2 Sheets—Sheet 1.

# E. JEBSEN.

## Machines for making Inlaid Work.

No. 196,966. Patented Nov. 6, 1877.

Fig: 1.

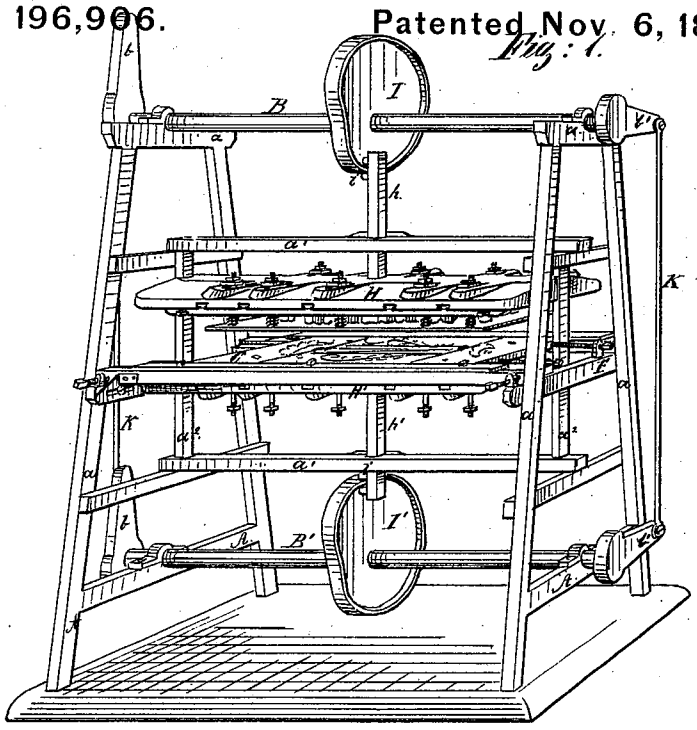
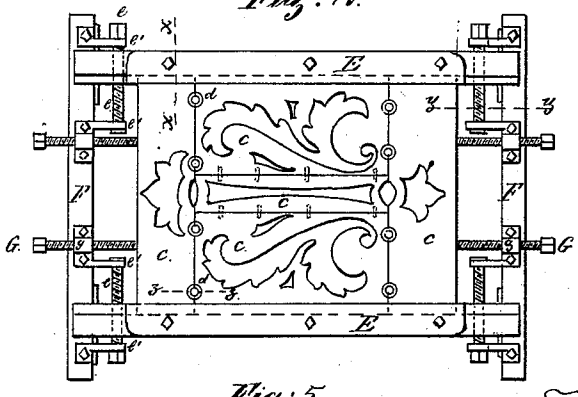


Fig: 2.



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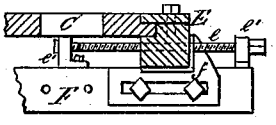

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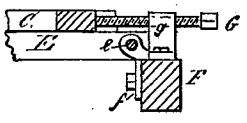
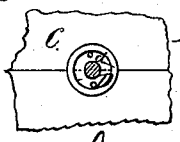


Fig: 5.

Fig: 6.



Witnesses

S. N. Dales

G. K. Dyer

By

Ernst Jebsen

Geo. W. Dyer & Co.

Inventor

Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

# E. JEBSEN.

## Machines for making Inlaid Work.

No. 196,906. Patented Nov. 6, 1877.

Fig: 7.

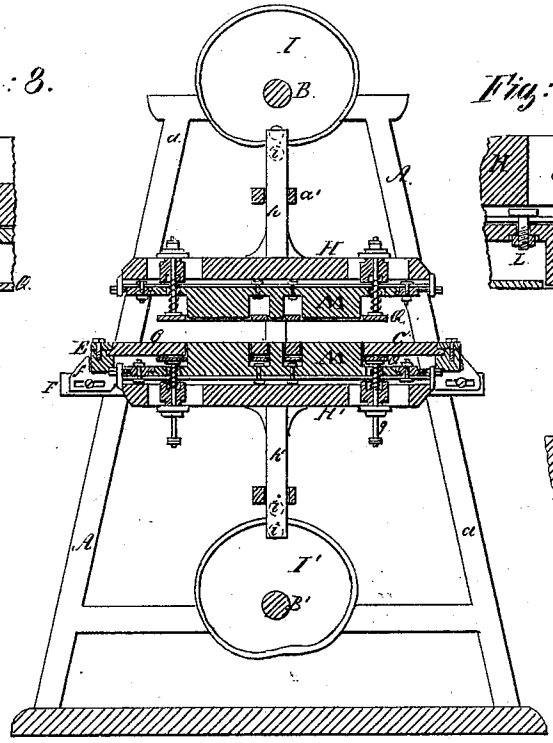



Fig: 8.

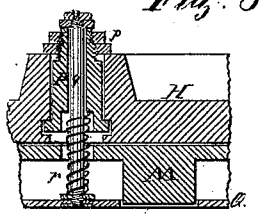



Fig: 9.

