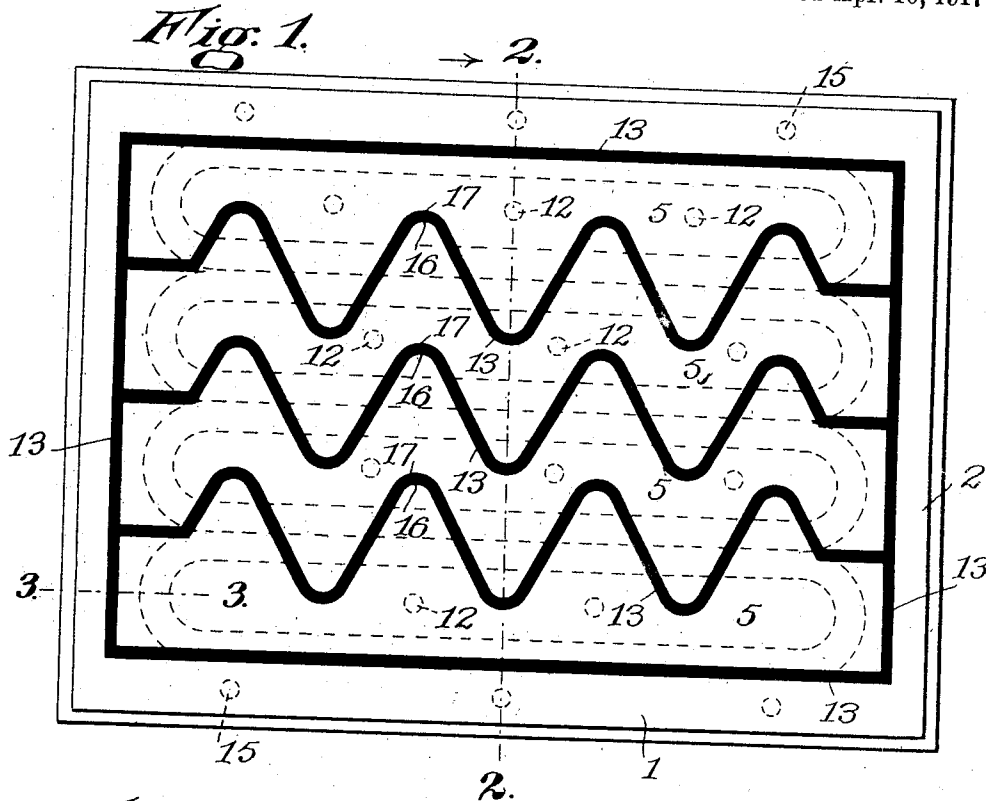
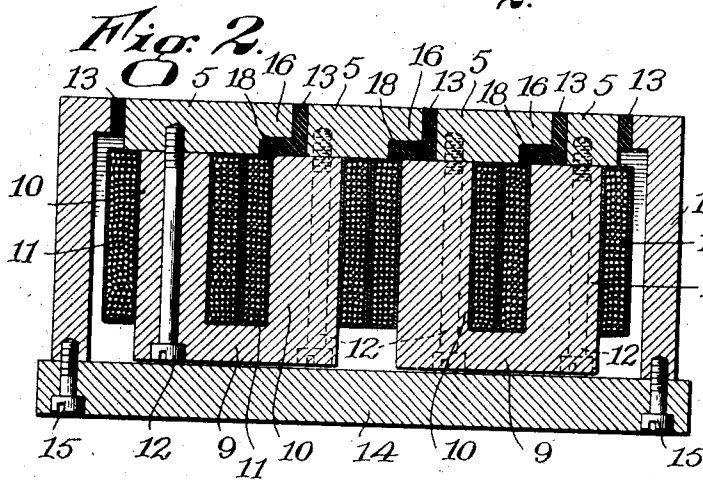
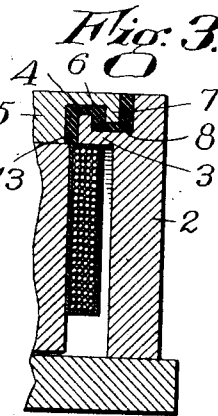


O. S. WALKER.
MAGNETIC CHUCK.
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1,222,052.

Patented Apr. 10, 1917.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OAKLEY S. WALKER, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Magnetic Chucks, of which the following, taken in connection with the accompanying drawings, is a specification.

