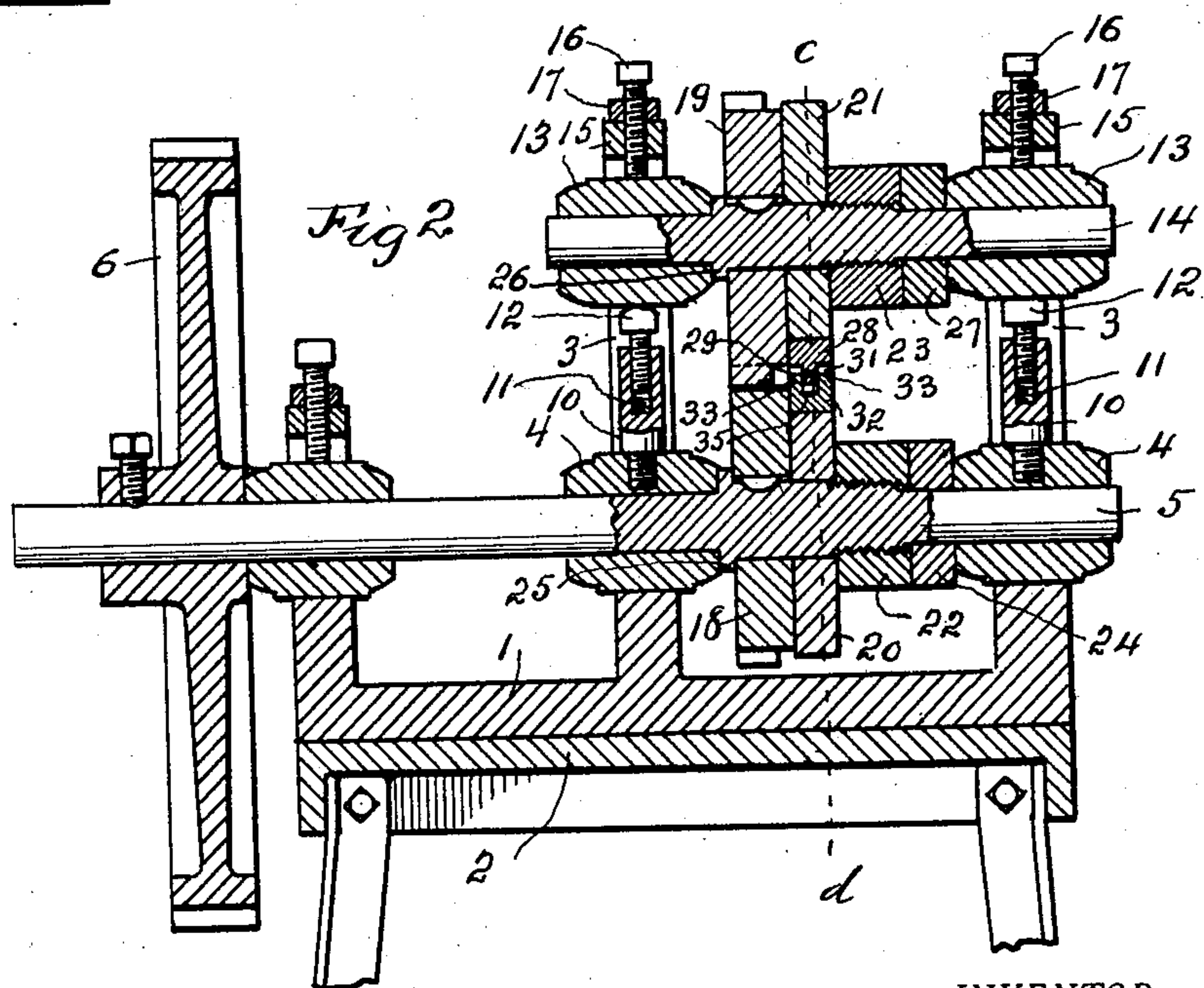
