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Patented Oct. 8, 1901.

G. F. McINDOE.

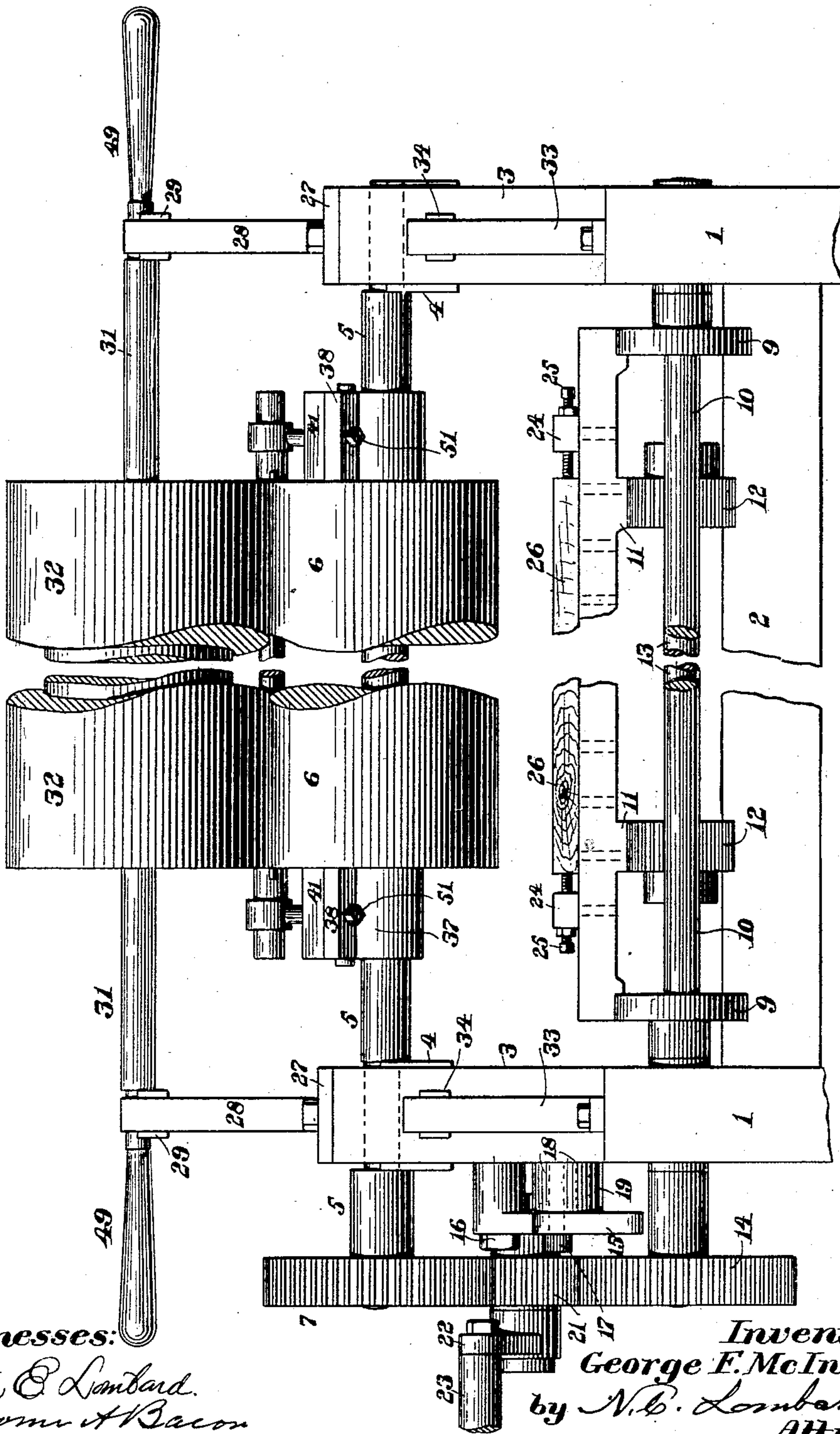
ART OF MAKING INTAGLIO PRINTING FORMS.