The present invention relates to the construction of a magnetic chuck, the face of which is adapted to support and grip the iron or steel pieces which are to be operated upon by the machine with which the chuck is used. The invention consists in the construction and arrangement of parts set forth in detail in the following description and particularly pointed out in the claims annexed thereto.

In the accompanying drawings,

Figure 1 is a top plan view of a chuck embodying my invention.

Fig. 2 is a vertical sectional view on line 2—2, Fig. 1, and

Fig. 3 is a fragmentary section on line 3—3, Fig. 1.

Like reference characters refer to like parts in the different figures.

Referring to the drawings, 1 indicates a rectangular metallic shell or frame, inclosing between its end and side walls a rectangular space adapted to be filled by the pole pieces, coils and cores of the chuck in the manner hereinafter set forth. In the present instance I have shown a construction in which the pole pieces constituting the work holding face of the chuck are disposed parallel to the longest dimension of said frame; it will be clear, however, that that dimension of the frame which is transverse to the said pole pieces can be increased indefinitely and additional pole pieces inserted to fill the additional space, whereby a chuck, wholly within the scope of the present invention, having pole pieces disposed parallel to the shortest dimension of the frame, is produced.

Whatever the disposition of the pole pieces with respect to the longest or shortest dimensions of the frame, the invention contemplates the formation of shoulders 3 near the upper edges of two opposite ends or sides 2, 2 of the frame, each shoulder having an upstanding tongue 4 terminating below the level of said edge. Each pole piece

5, preferably consisting of a strip of Swedish iron, has each end formed on the under side with a transverse groove 6, within which the tongue 4 is received, and is also provided with a downwardly projecting tongue 7, received within the groove 8 formed in the side 2 between the body of said side and the tongue 4. With the upper surfaces of said pole pieces 5 flush with the edges of the sides and ends of the frame, the tongues 7 preferably extend slightly below the tongues 4, as shown in Fig. 3, whereby in the assembled structure hereinafter more fully set forth, said pole pieces 5 constitute tie bars serving to prevent the outward springing of the sides or ends 2 between which they extend.

The several pole pieces 5, herein shown as four in number, although it is clear that any even number of such pieces may be provided, are disposed side by side in a row, and with their interposed gaps of nonmagnetic metal, hereinafter referred to, entirely fill the upper portion of the rectangular space inclosed by the frame 1, thereby forming, entirely by themselves, the work holding face of the chuck.

Adjacent pole pieces of said row are adapted to receive magnetism of opposite polarity, and to this end, said pole pieces are connected in pairs to the opposite poles of magnets or core members 9, underlying the same in the space inclosed by said frame. Each core member 9 takes the form of a bar of Swedish iron, U-shaped in cross section, extending parallel to said pole pieces, and each leg 10 of said U-shaped bar is encircled by a coil of wire 11, all of said coils, in the present instance four in number, being connected in series to a source of electrical supply, not shown. The upper edge of each leg 10 is machined, and the same is drawn into intimate contact with the machined under side of the associated pole piece 5, by means of screw bolts 12 passing completely through said legs and part way into the body of said pole pieces, the heads of said bolts lying within counterbored recesses in the under surfaces of the bars 9.