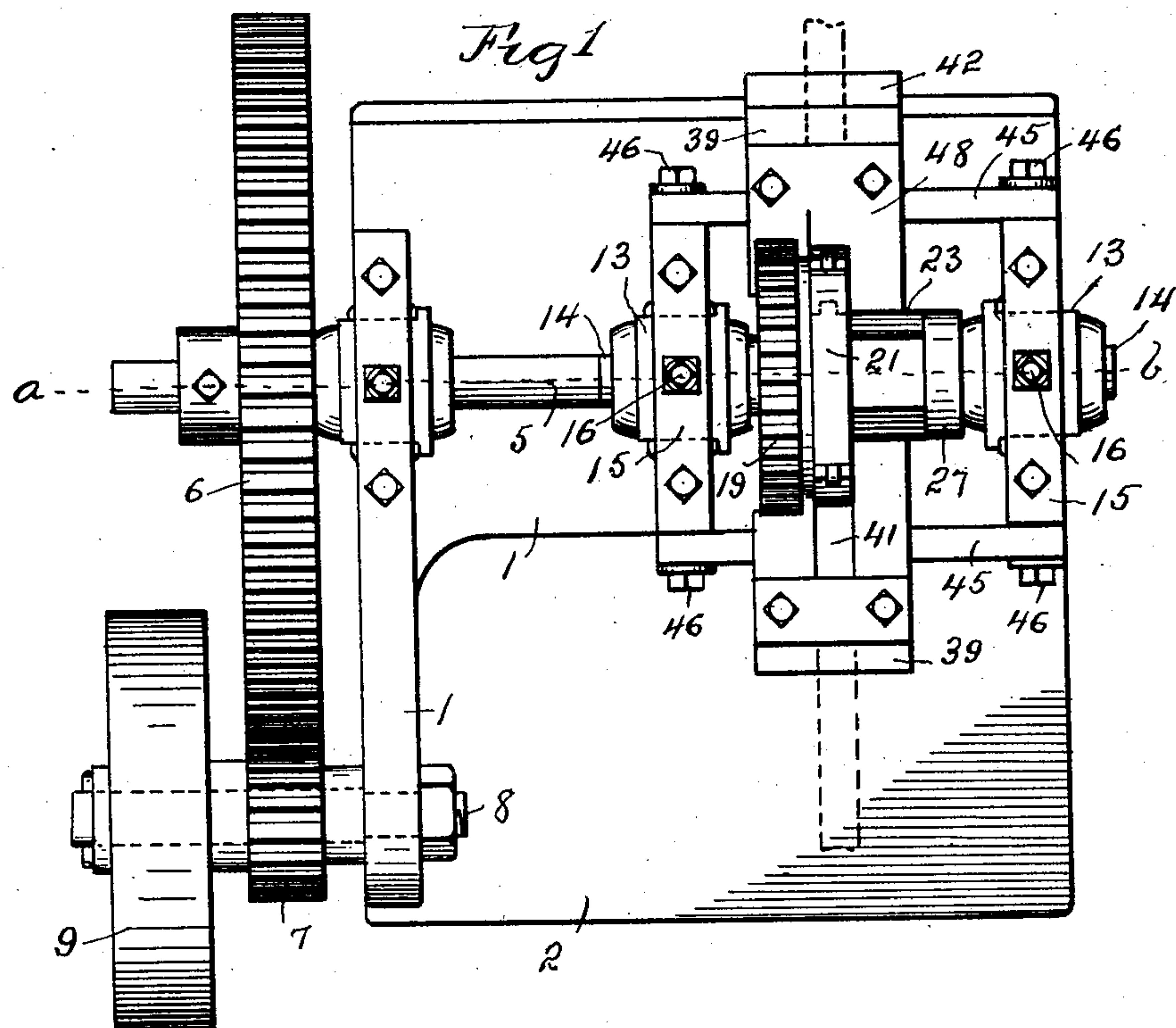