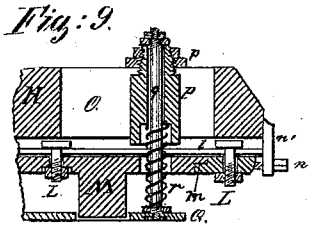



Fig: 10.

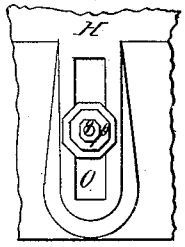



Fig: 11.

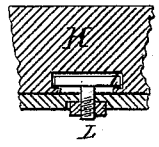
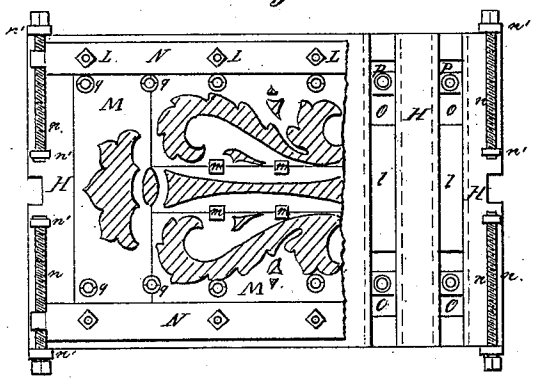



Fig: 12.




Witnesses
L. F. Duly
G. K. Dyer

By

Ernst Jebsen
Inventor

Geo. W. Dyer & Co
Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

ERNST JEBSEN, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN MACHINES FOR MAKING INLAID WORK.

Specification forming part of Letters Patent No. **196,906**, dated November 6, 1877; application filed July 2, 1877.

*To all whom it may concern:*

Be it known that I, ERNST JEBSEN, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Machine for Making Inlaid Work, as fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the machine. Fig. 2 is a plan of the die-plate. Fig. 3 is a section on line *x x* in Fig. 2. Fig. 4 is a section on line *y y* in Fig. 2. Fig. 5 is a section on line *z z* in Fig. 2, and Fig. 6 is a plan of the device for connecting the several sections of the die-plate. Fig. 7 is a cross-section of the whole machine. Figs. 8, 9, 10, and 11 are detached and sectional views of the punch-plates and their adjusting devices; and Fig. 12 is a sectional plan of one of the punch-heads complete.

My invention relates to a machine by which veneers of different colors or shades are punched and the blanks thus obtained are transplaced from one veneer to another, all of which is performed at one operation.

My invention consists of a stationary die-plate composed of several sections, so as to conform with the design or configuration to be inlaid, and of two sets of punches shaped to correspond with the die-plate, and arranged one below and the other above said die-plate, having an alternate reciprocating motion, and operating in such a manner that the blank punched out of the veneer, inserted upon the top of the die-plate, is transplaced into the aperture already cut through the veneer, inserted against the bottom of said die-plate, and vice versa, so that a single motion of the punches in either direction will complete a sheet or plate of inlaid work.

A is the frame of the machine, consisting of the two end sections *a*, of the longitudinal connecting-bars $a^1$, and of the guide-bars $a^2$ for the punch-heads. The end sections *a* have journal-boxes for the driving-shafts B and B′.

C is the die-plate, which is rigidly secured to and between the two end frames *a* horizontally, and in a position half-way between the two driving-shafts B and B′.

The die-plate C is composed of several sections, *c c*, in conformity with the configuration to be produced, the shapes to be punched being cut open in said sectional plates. These sections are joined to each other by dowel-pins and by screw-bolts D, having nuts *d*, the heads of said bolts D, as well as the nuts, being circular, with a bead-shaped swell rim seated into conforming sockets sunk half into each of the joining sections, as shown in Figs. 5 and 6.

The side edges of said die-plate rest in two grooved bars, E, which are adjustably secured upon two bars, F, bolted horizontally to the inside of the end frames *a*.

The adjustment of the bars E transversely is accomplished by screws *e*, one at each end of each bar E, each pivoted between two brackets, *e′*, of bars F, and passed through a screw-threaded hole in bar E.

Angular brackets, *f*, which are bolted to the ends of bars E, and which have a slotted hole for a bolt tapped into the ends of bar F, are intended for additionally securing the bars together after adjustment.

Set-screws G, two for each end, move in tapped lugs, *g*, which are bolted to the top of bars F, and are intended for adjusting and holding the die-plate longitudinally.

The punch-heads H and H′ are exactly alike, except that they are placed in reversed positions. Said heads are fitted to the guide-bars $a^2$ of the frame, and have central stems *h* and *h′* vertically projecting from the heads, which, for additional guides, slide in holes through bars $a^2$.

Two rollers, *i*, are pivoted to one side of the extreme end of each of said stems *h h′*, between which a sidewise-projecting endless flange of cams I I′ moves, being so shaped that they will give one intermittent reciprocating motion to the punch-heads during each revolution.

Said cams I and I′ are secured upon the central portion of the shafts B and B′, which have cranks *b* and *b′* on their ends, the two cranks on each shaft being placed perpendicular to each other.

