No. 822,095. PATENTED MAY 29, 1906.

C. E. F. AHLM.

LIFTING MAGNET.

APPLICATION FILED AUG. 28, 1905.

Fig. 1.

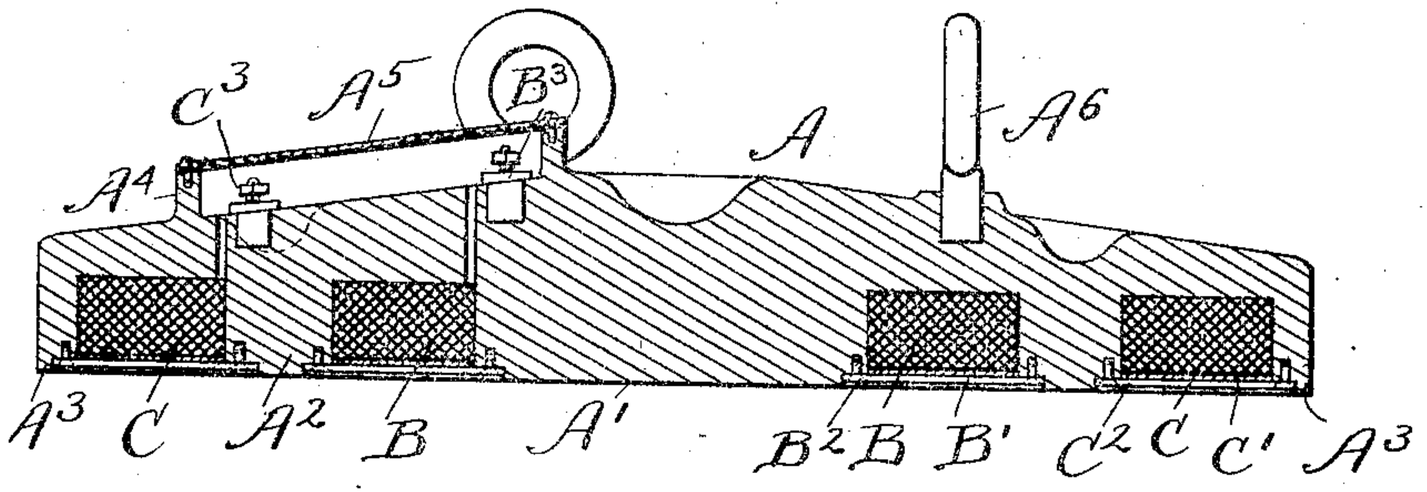
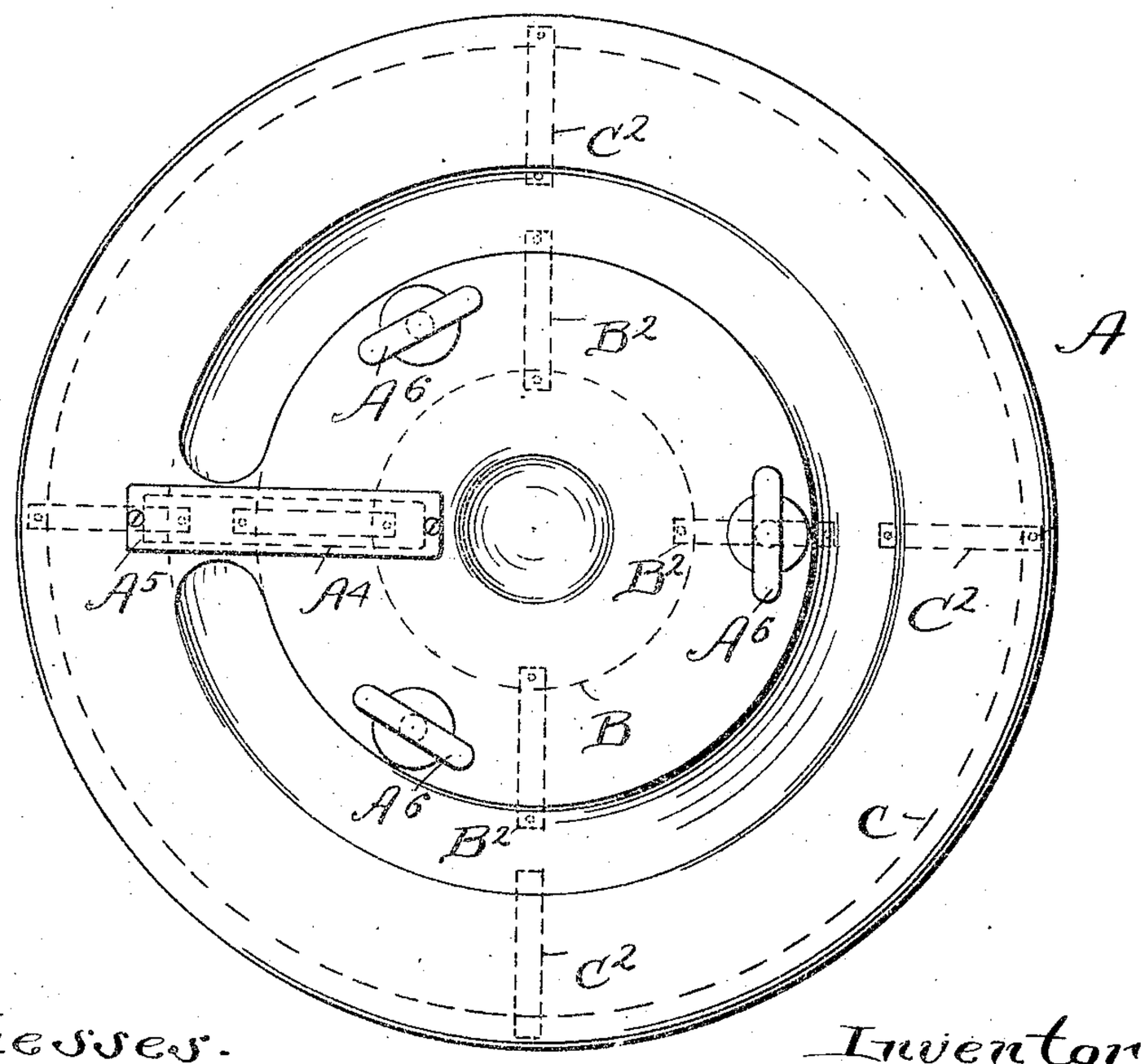