(Application filed Dec. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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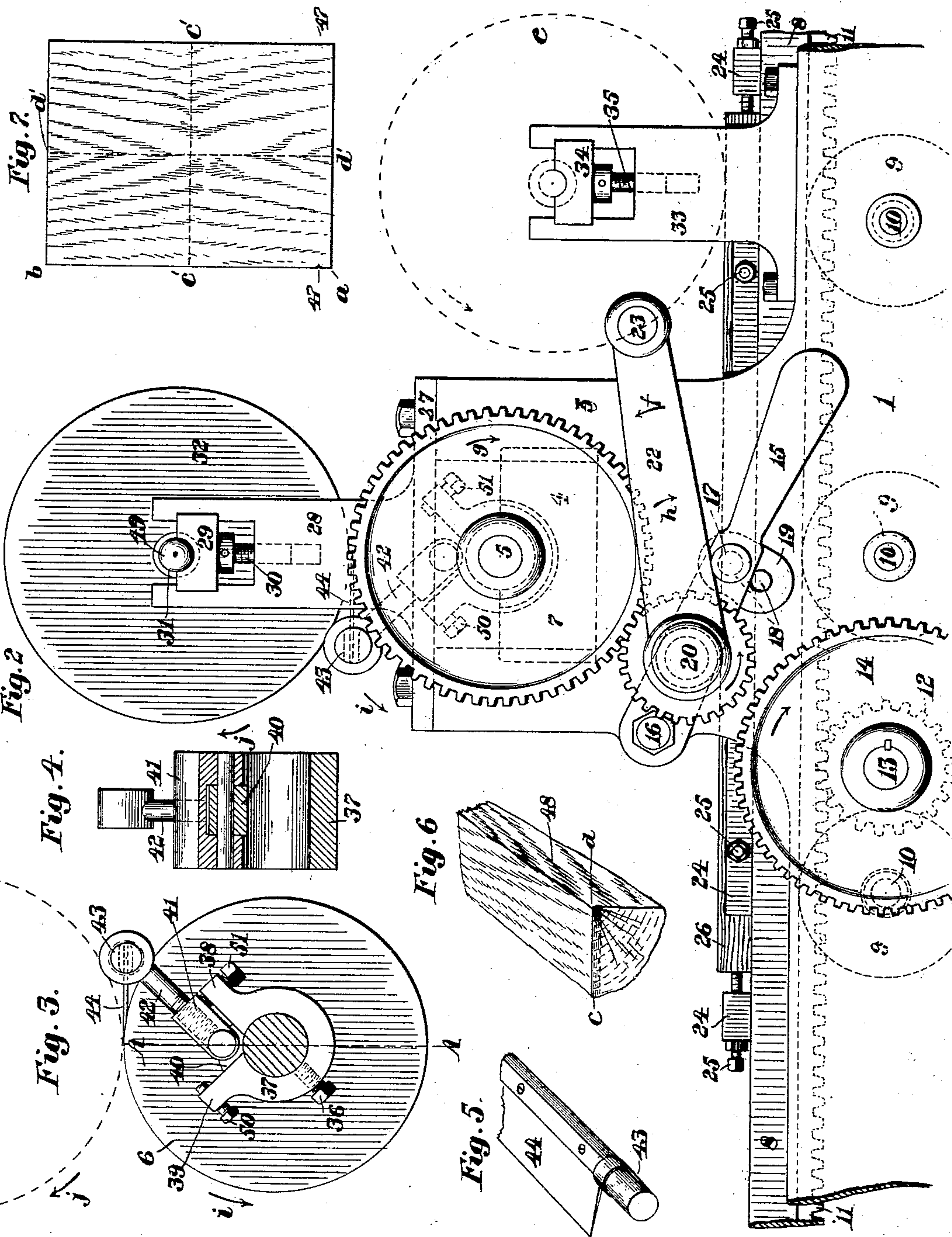


Fig. 2

Fig. 4.

