carrying slide B'.

A roller *g*, has bearings in adjustable forked brackets *g'*, mounted in the frames A in a manner substantially the same as described 85 with reference to roll *b*, and *d*, the stems of the brackets being adjustable in their sockets. About this roll *g*, at one end, and a roll, *h*, at the other end, extends an endless carrying belt or apron, *g''*, which will be of flannel, 90 by preference, or of some similar absorbent material. This absorbent apron will be as wide as, or wider than the web of paper, so as to be in contact with the latter throughout its entire width. The roll *h*, is the impression 95 roll, and is, as here shown, arranged centrally in the frame A. This roll is hollow and its hollow journals, *h'*, have bearings in blocks,

$h'$ , which are adapted to slide up and down in guide slots in the frame. The roll  $h$ , is raised or lowered by means of screws  $h^2$ , which screw through plates on the frame and have collared bearings in the respective blocks  $h'$ . The screws are provided with cranks  $h^3$ , for convenience in operating them. Above the impression roll  $h$ , is mounted the printing roll,  $I$  which is also hollow. This roll  $I$ , has bearings in pillow blocks in the respective side frames  $A$ .

The specific construction of the roll  $I$ , is illustrated in Figs. 4 and 5. Over the roll is slipped a thin integral metal shell or cylinder,  $I^x$ , on which is engraved the pattern to be printed, the engraving not being done directly on the surface of the roll as is usual in this class of work. After the shell is on the roll, annular caps,  $i$ , are slipped over the ends of the shell and secured to the roll by screws  $i'$ . The shell is held firmly on the roll and prevented from rotating about the same, by means of set-screws,  $i^2$ , which screw through the caps and bear against the ends of the shell. The shell may be removed from the roll by first removing one of the caps  $i$  and then slipping it off; this enables the operator to employ any number of shells adapted to fit the roll  $I$ , but having each a different design engraved or etched on its surface.

On one of the projecting journals of the roll  $I$ , are tight and loose driving pulleys,  $j$  and  $j'$ ; and on the journal, between the tight pulley  $j$ , and the frame, is fixed a spur wheel  $j^2$ . This wheel may be fixed to, or cast in one with the pulley  $j$ . The gear wheel  $j^2$  drives a roll  $j^3$ , through the medium of gear wheels  $j^4$  and  $j^5$ , the latter being fixed on the journal of the roll  $j^3$ . The arrangement of the gearing last described is clearly illustrated in Fig. 1<sup>a</sup>. The roll  $j^3$  has bearings in projecting parts of the side frame and carries the upper end of an endless band or apron,  $k$ , which is as wide as, or a little wider than the web of paper  $x$  to be printed. The length of the band  $k$ , is some multiple of the circumference of the engraved shell; as here shown its length is three times the circumference of the shell, and on it are fixed three transversely arranged rubber strips,  $k'$  equally spaced. At its lower end the band  $k$  passes around a roll  $k^2$ , which is mounted in adjustable brackets similar to those heretofore described, whereby the roll  $k^2$  may be adjusted so as to tighten the band. Another endless band,  $k^x$ , is arranged parallel with the band  $k$ , and this band is carried on rolls  $m$  and  $m'$ , which are mounted in a manner similar respectively to the rolls  $j^3$  and  $k^2$ . Between the two plies or sides of the belt  $m$ , is arranged a plate  $n$ , preferably of metal or wood, which serves as a backing for the operative part of the belt between the rolls and prevents the belt from yielding or sagging. This plate  $n$ , is supported by bars  $n'$ , which are secured to the main frame by screws or bolts. Between the plies or sides of the belt  $k$ , is situated a plate  $n^2$ , similar to

plate  $n$ , and adapted to perform functions like those of plate  $n$ . The plate  $n^2$ , is made adjustable toward and from the inner face of belt  $k$ , by means of screws,  $n^3$ , which screw through the bars  $n'$ , and are collared in bars,  $n'^x$ , on the plate  $n^2$ .

The web of paper,  $x$ , after passing under the engraved roll and receiving the impression, is carried down between the adjacent faces of the belts  $k$  and  $k^x$ , the rubber strips  $k'$ , bearing on it and pressing it upon the belt  $k^x$ . These rubber strips bear on the printed face of the web, and between the designs printed thereon by the engraved shell.

