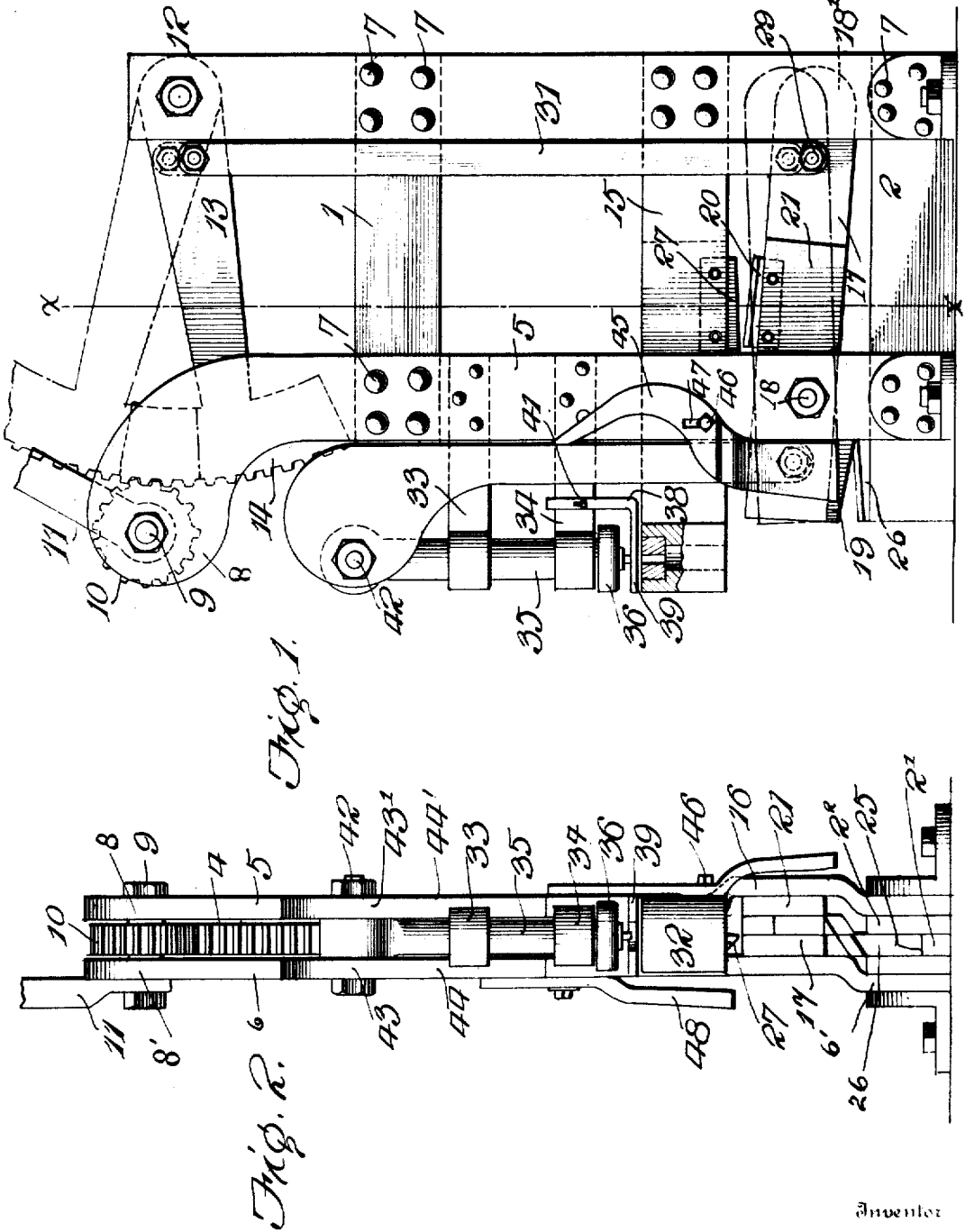


J. W. GRACE.
 COMBINED PUNCHING AND SHEARING MACHINE.
 APPLICATION FILED MAY 3, 1909.

947,212.

