

No. 885,237.

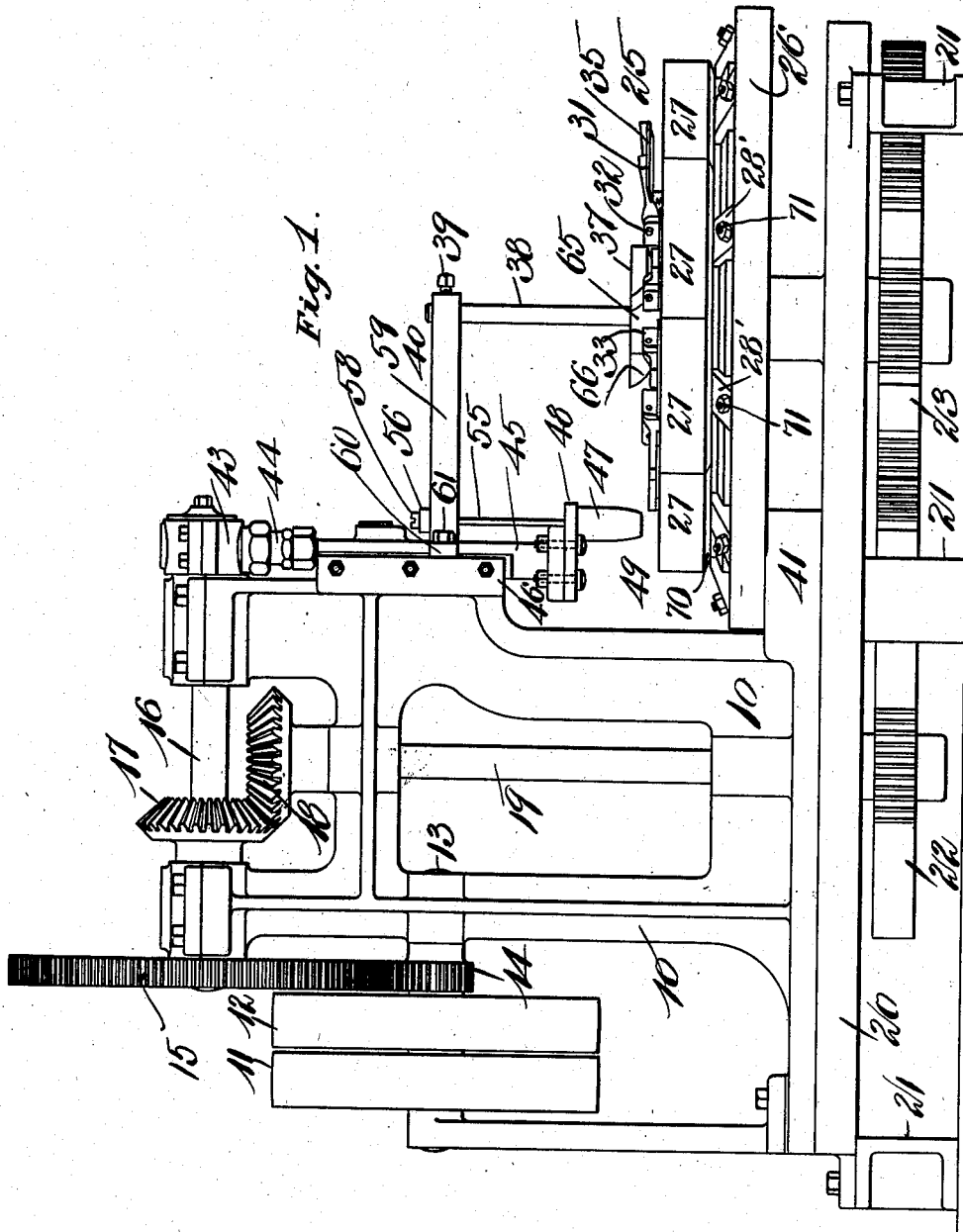
D. D. FROTHINGHAM.