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APPLICATION FILED OCT. 29, 1910.

Patented July 18, 1911.

3 SHEETS—SHEET 1.



WITNESSES:  
*R. Hamilton*  
*E. B. House*

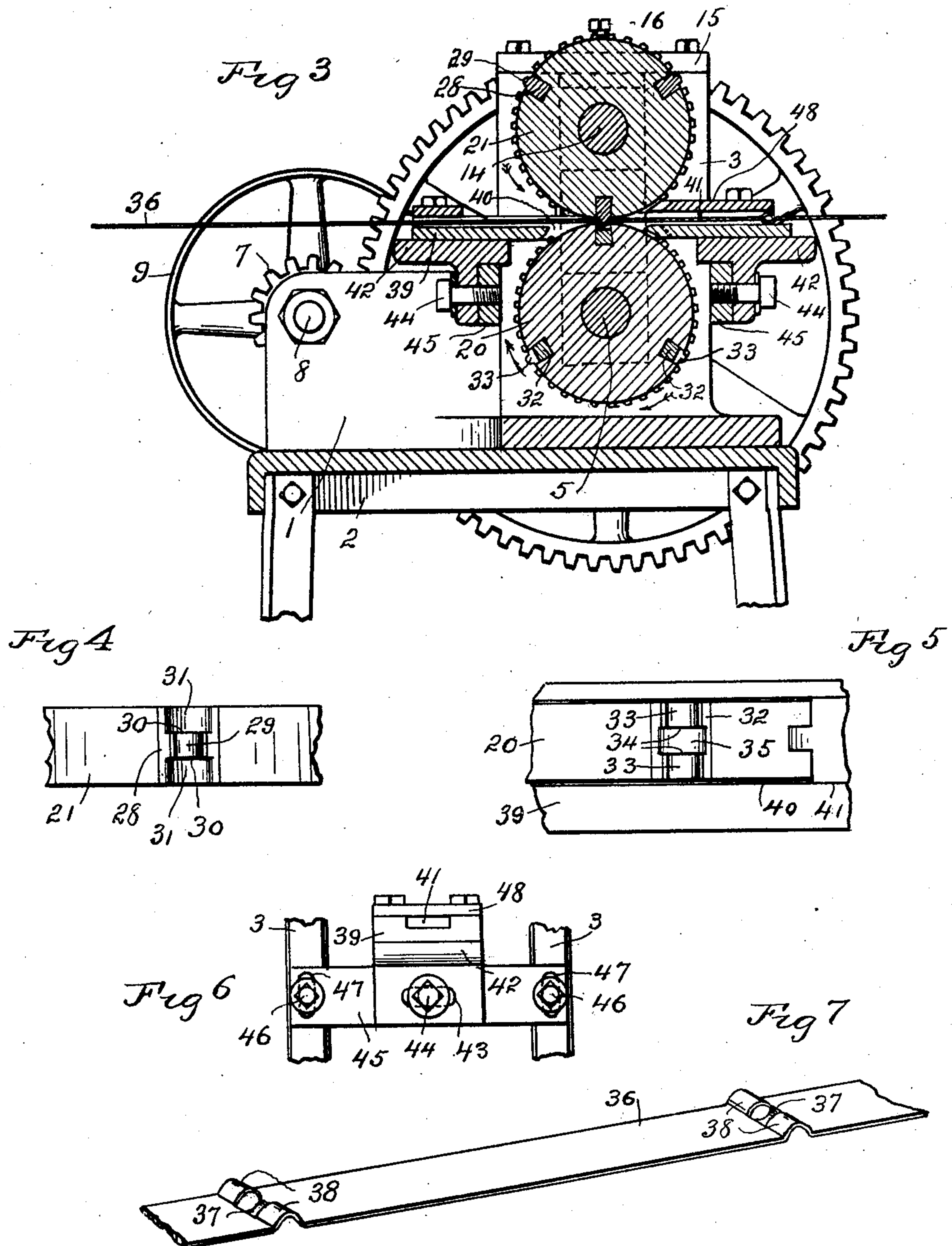
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# UNITED STATES PATENT OFFICE.

ERASMUS V. BAIR, OF KANSAS CITY, KANSAS.

PUNCHING-MACHINE.

997,946.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed October 29, 1910. Serial No. 589,726.

*To all whom it may concern:*

Be it known that I, ERASMUS V. BAIR, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

My invention relates to improvements in punching machines.