Patented Jan. 18, 1910.

2 SHEETS—SHEET 1.



Inventor

Witnesses
 C. P. Wright, Jr.
 S. L. Drunket.

J. W. Grace
 By A. S. Patterson
 Attorney

J. W. GRACE.
 COMBINED PUNCHING AND SHEARING MACHINE.
 APPLICATION FILED MAY 3, 1909.

947,212.

Patented Jan. 18, 1910.
 2 SHEETS—SHEET 2.

Fig. 5.

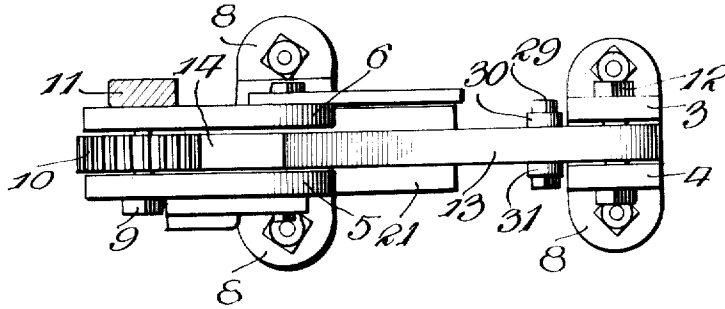
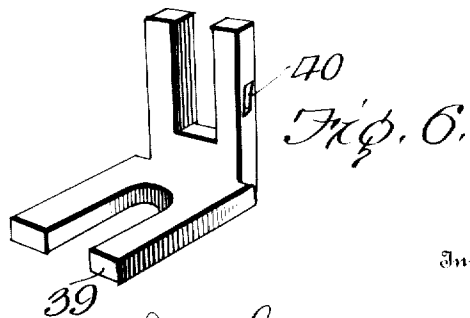
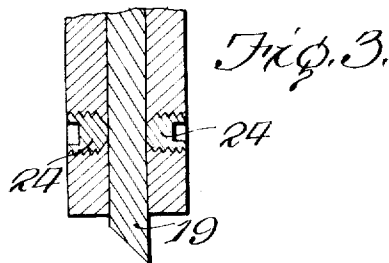
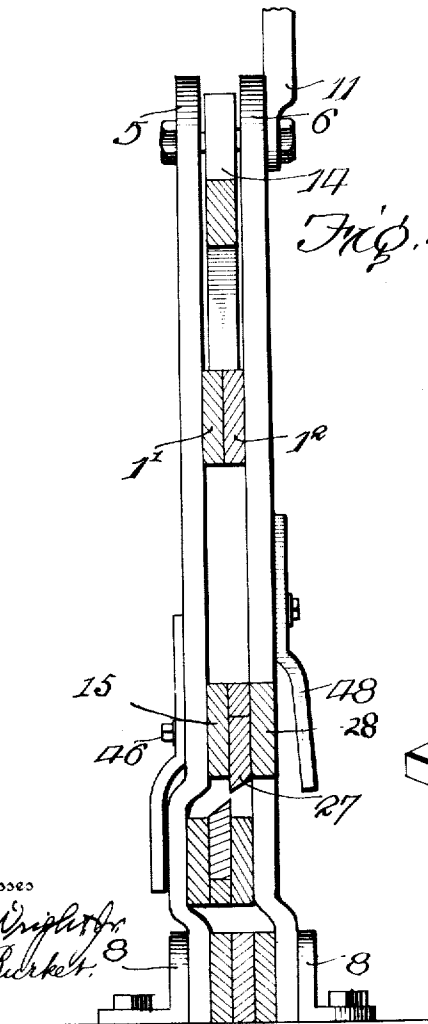


Fig. 4.



Inventor

Witnesses
 C. P. Wright
 S. L. Barker

By

J. W. Grace
 A. S. Patterson

Attorney

UNITED STATES PATENT OFFICE.