Fig. 3.

Fig. 6

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE F. MCINDOE, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO JAMES W. MCINDOE, OF SAME PLACE, AND ARTHUR E. WHITNEY, OF WINCHESTER, MASSACHUSETTS.

ART OF MAKING INTAGLIO-PRINTING FORMS.

SPECIFICATION forming part of Letters Patent No. 684,294, dated October 8, 1901.

Application filed December 28, 1900. Serial No. 41,366. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGE F. MCINDOE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and
5 useful Improvement in the Art of Making Intaglio-Printing Forms, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the art of making
10 intaglio-printing forms from which may be printed upon paper or other similar material an exact representation of the grain of wood; and it consists in certain novel features and successive steps of manipulation, as fully set
15 forth and described hereinafter and particularly pointed out in the claims hereto appended.

The object of my invention is the production at a comparatively small cost of an
20 intaglio-printing form on which shall be produced a representation of the grain of a selected piece of wood, from which a reproduction of the configuration of the grain of said piece of wood may be printed continuously
25 upon the surface of a roll of paper or other material, thus producing a useful article of manufacture in large quantities at small cost. In carrying out this object I first select a flat
30 piece of wood having a configuration of grain such as I wish to reproduce on paper, subject said wood to the action of steam at a high temperature to open the pores of the wood and soften the gums contained therein, and then subject it to the action of a suitable solvent
35 of said gums—such as turpentine, benzol, acetic acid, or other equivalent material—to dissolve said gums, and then subject the surface of said wood to the action of a brush to remove said gums from the pores of the
40 wood. The wood is then dried, and its two flat sides are made true and parallel to each other. The grain of the wood thus prepared is the design to be reproduced upon a metallic cylinder, from which the printing is to be done
45 by an after operation. A thin coating of any well-known acid-resisting paste-like material capable of being spread by an ink-distributing roller is applied to the surface of the wood, and then the wood thus coated is passed be-
50 neath and in contact with an elastic roller,

preferably such as is used for inking the type on printing-presses, under a light pressure, when the acid-resisting coating will be removed from the wood and transferred to the periphery of said elastic roller. The elastic
55 roller is then placed in contact with the periphery of the metallic cylinder upon which is to be produced the intaglio-printing surface, and said cylinder and roller are revolved in unison, and the acid-resisting material is transferred
60 from said elastic roller to the metallic cylinder. The acid-resisting coating as transferred from the wood to the elastic roller and from said roller to the metallic cylinder has a great number of perforations therein, of various
65 shapes and sizes, caused by cavities in the wood where the gum has been removed and which were not covered by the acid-resisting coating. The metallic cylinder is then subjected to the action of acid to etch the same
70 through said openings in the acid-resisting coating in a well-known manner.

In carrying out this improvement in the art of producing intaglio-printing forms as above outlined I employ certain mechanical devices
75 embodied in a machine as represented in the accompanying drawings, in which—

Figure 1 is an end elevation of a machine adapted for the purpose. Fig. 2 is a side elevation of the central portion of the machine,
80 the end portions of the frames and bed being broken away, drawn to an enlarged scale. Fig. 3 is a sectional elevation of the metallic cylinder upon which is to be formed the printing-surface with its shaft, the reversible
85 guard-plate, and its carrier. Fig. 4 is a section of one of the guard-plate carriers on line A A on Fig. 3. Fig. 5 is a perspective view of a portion of the guard-plate. Fig. 6 is a perspective view of a quarter-section of a log
90 of wood from which the design to be reproduced is obtained, and Fig. 7 represents a symmetrical design to be reproduced upon the printing-cylinder, to be hereinafter referred to.

In the drawings, 1 represents the main side frames, connected together by suitable tie-
95 girths, as 2, and each provided with the upwardly-projecting slotted housings 3, in which are fitted the bearing-boxes 4, in which is 100

mounted the shaft 5 of the metallic cylinder 6, which is to be developed into an intaglio-printing form. Upon one end of the shaft 5 is secured the spur gear-wheel 7, as shown.

