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MACHINE FOR MAKING RAILROAD CHAIRS.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING WROUGHT-IRON RAILROAD-CHAIRS.

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To all whom it may concern:

Be it known that I, WILLIAM VAN ANDEN, of Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful Machine for Making Railroad-Chairs of Malleable Iron by Power Machinery; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of my invention, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1, is a front elevation of the machine, the upper or divided die being in the act of descending upon the heated bar of iron to stamp or cut the chair blank preparatory to bending the lips. Fig. 2, is a vertical section on the line *x*, *x*, of Fig. 1, the several parts being in the same position, except the gearing and shafts, which are shown externally. Fig. 3, is a perspective view of the upper or divided die, closed for stamping the blank from the bar. Fig. 4, is perspective view of the bottom die, and jointed cutting and bending shears. Fig. 5, is a vertical section through the center of the upper and lower die, and cutting and bending shears, the latter being in the act of bending the lips over the die F″. Fig. 6, is a face view of the upper die when closed. Fig. 7, is a face view of the lower or stationary die. Fig. 8, is a side view of one of the grooved blocks, in which the pin of the vibrating jaw traverses for opening and closing the jaw. Fig. 9, is a side view of the upper die, showing the vibrating portion of the jaw, with its discharging hooks in an inclined position, having discharged the finished chair, which is represented as falling from the hook. Fig. 10, is a view of the upper die as opened, showing the inner faces parallel to each other. Fig. 11, shows a chair blank before the lips are cut, drawn on an enlarged scale, the dotted lines showing where the lips are to be cut. Fig. 12, shows a plan or top view of the chair, after the lips are bent and the chair is completed. Fig. 13, is an edge view of ditto. Fig. 14, is a perspective view of one of the cutting and bending shears.

The object of my invention is to provide an apparatus, or combination of mechanism, that shall at one operation, cut and shape, out of a plain bar of wrought iron a complete railroad chair, of the form and character hereinafter explained, as for instance, such as is represented in Figs. 12 and 13, consisting of a square plate notched at two of its opposite edges for the reception of the spikes which fasten it to the sleeper; and having the middle portion of its intermediate edges bent upward and inward, so as to form two curved lips, as seen in Fig. 13, for the reception, and retention, of the iron rail of the track.

I so construct my machine, as to cut off from a bar of suitable width and thickness the plate which is formed into a chair by first, simultaneously with its separation from the bar, punching the notches or holes for the spikes, and then holding the plate fast by the same die which cuts and punches it, while a pair of jaws or jointed cutters and benders approach from below, and complete the chair by the formation or bending of the lips around a portion of the upper die, from which, the chair, thus formed is expelled by a pair of hooks or clearers, attached to the portion of the double die that opens outwardly, as the said double die ascends, it being impossible to discharge the chair when finished from the upper die without making said die in two parts, joined at their upper ends in the manner of a pair of jaws, which is one of the distinguishing features of my invention.

In the annexed drawings, like letters in the several figures have reference to the same parts.

A is a stout frame of iron cast in a single piece. In this frame are journaled in a horizontal position two shafts *n* *l*, whose axes are parallel, the upper one *n* of which, carries the driving wheel *t*, and also a spur wheel *v* meshing into a similar spur wheel *w*, upon the lower shaft *l*, so that these two shafts rotate simultaneously and at equal speed. Each shaft *n*, *l*, carries at its fore end a pin *n′*, *l′* placed eccentrically for operating the upper or jointed sliding die and the jointed cutters and benders V successively. The upper or double die for cutting the chair blank, consists of the following parts. There are two jaws F, *f*, hinged together at their upper ends at J, of these the jaw F, has lateral projections 3 for its retention within ways or guides B, G, affixed to the frame. Thus the jaw F, is capable only of vertical motion. The jaw *f*, on the other hand, in addition to the vertical slid-

ing motion which it has in common with the jaw F, swings out and in upon the hinge J, being drawn away from the jaw F at every ascent of the double die and again closed and held fast against it at every descent of the said die, by means of the pin D, traversing the partially vertical and partially deflected grooves H in the guide blocks G. The vertical sliding motion of the double die F *f* is derived from the eccentric pin *n'* rotating in the slot *j* in the jaw F. This slot *j* has so much of its lower surface as answers to one third the revolution of the pin, concentric with its sweep, so that the upper die during this period is firmly held down fast by the pin *n'* upon the chair blank on the lower die.

To the outside of the lower extremity of the vibrating jaw *f*, is attached a shears blade I, which, at the descent of the upper or double die F, *f*, cuts off from the bar the strip or plate required for a chair—the stop or shoulder 4 at the back of the lower die determining the length of the piece to be cut or detached.

The faces of the two jaws F, *f*, when held together present the figure of the letter H the face of the die on the jaw F, furnishing one of the stems F' and the cross piece F'' and the face of the jaw *f*, the other stem f^2.

Projecting downward from the outer edge of each stem, are four small studs *m*, *m*, *m'*, *m'*, which punch out of opposite edges of the chair plate, as many pieces to form notches *p*, for the reception of the hook headed spikes by which the chair is to be affixed to the sleeper.

The openings 5, 6, in the face of the double die F *f* and the corresponding recesses 11, 12, immediately above them in the jaw F are to permit the rise of the cutting and bending shears during the formation of the lips around the cross piece or former F'' of the upper or double die by the action of the said cutting and bending shears described. Hooks R, R, are so attached to the inner side of the jaw *f* as to catch the lips of the chair and drag it off the cross piece F'' as the outer jaw *f* retreats from the inner jaw F in the ascent of the upper die, said retreating motion being produced by the aforesaid pins D striking against the inclined sides of the grooves H. These hooks enter recesses in the inner jaw F when the outer jaw *f* is closed, and when the lips of the chair are bent over upon the cross piece F'' the lips of the chair will come directly in front of the discharging hooks R, R.