PATENTED APR. 21, 1908.

MACHINE FOR CUTTING AND PUNCHING SHEET MATERIAL.

APPLICATION FILED FEB. 16, 1907.

4 SHEETS—SHEET 1.



Witnesses:
H. A. Hall
Walter L. Rice

Inventor:
Daniel D. Frothingham
By his attorney, Charles S. Frothingham

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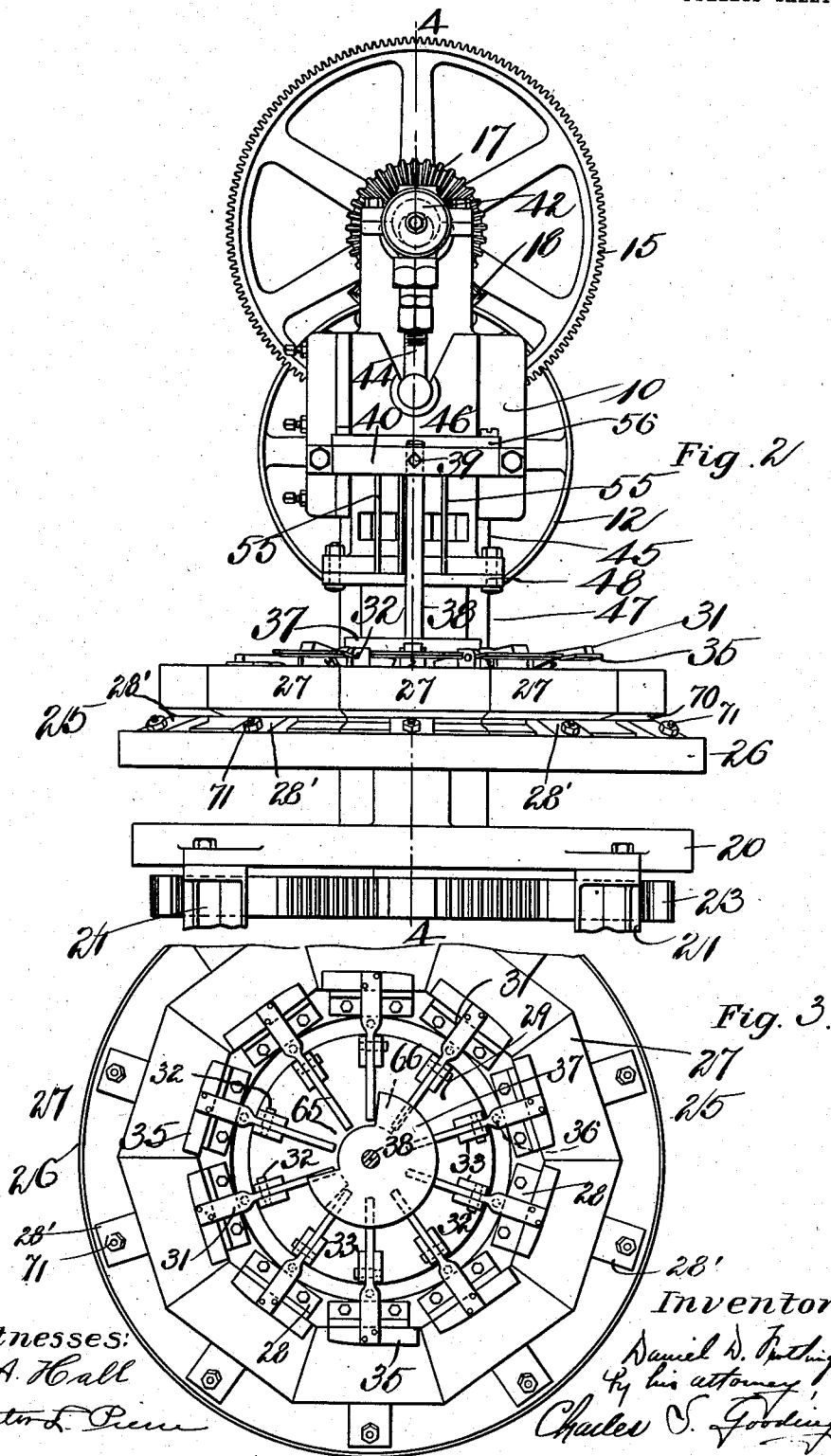
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4 SHEETS—SHEET 2.