The object of my invention is to provide a machine by which may be rapidly and accurately punched in a strip of sheet metal a plurality of pairs of longitudinal slits, said pairs of slits being disposed at regular intervals along the metal strip, the metal between each pair of slits being depressed and the metal at opposite sides of the depressed portions being raised, whereby eye-lets may be formed in the metal strip for receiving wires or rods, disposed transversely to the strip.

The novel features of my invention are hereinafter more fully described and claimed.

In the accompanying drawings which illustrate the preferred form of my invention—Figure 1 is a plan view of the machine. Fig. 2 is a vertical section on the dotted line *a—b* of Fig. 1. Fig. 3 is a cross section on the dotted line *c—d* of Fig. 2, Fig. 4 is a top view of a part of the upper feed roller and one of the dies mounted thereon. Fig. 5 is a plan view of a part of the lower feed roller and of a part of the guiding plate. Fig. 6 is an end elevation of the guiding and stripping mechanism and a part of the frame supporting the same. Fig. 7 is a perspective view of a metal strip which has been run through the machine.

Similar reference characters denote similar parts.

1 denotes a frame of any suitable construction and which may be mounted upon a table 2. The frame 1 is provided with two upwardly extending U-shaped pedestals 3, between the arms of which are respectively mounted bearing blocks 4, in which is rotatively mounted a horizontal shaft 5, to which is secured a spur gear wheel 6, which meshes with a pinion 7, which is rotatively mounted upon a stud 8, secured to the frame 1, said pinion having secured to and rotatable with it a pulley wheel 9, which may be rotated by any suitable means, not shown.

Secured to the upper sides of the bearing

blocks 4 are vertical studs 10, the upper ends of which are provided with vertical screw threaded holes 11, in which are rotatively mounted respectively, two screws 12, upon the upper ends of which are respectively mounted bearing blocks 13, having rotatively mounted therein a horizontal shaft 14, which is disposed parallel with the shaft 5. Secured to the upper ends of the arms of the pedestals 3 are two horizontal plates 15 which are provided with vertical screw threaded holes in which are fitted screws 16, the lower ends of which respectively bear upon the upper sides of the bearing blocks 13. Mounted on the screws 16 are lock nuts 17, which bear upon the upper sides of the plates 15 respectively. Keyed respectively on the shafts 5 and 14 are spur gears 18 and 19 which mesh with one another and serve to cause the shaft 14 to rotate synchronously with the shaft 5.

20 and 21 denote respectively two rotary members which are preferably cylindrical feed rollers, disposed concentrically upon the shafts 5 and 14 and held from rotation thereon by being tightly clamped against the gears 18 and 19 respectively by nuts 22 and 23, which are respectively fitted upon screw threaded portions provided on the shafts 5 and 14. Intermediate of the nut 22 and the adjacent bearing block 4 is mounted a washer 24 which limits motion longitudinally in one direction of the shaft 5. Longitudinal movement in the other direction is prevented by means of a flange 25 which bears against the other bearing block 4. To limit longitudinal movement of the shaft 14 in one direction, said shaft is provided with an annular flange 26 which bears against the adjacent bearing block 13. To limit longitudinal movement of the shaft 14 in the other direction, said shaft has mounted on it a collar 27 which is fitted between the nut 23 and the adjacent bearing block 13.

The feed roller 21 is provided with one or more peripheral dovetail shaped recesses in which are respectively mounted a plurality of dies 28, each of which is provided with a radial projection 29, having two sides provided with parallel cutting edges 30, which are disposed at right angles to the axis of rotation of the roller 21. Said die 28 is provided at opposite sides of said projection 29, adjacent to said cutting edges 30, with two recesses 31.

The feed roller 20 is provided with one



or more peripheral dovetail shaped recesses in which are respectively fitted punches 32, provided each, as shown in Fig. 5, with a pair of radial projections 33, the adjacent sides of which are provided with cutting edges 34, disposed parallel with each other and coöperating respectively with the cutting edges 30, of one of the dies 28. The punch 32 is provided intermediate of the projections 33 with a recess 35, adapted to receive the projection 29 of the die 28 which coöperates with said punch.