The lower die E, is cast, or otherwise firmly attached to the frame and its face is an exact counterpart of that of the upper or double die, except that notches *p'* are opposed to the studs or punches *m*, *m'*, of the upper die, and either forms part of the casting, or the latter is faced with a steel die the shape of the chair blank. *h*, *h*, is a pair of guides affixed to the frame between which a block *w* is guided to which a vertical play or alternate movement is imparted by the rotating of the eccentric pin *l'* working in a slot *i* in the block *w* similar to that in the upper die. To shoulders *x*, *x*, upon this sliding block is hinged a pair of arms V, V, which I call the cutting and bending shears, as they are designed to cut the lips of the chair and bend them. These are of the following construction. The upper inner edges 7 of these arms, are of a hooked and beveled form as shown at 7, 8, Fig. 8. The edges 8, of the upper beveled face of the hook are faced with steel and sharpened so that in ascending they act as shears and clip or sever the lips from the straight sides of the plate or chair blank in its heated state, and at the same time bend them upward so as to stand erect on either side of the cross piece F'' of the upper die. The hooks then suddenly close upon the lips and bend them over onto the cross piece F'', and thus completes the chair. This latter motion is effected by means of beveled studs, or triangular protuberances *b*, formed on the outer edges of the cutting and bending shears caused to strike against angular projections, *a*, jointed, or secured, to the cheeks *c*, *c*, in such a way as to turn and rest against the cheeks *c*, *c*, during the upward movement of the arms, and to turn downward as the shears descend to let them pass; and in case of injury or breakage to be susceptible of being easily replaced. Channels *e*, *e*, are made in the sides of the lower die E and recesses (5, 6,) in the double die to allow the cutting and bending shears to have room to play or move freely during the operation of cutting and bending the chair blank. A helical spring *d* is placed between the cutting and bending shears to throw them from each other after the bending operation is completed. This spring is placed in a horizontal transverse recess in the die box E, having its ends bearing against the inner edges of the cutting and bending shears which rub against the ends of the spring, as the shears move upward and downward during the operation of the machine. There is a projection f^4, on the inner face of the jaw *f*, that enters a corresponding cavity or depression 15 in the jaw F when the jaws are closed, for the purpose of relieving the joint J, of much strain during the operation of cutting and punching—said projection having a bearing against the jaw F. The dies may be made of chilled iron in place of steel.

Holes may be punched within the edge of the base of the chair instead of nicking, by placing the punches in the lower die and as the upper die rises lifts the chair from

the punches; the upper die then opens and relieves the chair as before described.

The pair of shears 17 represented at the back of the machine are of the ordinary construction and are designed to make the bar of iron square or at right angles to the parallel sides, the lower one being stationary and the upper one movable, the movement being produced by an eccentric pin on the rear end of the upper shaft *n*.

The operation of the machine is as follows: The machine being put in motion by steam, water, or any adequate power, applied to the driving wheel (*t*) by means of a driving pinion (P). Let us suppose the pin *n'* to be in the position and moving in the direction indicated by the dotted lines and arrows Fig. 1, so that the upper die is nearly in its highest position, and is commencing to descend and the cutting and bending shears are down and at rest. Now let a bar of malleable iron of the width and thickness required for the chair plate, previously heated to redness, be slipped onto the lower die E the shear I blade of the descending double die coming in contact with the bar and the lower die forming a part of the shear, will detach the square plate required for the chair; while at the same time the studs or projections *m*, *m*, *m'*, *m'*, will punch out portions of the plate, and form the spike holes or notches *p*, which being done, the die remains firmly pressing upon the plate while the cutting and bending shears V, ascending and pressing upward from below, cut portions of the plate from the sides to form the two lips and bend them over the cross piece F'', of the upper or double die, and the eccentric pin *l'* coming in contact with the projection (9) at the top of the slot *i* increases the motion of the arms V just as they are beginning to bend the lips inward toward each other. The projections (*b*, *b*,) on the shears V, V, having passed the jointed projections (*a*, *a*,) on the cheeks *c*, *c*, the shears V, V, are instantly thrown open by the helical spring (*d*)—the upper die then ascends and the jaw *f*, opens and on the arrival of the shoulders D, at the inclined part of groove H, the clearers R, R, discharge the chair as before explained. The cutting and bending shears descend simultaneously with the ascent of the double die, and when the shears are below the level of the upper die, the chair is ready to be discharged.

It will of course be understood that the alternate motions and pauses in the double die and cutting and bending shears are produced by the eccentric pins on the ends of the two parallel shafts revolving simultaneously at equal speed, and traversing the heart shaped openings in the double die and block W; the inward motion of the bending shears being produced by the projections *b*, on the back of the shears V, striking against the jointed cams or cogs *a*, *a*, hung to the cheeks *c*, *c*, during the ascent of the shears.

Having thus described the construction and operation of my machine for making wrought iron chairs for securing the rails of rail-roads by power machinery, what I claim as my invention, and desire to secure by Letters Patent is,

1. The double or parting die F *f* substantially as described, parting by means of a joint at the top, or otherwise, for the purpose above set forth.

2. The vertical shears and benders V, V, working in connection with the double die F, *f*, in such manner as to cut and form the lips of a chair at one operation, substantially as described.

3. I also claim the combination of dies, shears, punches, benders, and clearers, arranged and operated in the manner and for the purpose above set forth, or any similar arrangement wherein the combination is essentially the same.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

WILLIAM VAN ANDEN.

Witnesses:
WM. P. ELLINS,
A. E. H. JOHNSON.

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