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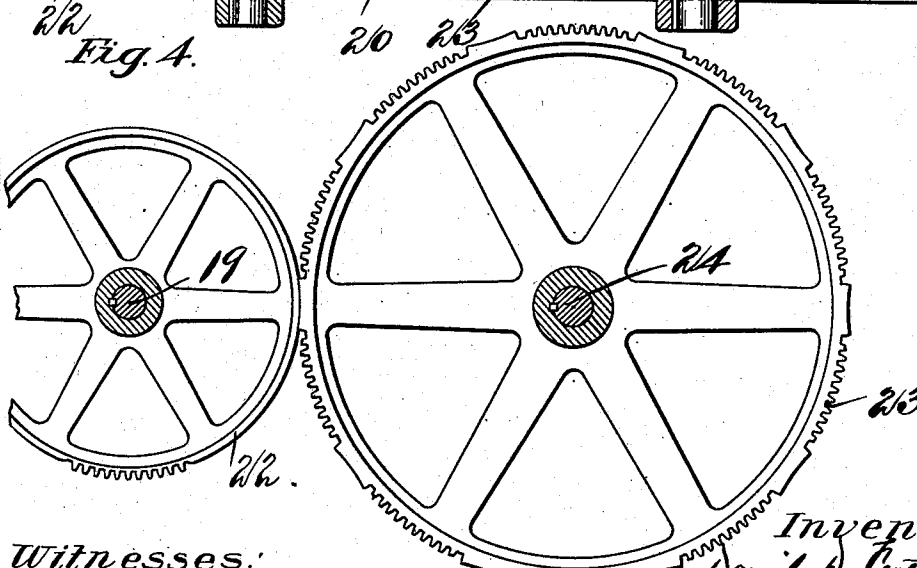
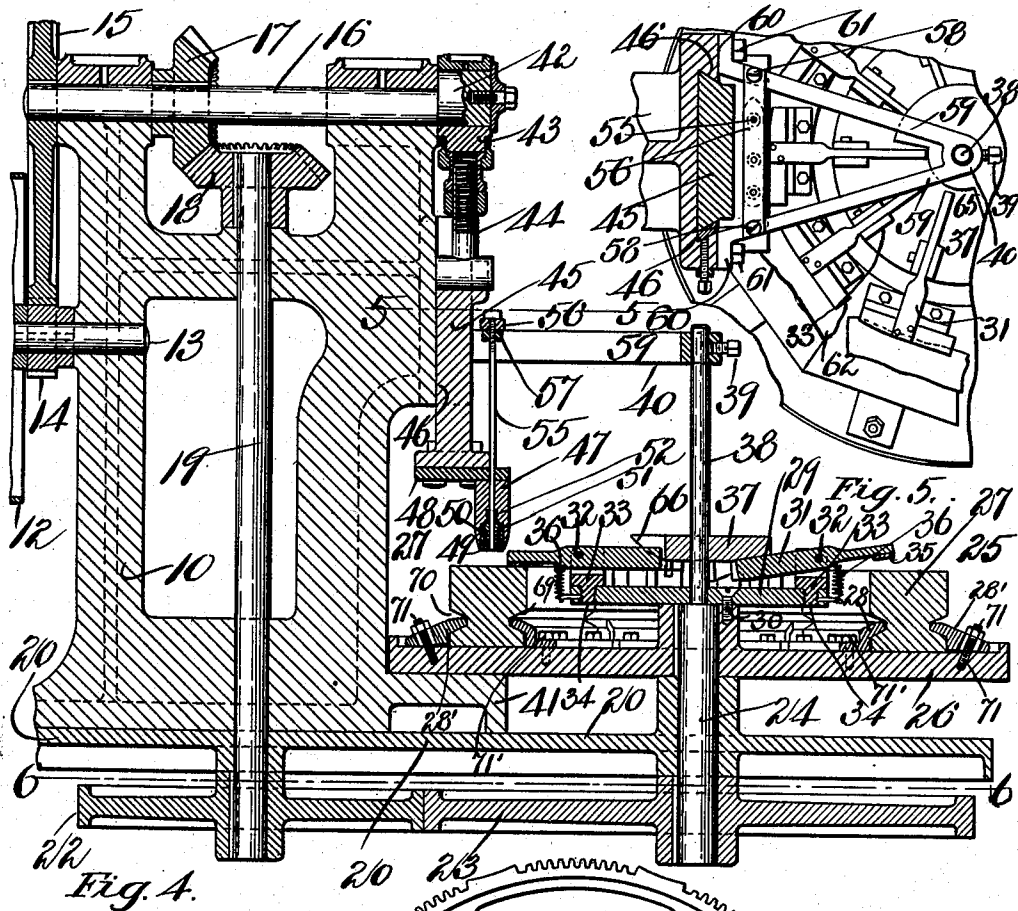
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4 SHEETS—SHEET 3.