5 A flat bed or platen 8 is mounted on supporting and guiding trucks 9 9, mounted on the shafts 10 10, having bearings in the side frames 1, and said bed has formed upon or secured to its under side one or more toothed
10 racks 11, with which gear-wheels 12, carried by the shaft 13, engage, so that by rotating said shaft in opposite directions said bed may be reciprocated in an obvious manner. The shaft 13 has secured upon one end thereof,
15 outside of the frame 1, and in the same plane as the gear-wheel 7 on the shaft 5, the spur gear-wheel 14, as shown in Figs. 1 and 2.

A lever 15 is pivoted to one of the housings 3 at 16 and secured in the desired adjusted
20 position by the pin 17, which passes through a hole in said lever and into either one of two holes 18 in the boss 19, formed upon the outer side of said housing. The lever 15 has set therein a stud 20, upon which is mounted, so
25 as to be revoluble thereon, the pinion 21, to the hub of which is secured the crank-arm 22, provided with the handle 23, by which said pinion may be revolved in either direction at the will of the operator. When the
30 pin 17 is in the upper one of the two holes 18 in the boss 19, the pinion 21 will be in engagement with the teeth of the gear 7, as shown in Fig. 2. By removing the pin 17, moving the lever 15 downward, and inserting
35 said pin in the lower of the said two holes 18 the pinion will be disengaged from the gear 7 and engaged with the gear-wheel 14, when if the crank-arm be rotated the bed 8 will be moved endwise in either direction according
40 to the direction the crank is revolved.

The bed 8 has formed upon or secured to its upper surface a plurality of upwardly-projecting lugs or ribs 24, in which are fitted the set-screws 25, by which the board of wood
45 26 is firmly secured in the desired position on said bed.

The housings 3 are provided with the caps 27, having the upwardly-projecting forked stands 28, in the fork of which is fitted the
50 half-boxes 29, supported upon and adjustable by the stop-screws 30 and in which rests the shaft 31, upon which is mounted the elastic roll 32, which is preferably constructed in the same manner and of the same material as
55 the inking-rolls ordinarily used on printing-presses. The frames 1 have also secured to their upper edges at one side of the housings 3 the forked stands 33, to which are fitted half-boxes 34, supported on and adjustable
60 by the stop-screws 35, substantially the same as in the case of the stand 28.

The shaft 5 has secured thereon by the set-screws 36 the collars 37, provided with the radiating ears 38 and 39, arranged at right
65 angles to each other and provided, respectively, with the guard-plate-adjusting set-screws 50 and 51 and connected by the seg-

mental web 40, having a thickness less than the width of the main body of said collar. The webs 40 have pivoted thereto the forked
70 lower ends of the rectangular blocks 41, the upper ends of which have adjustably set therein the studs 42, in bearings in the upper ends of which is mounted the rock-shaft 43,
75 which carries the guard-plate 44, having a thin knife-edge and extending radially from said shaft to such distance that when it and the studs 42 are in either of the positions shown in Figs. 2 and 3, with the set-screws
80 50 and 51 properly adjusted, the free edge of said blade will be in the vertical plane cutting longitudinally through the axis of the cylinder 6, the object of said set-screws 50
85 and 51 being to render it practical to bring the edge of the guard-plate 44 into exactly the same position relative to a vertical plane cutting longitudinally through the axis of the
90 cylinder whether the blocks 41 and studs 42 are in the position shown in Fig. 2 or in Fig. 3, thereby avoiding the expense of very much finer workmanship, which would be necessary
95 in fitting up the guard-plate if said set-screws were not employed.

The piece of wood 26, which forms the basis of the design to be reproduced upon the print-
100 ing-surface, is rectangular in outline, as shown in Fig. 7, and must have a length from *a* to *b* somewhat greater than the circumference of the metallic cylinder 6 and has cut in its edge near one end a notch or indentation 47,
105 which will appear as a notch in the acid-resisting coating when transferred from the wood to the elastic roller and will serve as a guide-mark for use in connection with the shield or guard plate 44 for locating said
110 elastic roller on the metallic cylinder before revolving the same.