The feed rollers 20 and 21, are so disposed as to grip between them and feed forward, transversely to their axes, a metal strip 36. The feed rollers 20 and 21 are so adjusted on their respective shafts 5 and 14, that the punches 32 and dies 28 will be brought into operative relation with each other at the proper times. As the feed rollers 20 and 21 are rotated in opposite directions the dies 28 and punches 32 will cut at regular intervals in the strip 36 pairs of longitudinal parallel slits, and at the same time the projections 29 on the dies 28 will form depressions 37 between said slits, while the projections 33 on the punches 32 will raise portions 38 at opposite sides of the depressed portions 37. Eyes will thus be formed in the strip 36 for receiving rods or wires, not shown, which are to be disposed transversely to the strip 36.

For guiding the strip 36 between the feed rollers 20 and 21, and into engagement with the dies 28 and punches 32, any suitable means may be provided. For this purpose I have provided a horizontal plate 39, which is disposed transversely to and between the shafts 5 and 14 and which is provided with a vertical hole 40, in which is located the feed roller 20. In the upper side of the plate 39 is provided a horizontal groove 41, for receiving the metal strip 36 and guiding the same into engagement with the dies 28 and punches 32. The guiding plate 39 is supported adjacent opposite ends upon horizontal portions of two T-shaped plates 42, the vertical portions of which are provided with horizontal slots 43, through which extend horizontal bolts 44, the screw threaded inner ends of which are respectively fitted in horizontal screw threaded holes provided in two horizontal plates 45, which are respectively secured to opposite sides of the pedestals 3, by horizontal bolts 46, which extend through vertical slots 47, provided in the plates 45, as best shown in Fig. 6. The slots 47 permit vertical adjustment of the plates 45 on the pedestals 3 and the slots 43 permit adjustment of the plates 42 parallel with the shafts 5 and 14.

The plate 39 serves to strip the metal strip 36 from the punches 32 in the feed roller 20.

To strip the metal strip from the dies 28, I provide a flat horizontal plate 48, which is

secured to the upper side of the plate 39 and has its inner end disposed adjacent to the periphery of the feed roller 21.

In operating my invention rotation is imparted to the shafts 5 and 14 by the mechanism already described. The metal strip to be punched is fed between the rollers 20 and 21 from the left, as viewed in Fig. 3. The said rollers will grip the strip and will force it along the groove 41 of the guiding plate 39. The dies 28 and punches 32 will consecutively and at regular intervals punch pairs of longitudinal slits in the strip and will at the same time form the depressions 37 and the raised portions 38 in said strip.

I do not limit my invention to the structure described and shown, as many modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

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

1. In a punching machine, two rotary members, means for synchronously rotating said members, a plurality of dies secured to one of said members, each die having a radial projection opposite sides of which are provided with cutting edges and each die having at opposite sides of its projection two recesses, and a plurality of punches carried by the other member and disposed so as to respectively coöperate with said dies, each punch having two radial projections disposed respectively so as to enter the two recesses of one of said dies, adjacent sides of the two projections on each punch having cutting edges for coöperating with the cutting edges of the projection of one of said dies, each punch having intermediate of its two projections a recess disposed so as to receive therein the projection of the die with which the punch coöperates.

2. In a punching machine, the combination with two rotary feed rollers, of means for synchronously rotating said rollers in opposite directions, a die carried by one of said feed rollers and having a radial projection opposite sides of which are provided with cutting edges, the die having two recesses disposed at opposite sides of said projection, and a punch carried by the other feed roller and having two radial projections disposed so as to respectively enter said recesses, said two radial projections having their adjacent sides provided with cutting edges which coöperate with the cutting edges of said projection on said die, the punch having intermediate of its two projections a recess disposed so as to receive therein the projection of the die.

3. In a punching machine, the combination with two rotary feed rollers, of means for synchronously rotating said rollers in opposite directions, a die carried by one of



said rollers and having a radial projection having two sides disposed at right angles to the axes of said rollers, said two sides having cutting edges, the die having two recesses at opposite sides of said projection and adjacent respectively to said cutting edges, a punch carried by the other feed roller and having two radial projections disposed so as to enter said recesses and having their adjacent sides provided with cutting edges disposed parallel with and adapted to cooperate with the cutting edges of the projection on the die, the punch having intermediate of said two projections a recess disposed so as to receive therein the projection of the die, and means for guiding a metal strip between said rollers and into engagement with said punch and die.