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Fig. 6.

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4 SHEETS—SHEET 4.

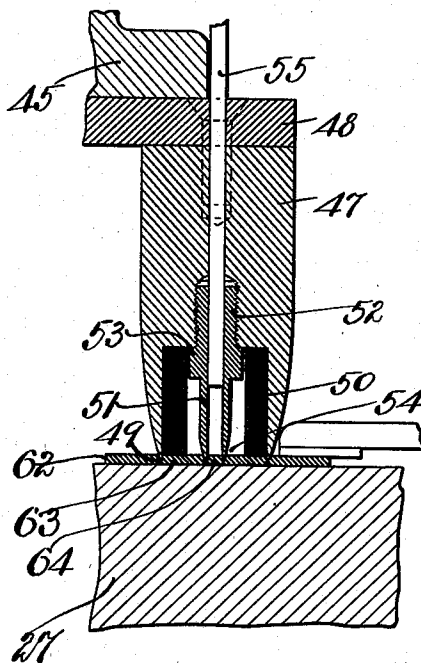


Fig. 7.

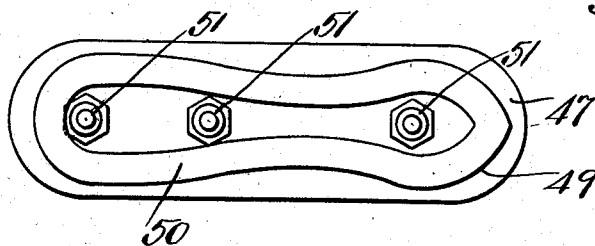


Fig. 8.

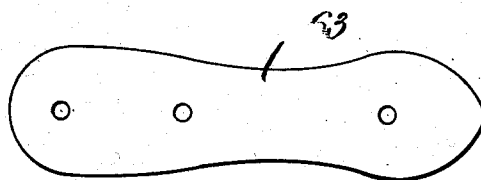


Fig. 9.

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UNITED STATES PATENT OFFICE.

DANIEL D. FROTHINGHAM, OF SALEM, MASSACHUSETTS.

MACHINE FOR CUTTING AND PUNCHING SHEET MATERIAL.

No. 885,237.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed February 16, 1907. Serial No. 357,617.

To all whom it may concern:

Be it known that I, DANIEL D. FROTHINGHAM, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Machines for Cutting and Punching Sheet Material, of which the following is a specification.

This invention relates to a machine for "dinking" or cutting out articles of sheet material, such as leather, from pieces or scraps of such material.