JOHN W. GRACE, OF BURLINGTON, VERMONT.

COMBINED PUNCHING AND SHEARING MACHINE.

947,212.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed May 3, 1909. Serial No. 493,802.

To all whom it may concern:

Be it known that I, JOHN W. GRACE, a citizen of the United States, residing at Burlington, in the county of Chittenden and State of Vermont, have invented certain new and useful Improvements in Combined Punching and Shearing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in combined punching and shearing machines.

The object of my invention is to provide a machine of this character in which the punch and shear blades are simultaneously operated by a single lever and having two sets of blades so arranged that they are simultaneously cutting.

Another object of my invention is to provide a machine of this character having certain details of structure whereby certain adjustments and interchanging of parts may be accomplished and whereby a more simple and efficient machine is produced.

In the accompanying drawings: Figure 1 is a side elevation of my improved machine showing in dotted lines the punch and shear blades in their position after the cutting or punching stroke. Fig. 2 is a front view of my improved machine. Fig. 3 is an enlarged sectional view showing the means for removably securing the knives to the lever. Fig. 4 is a vertical sectional view taken on the line $x-x$ of Fig. 1. Fig. 5 is a top plan view of my improved machine. Fig. 6 is a perspective view of the guide for the punch.

Referring now to the drawings, 1 and 2 represent two horizontal plates spaced apart and held by the vertical plates 3 and 4 at the rear and the vertical plates 5 and 6 at the forward end and which are riveted, bolted or otherwise secured on opposite sides of the horizontal plates, as indicated at 7. These horizontal plates 1 and 2 are each made of two pieces of metal arranged side by side and the two upper plates indicated by 1' and 1², while the two plates of the lower horizontal bar 2 are indicated by 2' and 2², which are likewise arranged side by side and held by the rivets or bolts 7.

Secured to the lower end of each of the vertical plates is an angle iron 8 forming feet by means of which the frame can be readily secured to a suitable bench or other support, and the same bolts 7 that secure the lower horizontal plate 1 to the vertical plates

secure the feet to the vertical plates. If desired, however, the lower ends of the plates 3 and 4 and 5 and 6 can be turned outwardly to form the feet and said feet in both forms are provided with openings by means of which the machine is secured to the table or supported by bolts or screws.

The upper ends of the vertical plates 5 and 6 extend a distance above the horizontal plate 1 and are curved outwardly as indicated at 8 and 8' and which are connected at their outer ends by the bolts 9.

Loosely mounted upon the bolt between the plates is a pinion 10 carrying the operating lever 11, whereby the pinion is oscillated upon the bolt. The upper end of the plates 3 and 4 extend a distance above the horizontal plate 1, and connecting said extended ends is a bolt 12, upon which is mounted the lever 13, which is free to oscillate upon said bolt. The outer end of the lever extends between the curved ends 8 and 8' of the plates 5 and 6 and is provided with a segmental rack 14. This rack 14 meshes with the pinion 10 and the oscillation of the pinion causes the lever 13 to rock upon the pivot 12 for the purpose hereinafter more fully described.

The vertical plates are held a distance apart equal to or a little greater than the thickness of the lever 13, so that the lever is free to rock between the same. The plate 5 is bulged outwardly at a point just below the third horizontal central plate 15, as indicated at 16. The third plate 15 is secured to the vertical plates in the same manner as the plates 1 and 2, and forms the abutting plate for the punch as will be hereinafter more fully described. This bulged portion of the plate 5 forms a larger space between the same for the purpose of providing means for securing the shearing blades to the shearing lever 17. The shearing lever 17 extends between the plates 5 and 6 and is pivoted at intermediate its ends. The rear end 18' extends between the plates 3, and 4, said plates serving as a guide to prevent the lever from twisting. The lever 17 on the inside of the pivot 18 on its upper face and on lower face on the outside of the pivot is cut away to receive the knives 19 and 20. Secured to one side of the lever is a plate 21, which extends over the cut-away portions of the lever and forms recesses for the blades. The plate is riveted or bolted to the lever and the bulged portion 10 of the