When it is desired to produce on the printing-form a symmetrical design from the grain of wood that can be printed continuously
115 upon a roll of paper, a block of wood having the desired configuration of grain as in Fig. 6 is selected, and from one side thereof four veneers are cut, as indicated by the dotted line *c*, shown on the end of the block 48, and
120 these four veneers are glued to a dressed board of suitable size in the positions shown in Fig. 7, with the ends *c* thereof abutting on the dotted line *c'* in Fig. 7 and the edges *d* thereof abutting on the dotted line *d'* on Fig. 7. The veneers are treated to remove the gums therefrom before being glued to the thicker board.

The operation of my invention when the machine shown in the drawings is used is as
125 follows: The wood basis is prepared as hereinbefore stated and secured in a fixed position on the bed 8 by the set-screws 25 or in any other well-known manner. The upper surface of the wood has spread thereon by
130 any suitable spreading-roller a thin coating of any suitable acid-resisting paste-like material, which adheres only to the upper solid surface of the wood without entering the cavi-

ties when the gum has been removed. The elastic roller, the shaft 31 of which has formed on its ends the handles 49 for convenience in handling it, is placed in position with its shaft resting in the half-boxes 34, which are so adjusted by the stop-screw 35 that the periphery of said roller will be at the proper distance above the bed 8 to bear with the desired pressure upon the surface of the wood 26 when it is fed beneath it, said roller being indicated in said position by the dotted circle *e* in Fig. 2. The pin 17 is removed, the lever 15 is depressed to cause the pinion 21 to engage the gear-wheel 14, and said pin 17 is passed through said lever 15 into the lower of the two holes 18 in the boss 19, when the crank-arm 22, with the pinion 21, is revolved in the direction indicated by the arrow *f* on Fig. 2 to feed said wood basis beneath said elastic roller, which is rotated by frictional contact with said basis until said roller has made a complete rotation and the acid-resisting coating has been transferred from said basis to said elastic roller. The next operation is to transfer said acid-resisting coating from the elastic roller to the metallic cylinder which is to be developed into an intaglio-printing form, which is done by placing said cylinder and roller in contact and rotating them in unison. It has been found, however, that when the comparatively heavy elastic roller is placed above said cylinder and in direct contact therewith before rotary motion is imparted thereto the surface of the elastic cylinder is so disturbed by the pressure of its weight upon the curved surface of the metallic cylinder as to produce a slightly-distorted appearance of the design along the line of contact where the transferring commences when said cylinder and roller are revolved. To obviate this difficulty, I employ the shield or guard plate 44, mounted as hereinbefore described, and before placing the elastic roller in position above the metallic cylinder, as shown in Fig. 2, I slightly move the cylinder 6 about its axis in the direction indicated by the arrow *g* on Fig. 2, so that the guard-plate 44, which moves with the cylinder, will extend slightly beyond the vertical plane which cuts longitudinally through the axis of said cylinder 6. The elastic roller is then removed from the boxes 34 and placed in position above said cylinder 6, with its shaft resting in the half-boxes 29, care being taken that the notch in the acid-resisting coating on said roller produced by the notch 47 in the edge of the wood basis coincides with the edge of said plate 44 to determine the starting-point of the transfer to the cylinder 6, the roller 32 resting for the time being upon the plate 44. The lever 15 being adjusted to its uppermost position, so that the pinion 21 is in engagement with the gear-wheel 7, the crank-arm 22 and said pinion are revolved in the direction indicated by the arrow *h* on Fig. 2, and the cylinder 6 and roller 32 are revolved in unison by frictional contact or