The object of the invention is to provide a machine in which pieces or scraps of leather or the like may be placed in a machine by the operator and pieces of such sheet material cut from said scraps and also punched, if desired, without danger of injury to the operator of the machine.

The object of the invention is further to provide a machine of the character set forth in which the operator places the scrap of leather upon a cutting table and the machine then clamps said piece of scrap to the cutting table, carries it to the die, or to the die and punch, as the case may be, where the piece of material of the desired shape is cut or cut and punched and subsequently fed away from the die and unclamped or released from the clamping mechanism, when it is removed from the cutting table by the operator, and placed in a convenient receptacle.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a side elevation of my improved machine for cutting and punching sheet material. Fig. 2 is a front elevation of the same, partly broken away to save space. Fig. 3 is a plan view of the cutting table and work-clamping mechanism, partly broken away to save space, with the stationary cam-shaft shown in section. Fig. 4 is a sectional elevation taken on line 4—4 of Fig. 2, the same being broken away. Fig. 5 is a plan view, partly in section, taken on line 5—5 of Fig. 4 and broken away to save space. Fig. 6 is a plan view, partly in section, taken on line 6—6 of Fig. 4, the same being broken away to save space. Fig. 7 is an enlarged section on line 4—4 of Fig. 2 of the punch and die, illustrating the same in the act of punching a piece of leather, a portion of the cutting table being

shown in connection therewith. Fig. 8 is an underneath plan of a die with a plurality of punches connected thereto. Fig. 9 is a plan view of a piece of leather cut and punched with the die illustrated in Fig. 8.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is the frame of the machine, 11 and 12 the driving pulleys, the pulley 11 being a loose pulley and the pulley 12 rigidly fastened to the shaft 13, journaled to rotate in bearings in said frame 10. A pinion gear 14 is fastened to the shaft 13 and meshes into a gear 15 fast to the shaft 16, also journaled to rotate in bearings in the frame 10. The shaft 16 has a bevel gear 17 fast thereto which meshes into a bevel gear 18 fast to a vertical shaft 19 journaled to rotate in bearings in the frame 10 and in the base 20 to which said frame 10 is fastened.

The base 20 is supported upon legs or brackets 21 and beneath said base are two intermittent gears 22 and 23. The intermittent gear 22 is fastened to the shaft 19 and the intermittent gear 23 is fastened to a shaft 24 journaled to rotate in a bearing in the base 20. The shaft 24 has a cutting table 25 fast to the upper end thereof and consisting of a disk 26 keyed to the shaft 24 and having a plurality of concentrically arranged wooden cutting blocks 27 fastened by clamps 28, 28' to the upper face of said disk.

A plate 29 is fastened to the disk 26 by screws 30. Said plate is concentric with the disk 26 and has pivoted thereon a plurality of clamp-levers 31. Each of the clamp-levers 31 is pivoted at 32 to a forked bracket 33 which has a stem 34 projecting downwardly therefrom and having screw-threaded engagement with the plate 29. Upon the under side of the outer free end of the lever is preferably provided a flat strip 35. A spring 36 holds the outer end of the lever normally in contact with the upper face of the block 27. The inner end of the lever projects beneath a stationary cam-plate 37 which is fastened to a stationary shaft 38. The upper end of the shaft 38 is fastened by a set-screw 39 to a bracket 40, which bracket is fastened to the frame 10. The lower end of the shaft 38 projects downwardly through the plate 29 and is concentric with the shaft 24. The disk 26 is supported upon its inner side, or the side adjacent to the frame, by a projection 41 upon said frame.