I will now describe the inking mechanism of the machine. On the top of the frame  $A$ , is removably secured an auxiliary frame  $A'$ , and in this frame is mounted the ink-scraping device known as the "doctor;" in Fig. 1 a part of the frame  $A'$ , is broken away in order to show one end of this device. The doctor, which is seen detached in Figs. 6, 7 and 8, comprises a blade or knife,  $o$ , clamped between under and upper plates,  $o'$  and  $o^2$ , by bolts or screws  $o^3$ . The doctor extends transversely across the machine above the printing roller  $I$ , and its edge bears on the engraved surface of the shell in such a manner as to scrape off all of the ink from the engraved surface except that which fills the engraved lines. On the respective ends of the plate  $o^2$ , are journals,  $o^4$ , which have bearings in blocks,  $o^5$ , which slide up and down in guide slots in the frame  $A'$ . In bars  $p$ , extending across the slots in the frame, are screws  $o^6$ , which have collared bearings at their lower ends in the respective bearing blocks  $o^5$ . By means of these screws the angle at which the doctor is set may be varied and adjusted. Extending transversely across the frame  $A'$ , is a bar or plate  $q$ , in which are set screws  $r$ , the tips of which bear on the plate  $o'$ , of the doctor and serve to press the edge of its blade  $o$ , down firmly on the engraved surface of the shell with the precise degree of force required. As the roll  $I$  revolves the ink removed by the blade  $o$ , is massed in front of the latter, and this mass of ink is taken up and again applied to the surface of the roll by an inking roller,  $s$ , of roller composition, rubber, or the like, which is mounted in adjustable brackets,  $u$ , in front of the doctor so as to take up the ink accumulating in front of the blade and again apply it to the engraved surface. The ink required to supply the machine may be put on the roller  $s$  with a pallet knife by the attendant and the doctor and inking roller will take care of it and properly distribute it. It will be seen that my construction obviates the use of an ink fountain, such as is usually employed on printing machines. I arrange the doctor above or on the top of the printing roll, and it is of such a length as to fit between the raised, circumferential ledges formed by the annular securing caps  $i$ . The roller  $s$ , which rolls the ink into the engraved lines, the blade,  $o$ , of the doctor, and the caps

$i$ , inclose a space for the ink, of which the surface of the printing roll forms the bottom.

As the ink employed for making transfers of this character is quite stiff and viscid, it is desirable to heat the roll I and its engraved shell, and also to heat the impressing roll  $h$ ; and to effect this result I make the rollers I and  $h$ , and their respective journals, hollow, and pass through them the products of combustion from either an ordinary lamp, as  $t$ , or a gas burner, as  $v$ . A flared receiver,  $v'$ , over the lamp or gas burner leads the heated gases into a pipe  $v^2$ , which is open at its upper end to the hollow journal of the roll I, whence they escape at the opposite journal into a chimney or pipe  $v^3$ . The connection of the pipes  $v^2$  and  $v^3$  with the respective journals of the roll I, is quite loose so that the roller may revolve freely without interfering with the pipes.

Means of the same kind as those described are employed for heating the roll  $h$ , but these will not require minute description. The flared receiver  $v^4$  receives the heated gases, which pass to the roller  $h$  by a pipe,  $v^5$ , and escape from it by a pipe  $v^6$ . The main object in heating the roller  $h$ , is to dry out the endless flannel apron which takes the web  $x$  from the dampening roller; this drying of the apron permits the machine to run continuously and not endanger the weakening of the web of tissue paper from over wetting.

I prefer to employ the heating devices I have described, but I do not wish to limit myself thereto as other known means may be employed for the purpose, as for example those employed in heating rolls in calico printing. I prefer to employ the products of combustion, however, rather than steam, partly because the temperature is more easily regulated, and partly because it is not easy to utilize steam with a roll adapted to be adjusted up and down, as the joints must be tight where steam is used. Moreover the condensation from the inevitable leakage of steam at the joints is liable to injure the paper of the web.