standard 5 allows for said plate. The knives are secured in the recesses by hollow screws 24, which have their inner ends engaging the blades as shown in Fig. 3, and the hollow opening of said screws being of an angular form allows of an angular instrument to be inserted for turning the screws and whereby the outer ends of the screws may be flush with the outer faces of the plates. The lower plate 2 has its plate 2' cut away as indicated at 25 in which the knife 26 rests, and the plate 27 is secured thereon for holding the knife in said recess and the knife held therein by hollow screws in the same manner as the knives 19 and 20. The plate 15 likewise has a recess in its lower face in which the knife 37 rests and secured upon the plate on one side of the knife is a plate 28 bolted or otherwise secured. The plate 6 is bulged outwardly as indicated at 6' to allow for said plate 28. The knife 27 is secured therein by the hollow screws in the same manner as the other knives.

The knives 19 and 20 being on opposite sides of the pivot of the lever 17 it will be seen that the rocking of the lever causes the knife 19 to coact with the stationary knife 25, and at the same time the knife 20 is co-acting with the stationary knife 27, whereby a double shearing is accomplished by the one operation of the lever. The inner end of the lever 17 has pivoted thereto at 29 links or rods 30 and 31', which have their inner upper end pivoted to the lever 13 at 35, whereby the rocking of the lever 13 causes the knife lever to rock and cause the shearing act. The levers 13 and 17, as arranged, and the links as connected give a great leverage to the cutting action of the knife.

The plate 14, as shown, extends beyond the vertical plates 4 and 5 and has secured therein by bolts a circular bed-plate 32, upon which the metal rests while it is being punched and the bed-plate is provided with the usual opening to allow the punch to pass into the same. The standards or plates 4 and 5 above the plate 15 have secured between the same the outwardly extending punch-guides 33 and 34, which are arranged directly above the bed-plate 32. Fitting in said guide is a punch rod 35 having at its lower end the head 36 in which is removably secured the punch 37, whereby different size and shape punches may be readily secured in the head for different character of work. Secured to the guide plate 34 is a guide 38 which has its lower end turned outward at 39 and provided with a slot through which the punch passes. This guide is provided with a vertical slot 40 through which the securing bolt 41 passes, whereby the guide can be lowered for removing the punch from the head.

The upper end of the punch rod is pivoted

at 42 between the enlarged ends 43 and 43' of the links 44 and 44'. The said links extend downwardly and are pivotally connected to the outer end of the knife lever 17 by a single bolt.

A guide-plate 45 is secured to the plate 5 by a bolt 46 passing through the slot 47, whereby the guide plate may be vertically adjusted. The said guide plate is curved outwardly and extends down adjacent to the knife 25 and prevents the metal being cut from tilting when the knife 19 engages said metal. A similar guide plate 48 is secured to the other side of the plate 6 and extends rearwardly for holding the metal when the knife 27 is co-acting with the knife 20.

By the construction herein shown and described it will be seen that by operating the lever 11 by hand the pinion 10 is oscillated and engages the rack 14 and moves it upwardly rocking the lever 13 upon its pivot 12. The rod 30 being connected to the lever 13 draws the same upward and the lower end of the rod being connected to the knife lever 17 rocks the same upon the pivot 18 causing a shearing action between the blades 19 and 25, and the blades 20 and 27. The link 44 being connected to the knife lever on the outside of the pivot the link is drawn downwardly causing the punch rod to travel downward and punching the metal upon the bed-plate.

It will be seen by the one operation of the lever 11, the two shearing and one punching operations are performed and the lever connection being such that an increased power is derived to cause an easy operation of the machine.

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

1. A machine of the character described, comprising a frame, an intermediately pivoted lever, knives carried by the lever on opposite sides of the pivot, a vertically movable punch directly over the said lever, and a link connected to each side of the lever and extending upwardly and connected to the punch, substantially as described.