The shaft 16 has an eccentric 42 fast to the forward end thereof surrounded by an eccentric strap 43 which is connected by an eccentric rod 44 to a slide 45 adapted to slide in ways 46, 46 in the frame 10. A die 47 is fastened to the lower end of said slide by means of a plate 48. The die 47 is hollow at its lower end, thus providing cutting edges 49, and in the interior of said die is provided a resilient cushion 50, preferably formed of rubber. A plurality of hollow punches 51, 51 are detachably fastened to the die 47 by means of screw-threaded stems 52 thereon. A flange 53 upon the punch 51 limits the extent to which said punch can be screwed into the die 47, and also assists in supporting the same when it is cutting the leather.

It will be seen that the punch 51 can be removed from the die 47 by unscrewing the stem 52 from said die and that the space or opening 54 extending through said elastic cushion is of sufficient size to enable the punch and the flange 53 to be withdrawn from the die without removing said cushion. An ejector 55 is provided for each of the punches 51, said ejector consisting of a rod which extends upwardly through the die 47 and has screw-threaded engagement with a cross-bar 56, said cross-bar being fastened at the opposite ends thereof to the legs of the bracket 40. A set-nut 57 locks the ejector 55 in position after the same has been screwed to the desired height in the cross-bar 56. When different size punches are used, different size ejectors may also be employed, or where the punches are placed at different distances apart, the ejectors are placed in alinement therewith, and in case of such variation of punches and ejectors the cross-bar 56 is changed to correspond therewith, the same being readily detached from the bracket 40 by unscrewing the screws 58, 58 (Fig. 5). It will be seen by reference to Fig. 5 that the bracket 40 has two legs 59, 59, each provided with a foot 60 which is fastened to the frame 10 by means of cap screws 61, 61.

It is very desirable in a machine of this class to have the cutting blocks 27 constructed to be readily attached to or detached from the table 26, and it is one of the objects of this invention to so construct said blocks and to so attach them to the table that they may be readily attached to or detached from said table when it is desired to renew or replace said blocks, and in order to secure this end grooves 69 and 70 are formed in the inner and outer faces, respectively, of said blocks. The bottoms of said grooves are inclined at an angle to the top of the table 26, as illustrated in Fig. 4, and the bottom faces of the clamp-plates, where they bear against the bottoms of said grooves, are also inclined at an angle to the top of the table. Furthermore, the bolts 71 which secure the outer

clamp-plates 28' to the table are inclined at an angle to the top of said table. The ends of the blocks 27, 27 abut against each other and are cut at an angle so that said ends will lie in planes which radiate from the center of said cutting table, thus preventing said blocks from moving in the direction of their length.

In removing the blocks from the cutting table the nuts upon the bolts 71 are removed and the clamp-plates 28' can then be immediately removed from the cutting table, and the blocks can then be taken off and renewed or replaced, as may be desired. When the reverse operation is performed, that is, when the blocks are to be fastened to the table 26, said blocks are placed upon the table, as illustrated in Fig. 3, with their ends abutting against each other and with the clamp-plates 28 projecting into the grooves 69. The clamp-plates 28' projecting into the grooves 70 are then tightened by means of the bolts 71 and their respective nuts, and as said clamp-plates stand at an angle to the upper surface of the table and said bolts are located at an angle to said upper surface, when the nuts upon the bolts 71 are tightened, the clamp-plates 28' force the blocks 27 inwardly toward the center of the table and against the clamp-plates 28 and also force the ends of said blocks against each other, thus firmly locking the blocks to the table, the clamps 28 being secured to the table by screws 71'. The whole operation of removing a block and inserting a new one is very much shortened by the means described.