In operating the machine the roll of paper is placed in position as seen in Fig. 1, and the web is led between the rolls I and  $h$ , as before described, and then downward between the delivery belts  $k$  and  $k^x$ . Some engraved patterns do not extend entirely around the shell or cylinder, and in that case the rubber strips on the belt  $k$ , will bear on the blank spaces of the web between the patterns; but where the pattern extends entirely around the shell, I cut away the rubber strips at points where they would otherwise bear on the printed lines and leave only such parts as bear on the spaces between the lines. I have said the strips  $k'$ , on the band or apron  $k$ , are of rubber, and I prefer to employ this material, but it will be obvious that some other soft or yielding material of a like nature may be employed in lieu of rubber; or they may be partly of wood and partly of rubber.

I am aware that it is not new to employ two paper-carrying belts one of which has strips of rubber along its margins to grip the paper, and this I do not claim; it is not practicable to drive belts satisfactorily when provided with strips arranged in this manner, owing to the increased thickness and stiffness of the belt at the points where the strips are situated, as these have to bend about the driving pulley or roll. My strips are narrow, and are arranged transversely of the belt.

The inking roller  $s$ , is driven by the roll I, through friction; the roll  $h$ , is driven from the roll I, through friction. The roll  $h$ , drives the roll  $g$ , through the apron  $g^2$ . The roll  $g$  and apron  $g^2$ , drives the roll  $b$ , by friction, and the roll  $b$ , drives the dampening roll  $d$  by friction. The band or apron  $k^x$ , is driven from the roll  $j^3$  by gearing, as seen in Figs. 1 and 1<sup>a</sup>.

In order to remove the shell  $I^x$  from the roll I, and replace it by another, the supplementary frame  $A'$ , is first detached and lifted off, together with the inking apparatus mounted in said frame. The pipes that carry off the products of combustion from the rolls are then removed. The bearing cap at the end of roll I seen in Fig. 1, is taken off and that end of the roll raised until the shell  $I^x$  can be slipped off.

My object in arranging the impression roll  $h$  below the printing roll, so that it is set up to the latter roll, is that this enables me to place the doctor on the top of the printing roll for the reasons heretofore stated. It will be noted that in its operation the liquid is applied to the web of paper, which afterward passes onto the absorbent apron  $g^2$ , which takes up the surplus liquid from the web. The heated roll  $h$  dries out the apron, and to some extent steams the paper, thereby insuring it being moistened equally throughout and to just the extent desired.

Having thus described my invention, I claim—

1. In a machine for printing transfers, the combination with the roll  $g$ , the heated roll  $h$ , and the endless blanket,  $g^2$ , on the same, for carrying the dampened web of paper, of means for dampening the paper situated near the point where the latter passes onto the absorbing blanket, whereby the latter absorbs the surplus moisture from the paper and is itself dried by the heated roll  $h$ , as set forth.

2. The combination with the roll I, and the thin, integral, engraved cylindrical shell  $I^x$ , adapted to fit on said roll, as set forth, of the annular caps,  $i$ , which take over the respective ends of the roll and shell, the screws which secure said caps to the roll, and the screws which hold the shell in position on the roll.

3. The combination with the roll I, and the engraved shell adapted to fit on said roll, of the annular caps,  $i$ , which form circumferential ledges on the roll near its ends, the doctor, arranged on the top of the roll with its blade between the said ledges, and the ink-

ing roller, arranged in front of said blade and in contact with the engraved surface of the shell, substantially as and for the purposes set forth.

5 4. In a machine for printing from etched or engraved rolls, the combination with the printing roll, of the doctor, arranged above or over the roll and provided with journals *o*<sup>4</sup>,  
10 having bearings in vertically sliding guide blocks in the frame, the said blocks, the screws for adjusting the blocks in their slots, and the set screws, *r*, arranged to bear on the doctor and press its blade up to the roll, as set forth.

15 5. In a machine for printing from etched or engraved rolls, the combination with the

printing roll, and the doctor arranged on the top of same to scrape the surplus ink from the roll, of the inking roller *s*, arranged in front of the doctor blade, said roller being in 20 contact with the printing roll and turning in the mass of ink accumulated in front of the doctor blade, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed 25 my name in the presence of two subscribing witnesses.

THOMAS HARPER.

Witnesses:

HERBERT BLOSSOM,  
PETER A. ROSS.