The crank-pins of the shafts B and B′ are

coupled by vertical connecting-rods K, thereby transmitting a uniform rotary motion from one shaft to the other.

The cams I and I′ are placed upon the shafts B and B′ in such relation to each other that the punch-heads will alternately come into contact with the die-plate.

The punch-heads H and H′ are each provided with a series of transverse T-shaped grooves, *l*, into which the heads of the bolts L are inserted for securing the punch-sections thereto.

The punches M project from plates which are made in sections similar to the die-plate, and are joined with each other by small feathers *m*, and held in place by two grooved side bars, N, grasping the edges of the punch-plate, which are adjusted transversely each by two screws, *n*, pivoted between lugs *n′*, projecting from the punch-head H, and passed through screw-threaded holes in the ends of bars N.

The bolts L are not tightened until the punches are properly adjusted so as to match with the die-plate C.

Each of the punch-heads H and H′ is also provided with two rows of oblong slots, O, being centrally in line with the T-shaped grooves *l*. Tubes P are inserted into these slots, which have bottom flanges shouldering with the T-shaped grooves, and are secured by nuts *p* after being transversely adjusted to their required position.

A plate, Q, is attached to each set of punches, having openings the same as the die-plate C, so as to allow the punches to pass through. A series of studs, *q*, are secured to its edges, which are passed through the tubes P, and are locked therein by nuts on their ends. A spiral spring, *r*, surrounds each of these studs *q*, the ends of which bear against the tube P and plate Q, so as to yield while the punches enter the dies, and to force the plates Q toward the face of the punches on their return stroke.

The *modus operandi* of my above-described machine is as follows: If inlaid work of two different shades or color of wood is to be made—say, of mahogany and white wood—the veneers are all first cut to the right size, after which I place a mahogany veneer upon the die-plate C, which will be cut by the upper punches, and the blanks thus cut I remove. Now, by placing a white-wood veneer below the die-plate, the lower punches will cut out the blanks, will push the same through the die-plate, and will transplant them into the apertures of the mahogany veneer above, which, now being finished, is removed and replaced by another mahogany veneer to be punched, and the blanks to be carried through the dies again and pressed into the apertures of the white-wood veneer, which is now removed and replaced, so that continuously each revolution of the machine will complete two inlaid veneers of the same design in reversed colors.

The plates Q are to push the veneers off the punches on their back stroke and to hold the punched-out veneer while the blanks are pressed into their apertures.

If the springs *r* should not give sufficient resistance to the plates Q for holding the veneer solid until the inlaying is accomplished, which may be the case with some kinds of material to be used, said plates Q may be given a positive reciprocating motion by means of a series of separate cams secured upon the ends of shafts B and B′.

The motion imparted to the punches M by the cams I and I′ is to be such that the upper punches will enter the die-plate until their faces are flush with the lower face of the die-plate, when the lower punches will move up until the veneer is grasped between the faces of the two sets of punches, and now, while the upper punches make their return movement, the lower punches will follow them so closely that the punched blank is never released until transplaced into the aperture of the upper veneer, which is pressed and held against the top face of the die-plate by plate Q, and vice versa.

The plates Q should always travel a little in advance of the punches toward the veneer to be cut, so as to hold the same solid while the punches go through, and should not release the veneer until it is inlaid.

For more than two colors or shades of material the veneers will have to pass through the same machine again after the dies and punches have been changed, or the machine may be constructed for two or more sets of dies and punches, through which the veneers are passed successively. After the veneers are thus inlaid, they may be fixed on paper, which is cleaned off again after they are applied to a piece of furniture.

Heretofore veneers for inlaying were mostly sawed out, by which operation the blanks to be exchanged from one to another were not of the required size to make an exact fit with the apertures, the thickness of the saw-cut being lost, to be filled by glue or putty, while by punching an accurate job is obtained, besides the speed with which inlaying is accomplished.

My machine will be useful for making marquetry, buhl-work, or tarsia for ornamentations with choice woods, metal, ivory, leather, mother-of-pearl, &c.

What I claim as my invention is—

1. In a machine for punching blanks for inlaid work, the combination of reciprocating dies with stationary intermediate die-plate, whereby the blank is cut and transplaced in one operation, substantially as described.

2. In a machine for punching blanks for inlaid work, the combination of reciprocating dies and stationary intermediate die-plate with spring-plates secured to and operating in advance of the said dies, substantially as and for the purposes set forth.

3. The die-plate C, composed of sections *c*

placed between bars E, and adjustably secured upon bars F by screws *e* and G, and angular plates *f*, substantially as described and shown.

4. The punch-heads H H′, having stems *h* *h′* and T-shaped grooves *l*, for adjustably securing the sectional punches M by means of bars N, bolts L, and set-screws *n*, substantially in the manner described and shown.

5. The stationary die-plate C, the reciprocating plates Q, and punches M, driven by shafts B and B′, and cams I and I′, all arranged within a frame, A, substantially in the manner described, and for the purpose specified.

ERNST JEBSEN.

Witnesses:
WM. H. LOTZ,
C. F. COLLOT.