Having thus specifically described my improved machine for "dinking" or cutting pieces of leather from scraps of the same, I will now proceed to describe the general operation of the same. The operator stands or is seated in front of the machine, or at the right of the same, as viewed in Fig. 1. At this point the clamp levers 31 are raised, as seen in Figs. 1 and 4, so that the operator can place portions of scrap material beneath the outer ends of the levers. Assuming the machine to be in operation, the belt being on the tight pulley 12, the pinion 14 rotates the gear 15, thus rotating the shaft 16 and the bevel gears 17 and 18 impart a rotary motion to the shaft 19 which rotates the intermittent pinion gear 22, thus imparting an intermittent rotary motion to the gear 23, to the shaft 24, and to the cutting table 25, as well as to the plate 29 and the levers 31 pivoted thereon. Said shaft 16 also imparts a vertical reciprocatory motion to the slide 45 through the eccentric 42, eccentric straps 43 and connecting rod 44, thus moving the die 47 downwardly and upwardly, together with the punches 51, 51 attached to said die. As the cutting table is, therefore, fed step by step in the direction of the arrow, (Fig. 3), the pieces of scrap 62 are brought one by one

beneath the die 47 and the punches 51. When the die is driven downwardly with said punches, they pass through the leather and cut the same against the upper face of the segment block 27, as shown in Fig. 7. The resilient cushion 50 yields at this time and the leather piece 63, which is cut from the scrap 62, passes upwardly into the hollow die 47, a portion 64 of said scrap 62 passing upwardly into the interior of the punch 51. As the die and punch retreat, the cushion 50 expands and pushes the piece of material 63, cut from the scrap 62, downwardly onto the block 27, while a continued upward motion of said die causes the stationary ejector 55 to push the portion 64 out of the interior of the punch.

It will be seen by reference to Fig. 3 that the cam plate 37 is cut out or recessed at 65 for a portion of the way therearound, so that when the levers 31 arrive at this cut-out portion, the springs pull the outer ends thereof downwardly and clamp the scrap to the blocks 27. After the leather has been cut, however, and the cutting table starts to move in the direction of the arrow (Fig. 3) the inner end of the lever encounters an incline 66 formed upon the under side of said cam plate 37 and is tipped downwardly at its inner end so as to release the piece of material in order that the same may be removed from the table by the operator as it approaches her during the continued rotation of the table.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. In a machine for cutting and punching sheet material, a die, mechanism to impart a reciprocatory motion thereto, a cutting table, mechanism to impart an intermittent rotary motion to said cutting table, a series of levers pivoted to said table adapted to hold a piece of sheet material in contact with said table, and means to rock said levers to release said sheet material.

2. In a machine for cutting and punching sheet material, a die, mechanism to impart a reciprocatory motion thereto, a cutting table, mechanism to impart an intermittent rotary motion to said cutting table, a series of levers pivoted to said table adapted to hold a piece of sheet material in contact with said table, and a stationary cam adapted to engage said levers during the rotation of said table and to operate them to alternately clamp and release said sheet material to and from said table, respectively.

3. In a machine for cutting and punching sheet material, a cutting table, mechanism to impart an intermittent rotary motion thereto, said table consisting of a disk with a plurality of concentrically arranged wooden cutting blocks fast thereto, a plate fast to said disk and concentric therewith, a plurality of levers pivotally supported on said

plate, a vertical stationary shaft concentric with said plate, the lower end of said shaft projecting into said plate, and a cam fast to said shaft and adapted to engage said levers during the rotation of said table and to operate them to alternately clamp and release said sheet material to and from said blocks, respectively.

4. In a machine for cutting sheet material, a die, a hollow punch inclosed within said die, a resilient cushion extending around the inner edge of said die, and a stationary ejector extending through said punch.

5. In a machine for cutting sheet material, a hollow die having a cutting edge a resilient cushion extending around the interior of said die adjacent to said cutting edge, and a stationary ejector extending through said die.

6. In a machine for cutting sheet material, a hollow die, a hollow punch inclosed within said die and fast thereto, a resilient cushion extending around the interior of said die adjacent to its cutting edge, a stationary ejector projecting downwardly into said punch, a cutting table, and mechanism to impart a reciprocatory motion to said die.

7. In a machine for cutting sheet material, a hollow die, a hollow punch inclosed within said die and detachably fastened thereto, a resilient cushion extending around the interior of said die adjacent to its cutting edge, said cushion having an opening extending therethrough to receive said punch, and a stationary ejector extending through said punch.