2. A machine of the character described, comprising a frame, an intermediately pivoted lever, knives carried by the levers on opposite sides of the pivot, a vertical punch in a vertical line with the lever and beyond the outer end thereof, links connected to the outer ends of the lever and extending upwardly and having enlarged outwardly extending portions extending in opposite sides of the punch and pivotally connected thereto, and means for operating said lever.

3. A machine of the character described, comprising a frame, an intermediately pivoted lever, a knife carried by the lever on opposite sides of the lever, on each side of

the pivot, knives carried by the frame working in conjunction with the knives carried by the lever, a punch in a vertical alinement with the lever out beyond the same, links
5 connecting the outer end of the lever with the punch, and means connected to the inner end of the lever for rocking it upon the pivot, substantially as described.

4. A machine of the character described,
10 comprising a frame, a lever adjacent one end of the frame, a punch carried by the frame above the lever, a link connecting the punch and the outer end of the lever, knives carried by the lever on each side of the pivot,
15 stationary knives carried by the frame and coacting with the movable knives, a lever pivoted at one end to the upper end of the frame, a link connection between said lever and the inner end of the knife lever, and
20 means carried by the opposite end of the lever for rocking the same on its pivot.

5. A machine of the character described, comprising a frame, a lever pivoted adjacent its outer end to the frame, a punch
25 carried by the frame beyond and above the lever, a link connected to the lever on the outside of the pivot and extending upwardly and having an outwardly enlarged upper end pivoted to the punch, and a lever connected by a link to the opposite end of the
30 cutter carrying lever.

6. A machine of the character described, comprising a frame, a lever pivoted adjacent its outer end to the frame, a punch
5 carried by the frame, a link connecting the punch and the outer end of the lever, knives carried by the lever, a lever pivoted at one end to the frame, above the free end of the first mentioned lever, means for operating
10 said lever and a link connecting the upper lever adjacent its pivot and knife lever adjacent its free end.

7. A machine of the character described, comprising a frame, a horizontal lever pivoted adjacent its outer end to the frame, a
5 punch carried by a link connection between the punch and the outer end of the lever beyond its pivot, knife carried by the lever on both sides of its pivot, co-acting knives carried by the frame, a lever pivoted at its rear

end to the frame, link connected to the lever adjacent the pivot and connected to the rear free end of the knife lever, a segmental rack carried by the outer free end of the second
55 lever, an oscillating pinion mounted in the frame and meshing with the rack and an operating lever carried by the pinion for oscillating the same.

8. A machine of the character described, comprising a frame, a lever pivoted at its
60 outer end to the frame, knives carried by the lever, a second lever pivoted at its rear end to the frame, links connected to the said lever adjacent its pivot and connected to the rear free end of the knife lever, a seg-
65 mental rack carried by the outer free end of the upper lever, a pinion mounted in the frame to oscillate and meshing with the rack and a lever for oscillating said pinion.

9. A machine of the character described,
70 comprising a frame, a lever pivoted adjacent its outer end to the frame, a knife carried by the lower face of the lever on the outside of the pivot, a knife carried by the frame and co-acting therewith, a knife carried
75 by the upper face of the lever on the inside of the pivot, a knife carried by the frame and co-acting therewith, a vertically movable punch mounted in the frame above the lever, a link connected to the lever on
80 the outside of the pivot and having an outwardly curved upper end extending over the punch and pivoted thereto, a vertically movable guide for the punch, guides for the knives on opposite sides of the frame, a lever
85 pivoted at its rear end to the frame above the knife lever, a link connected to said lever adjacent its pivot and connected to the rear free end of the knife lever, a segmental rack carried by the outer free end of
90 the upper lever, an oscillating pinion mounted in the frame and engaging the rack, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. GRACE.

Witnesses:

WILLIAM S. BURNS,
CHARLES E. ALLEN.