otherwise in the directions indicated by the arrows *i* and *j*, respectively. When the cylinder 6 has made about three-fourths of a revolution, more or less, the blocks 41, carrying the studs 42, are moved from contact with the stop-screws 50 into contact with the stop-screws 51, and the guard-plate 44 is turned into the position shown in Fig. 3 by the operator seizing the ends of the shaft 43 and moving it from the position shown in Fig. 2 to the position shown in Fig. 3 and at the same time partially rotating it so as to move the free edge of the guard-plate 44 upward and then downward through the arc of a circle till it rests upon the cylinder 6 in the position shown in Fig. 3, with its thin free edge in exactly the same position relative to a vertical plane cutting longitudinally through the axis of said cylinder, and as the rotation of the cylinder 6 continues the edge of the guard-plate passes beneath the elastic roller to raise it from the cylinder 6 and terminate the transfer upon the same line where it commenced. The cylinder 6 is then removed from the machine and is rotated in a bath of suitable acid to etch the uncovered portions of its surface to develop it into an intaglio-printing form, which is a reproduction of the grain of the wood basis, from which a sharply-defined representation of the grain of the said basis may be printed upon paper or other similar material with great rapidity and at small cost.

The grains of some woods are so open or deficient in gum that a fairly good reproduction of said grain may be transferred therefrom without subjecting said wood to the action of steam and a solvent of the gums, and the design of the wood-grain may be reproduced in intaglio form upon the printing-form, from which may be printed a fairly good representation of wood for a cheaper class of work, and in such cases I dispense with such treatment of the wood, care being taken, however, to dress said wood to a smooth level surface.

The machine illustrated and described, but not claimed, in this application forms the subject-matter of another application of mine filed September 4, 1901, Serial No. 74,268.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The improvement in the art of producing intaglio-printing forms in imitation of the grain of wood, which consists in the preparation of a wood basis therefor by first subjecting a piece of wood of approximately an even thickness, to the action of steam to open the pores of the wood and soften the gums contained therein; then subjecting the wood to the action of a solvent of said gums to dissolve them; subjecting the surface of said wood to the action of a brush to remove said gums therefrom; then dressing the surface of said wood to bring it to an even thickness and to a generally level surface with cavities therein.

2. The improvement in the art of producing curved intaglio-printing forms for reproducing on paper a representation of the grain of a selected piece of wood which consists in
5 subjecting a piece of wood of approximately an even thickness, to the action of a solvent of the gums contained therein to dissolve them; then subjecting said wood to the action of a brush to remove said gums; dressing
10 the surfaces of said wood to bring it to an even thickness and a generally level surface with cavities therein; applying to the outer level surface of said wood a thin coating of an acid-resisting paste-like material; subject-
15 ing the wood so coated to the action of a revolving elastic cylinder or roller, to take said acid-resisting coating from the wood; then placing said elastic roller in contact with a metallic cylinder and rotating said metallic
20 cylinder and elastic roller in unison to transfer the acid-resisting coating from said elastic roller to said metallic cylinder; and then developing said cylinder into an intaglio-printing form.

25 3. The improvement in the art of producing curved intaglio-printing forms which consists in first saturating a piece of wood with a suitable fluid, as steam, to open the pores

of the wood and soften the gums contained therein; then subject said wood to the action
30 of a solvent of said gums to dissolve them; subjecting the surface of said wood to the action of a brush to remove said gums; dressing the surfaces of said wood to bring it to an
35 even thickness and to a generally level surface with cavities therein; applying to said level surface of wood a thin coating of an acid-resisting material; passing said coated wood beneath a rotating elastic roller to take
40 the acid-resisting coating from the wood; then transferring said acid-resisting coating from said elastic roller to a metallic cylinder by bringing said roller and cylinder in contact and rotating them in unison; and then
45 subjecting said cylinder to the action of acid to etch the uncovered portions of said cylinder to develop it into an intaglio-printing form.

In testimony whereof I have signed my name to this specification, in the presence of
50 two subscribing witnesses, on this 19th day of December, A. D. 1900.

GEORGE F. MCINDOE.

Witnesses:

N. C. LOMBARD,

J. HOUSTEN STEVENSON.