8. In a machine for cutting and punching sheet material, a cutting table, mechanism to impart an intermittent rotary motion thereto, said table consisting of a disk with a plurality of concentrically arranged wooden cutting blocks fast thereto, a plate fast to said disk and concentric therewith, a plurality of levers pivotally supported on said plate, a vertical shaft concentric with said plate, the lower end of said shaft projecting into said plate, a stationary bracket to which the upper end of said shaft is fastened, and a cam fast to said shaft and adapted to engage said levers during the rotation of said table and to operate them to alternately clamp and release said sheet material to and from said blocks, respectively, in combination with a hollow die, a hollow punch inclosed within said die and fast thereto, a resilient cushion extending around the interior of said die to its cutting edge, a stationary ejector projecting downwardly into said punch, a cutting table, and mechanism to impart a reciprocatory motion to said die.

9. In a machine for cutting sheet material, a die, mechanism to impart a reciprocatory motion thereto, a stationary ejector extending through said die, a cutting table, an intermittent gear fast to said table, and a

second intermittent gear adapted to intermittently rotate said first named gear and table.

10. In a machine for cutting and punching
5 sheet material, a cutting table, a plurality of
wooden cutting blocks arranged concentric-
ally upon said cutting table, each of said
cutting blocks being provided with grooves
in opposite faces thereof, and clamp plates
10 fast to said cutting table and projecting into
said grooves, whereby said cutting blocks
are clamped to said table.

11. In a machine for cutting and punching
sheet material, a cutting table, a plurality of
15 blocks arranged concentrically upon said
cutting table, the ends of said blocks abut-
ting against each other and lying in planes
radiating from the center of said cutting
table, and means to clamp said blocks to said
20 table.

12. In a machine for cutting and punching
sheet material, a cutting table, a plurality of
wooden cutting blocks arranged concentric-
ally upon said cutting table, each of said cut-
25 ting blocks being provided with grooves in op-
posite faces thereof, the bottoms of the outer
set of said grooves inclined at an angle to-
ward the top of said table, and clamp-plates
fast to said table and projecting into said
30 outer set of grooves, whereby said blocks are
clamped to said table.

13. In a machine for cutting and punching
sheet material, a cutting table, a plurality of
wooden cutting blocks arranged concentric-
35 ally upon said cutting table, each of said
cutting blocks being provided with grooves in
opposite faces thereof, and clamp-plates fast
to said cutting table and projecting into said
grooves, whereby the under face of one of
40 said clamp-plates is inclined at an angle to
the top of said table.

14. In a machine for cutting and punching

sheet material, a die, mechanism to impart a
reciprocatory motion thereto, a rotary cut-
ting table, and means to hold a piece of sheet 45
material in contact with said table by spring
tension.

15. In a machine for cutting and punching
sheet material, a die, mechanism to impart a
reciprocatory motion thereto, a rotary cutting 50
table, and means to hold a piece of sheet ma-
terial in contact with said table by spring
tension.

16. In a machine for cutting and punching
sheet material, a die, mechanism to impart a 55
reciprocatory motion thereto, a cutting
table, a series of levers pivoted to said table
adapted to hold a piece of sheet material in
contact with said table, springs adapted to
normally cause said levers to press said ma- 60
terial against said table, and means to rock
said levers to overcome the tension of said
springs to release said sheet material.

17. In a machine for cutting and punching
sheet material, a die, mechanism to impart a 65
reciprocatory motion thereto, a cutting table,
mechanism to impart an intermittent rotary
motion to said cutting table, a series of levers
pivoted to said table adapted to hold a piece
of sheet material in contact with said table, 70
springs adapted to normally cause said levers
to press said material against said table, and
a stationary cam adapted to engage said
levers during a part of the rotation of said
table to overcome the tension of said springs 75
to release said sheet material from said table.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

DANIEL D. FROTHINGHAM.

Witnesses:

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