In assembling the parts of the structure, the frame 1, with the pole pieces 5 loosely inserted therein, is disposed in an inverted position, with the upper faces of said pole pieces resting on a true plane surface. The gaps between adjacent pole pieces, and be-

tween said pole pieces and the sides and ends of the frame, are filled with nonmagnetic metal, such as Babbitt metal, indicated at 13, poured therein from the interior of the space inclosed by said frame. The pole pieces are thereby firmly locked in position, and are incapable of movement in said frame, being supported firmly at their ends by the flanges 3 and in turn cooperating with said flanges to prevent the springing or distortion of the frame. The core members 9, supporting the coils of wire 11, are next secured in place, by the screw bolts 12, thus providing for the suspension of said members and coils from the pole pieces which they energize.

In order to prevent the access of dust or oil to the interior of the chuck, a plate 14 is secured by bolts 15 to the under side of the frame 1, and constitutes a base or supporting member for the chuck, preferably spaced from the under surfaces of the members 9.

In practice, it is found desirable to provide the contiguous edges of adjacent pole pieces 5 with interlocking projections and recesses 16 and 17, as shown clearly in Fig. 1, thereby increasing the actual length of the gaps between said pieces and bringing said gaps into closer proximity at certain portions of the work holding face of the chuck than would be possible if said gaps extended parallel to the sides of the frame. The consequent overlapping by the projections 16 on one pole piece 5 of the core or leg 10 of the adjacent pole piece makes it necessary to cut away said projections on the under side as shown at 18, Fig. 2, to prevent a magnetic short circuiting of the chuck. By the construction above described, certain classes of small work can be made to span a plurality of gaps, thereby increasing the holding power of the chuck with respect to such work.

In the construction above described, the shell of the chuck forms no part of the magnetic circuit; nor does said shell constitute any portion of the actual work holding face of the chuck. Said work holding face is constituted entirely by the pole pieces 5; the usual tie bars, formed integral with the shell of the chuck, being eliminated. As a consequence, it is possible to bring the pole pieces closer together, with no intermediate magnetic metal therebetween through which leakage of the lines of magnetic force can take place. The holding power of the chuck is evenly diffused over the entire face thereof, rather than concentrated in a relatively small number of spots on said face with dead spaces between said spots.

By reason of the zigzag formation of the gaps between the pole pieces, work which is disposed longitudinally of said gaps is held uniformly throughout its length on account of spanning a plurality of gaps between sections of opposite polarity. It will be apparent also that the distance between the gaps may be decreased and the actual lengths of said gaps increased by merely making the angles of the interlocking projections and recesses 16 and 17 more acute, thereby enhancing the adaptability of the chuck for holding small work.

I claim,

1. A magnetic chuck comprising a shell, and a plurality of pole pieces overlapping the walls of said shell and having interlocking engagement with said shell.

2. A magnetic chuck comprising a shell, and a plurality of pole pieces having their ends overlapping and interlocked with the walls of said shell.

3. A magnetic chuck comprising a shell, and a plurality of pole pieces supported at their ends upon two opposite walls of said shell, said pole pieces interlocking with said walls and thereby constituting tie bars to prevent the outward springing of said walls of the shell.

4. A magnetic chuck comprising a shell, and a plurality of pole pieces supported between two opposite walls of said shell and having interlocking tongue and groove connections with said walls.

5. A magnetic chuck comprising a plurality of pole pieces constituting a work holding face, and a plurality of core members suspended from said pole pieces.

6. A magnetic chuck comprising a plurality of pole pieces, a plurality of core members suspended from said pole pieces, and a plurality of magnetizing coils carried by said core members.

7. A magnetic chuck comprising a plurality of pole pieces, and a core member common to each adjacent pair of pole pieces, each core member comprising a bar U-shaped in cross section, having each side in contact with one pole piece of said pair.

8. A magnetic chuck comprising a plurality of pole pieces, magnetizing means for said pole pieces in contact therewith, each pole piece having a portion overlying the magnetizing means of the adjacent pole piece and being cut away at said portion to form a nonmagnetic gap.

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