4. In a punching machine, the combination with two rotary feed rollers, of means for synchronously rotating said rollers in opposite directions, a die carried by one of said rollers and having a radial projection having two sides disposed at right angles to the axes of said rollers said sides having cutting edges, the die having two recesses at opposite sides of said projection adjacent to said cutting edges, a punch carried by the other roller and having two radial projections disposed so as to enter said recesses respectively and having their adjacent sides provided with cutting edges cooperating with the cutting edges on the die, the punch having intermediate of said two projections a recess for receiving the projection of the die, and means for guiding a metal strip between said rollers and into engagement with said punch and die, the said guiding means being adjustable parallel with the axes of said rollers.

5. In a punching machine, the combination with two rotary feed rollers, of means for synchronously rotating said rollers in opposite directions, a die carried by one of said rollers and having a radial projection having two sides provided with cutting edges disposed at right angles to the axes of said rollers, the die having two recesses respectively adjacent to said cutting edges, a punch carried by the other feed roller and having two radial projections disposed so as to respectively enter said recesses and having their adjacent sides provided with cutting edges parallel with and cooperating with the cutting edges of the projection on the die, the punch having intermediate of said two projections a recess for receiving therein the projection of the die, and means for guiding a metal strip between said rollers and into engagement with said punch and die, said guiding means having means for stripping said metal strip from said feed rollers.

6. In a punching machine, the combination with two rotary feed rollers, of means

for synchronously rotating said rollers in opposite directions, a die carried by one of said rollers and having a radial projection having two sides provided with cutting edges disposed at right angles to the axes of said rollers, the die having two recesses respectively adjacent to said cutting edges, a punch carried by the other feed roller and having two radial projections disposed so as to respectively enter said recesses and having their adjacent sides provided with cutting edges parallel and cooperating with the cutting edges of the projection on the die, the punch having intermediate of said two projections a recess for receiving the projection of the die, and means for guiding a metal strip between said rollers and into engagement with said punch and die, said guiding means having means for stripping the metal strip from said feed rollers and being adjustable parallel with the axes of said feed rollers.

7. In a punching machine, the combination with two rotary members, of means for synchronously rotating said members in opposite directions, and means carried by said members for cutting two parallel slits in a metal strip which may be passed between said members, said slits being disposed at right angles to the axes of said members, said cutting means being provided with means for depressing the metal between said two slits and for raising the metal at opposite sides of said depressed portion.

8. In a punching machine, the combination with two rotary feed rollers having parallel axes and having means for feeding between them, at right angles to their axes, a metal strip, of means for synchronously rotating said feed rollers in opposite directions, and means carried by said feed rollers for cutting two parallel slits in said metal strip at right angles to the axes of said rollers, said cutting means having means for depressing the metal between said two slits and for raising the metal at opposite sides of said depressed portion.

9. In a punching machine, the combination with two rotary feed rollers having parallel axes and having means for feeding between them at right angles to their axes a metal strip, of means for synchronously rotating said feed rollers in opposite directions, means carried by said feed rollers for cutting in said metal strip two slits disposed at right angles to the axes of said rollers, said cutting means having means for depressing the metal between said two slits and for raising the metal at opposite sides of said depressed portion, and means for guiding said metal strip between said rollers and into engagement with said cutting means.

10. In a punching machine, the combina-



tion with two rotary feed rollers having parallel axes and having means for feeding between them, at right angles to their axes, a metal strip, of means for synchronously  
5 rotating said feed rollers in opposite directions, means carried by said feed rollers for cutting in said metal strip, two slits disposed at right angles to the axes of said rollers, said cutting means having means  
10 for depressing the metal between said two slits and for raising the metal at opposite sides of said depressed portion, means for

guiding said metal strip between said rollers and into engagement with said cutting means, and means for stripping said metal strip from said feed rollers. 15

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

ERASMUS V. BAIR.

Witnesses:

E. B. HOUSE,

FLORENCE M. VENDIG.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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