Fig. 2.



Witnesses.
E. B. Gilchrist
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UNITED STATES PATENT OFFICE.

CHARLES E. F. AHLM, OF CLEVELAND, OHIO, ASSIGNOR TO CLEVELAND ARMATURE WORKS, OF CLEVELAND, OHIO, A PARTNERSHIP.

LIFTING-MAGNET.

No. 822,095. Specification of Letters Patent. Patented May 29, 1906.

Application filed August 28, 1905. Serial No. 276,058.

To all whom it may concern:

Be it known that I, CHARLES E. F. AHLM, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Lifting-Magnets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to certain improvements in lifting-magnets designed to be used in loading and unloading and transferring pig-iron, sheet-steel, scrap, and articles capable of magnetization.

In lifting articles of a flat or plate-like character it has been found that the ordinary magnets are usually of an insufficient diameter or when of sufficient diameter the poles are so widely separated that the reluctance is so great as to cause the magnetic flux to be weakened, and by consequence the benefit of the increased diameter of the magnet is lost.

I have designed a magnet involving principles of construction which eliminate the defects above noted and which is by reason of its particular arrangement more efficient and economical in actual use.

In the accompanying drawings, Figure 1 is a vertical cross-section of the type of magnet which I employ for lifting flat sheet-like articles. Fig. 2 is a plan view of the same.

Referring to the figures, it will be seen that the frame A of the magnet, which is a piece of metal of high magnetic permeability, is, as shown in Fig. 1, provided with two annular concentric magnetic coils B and C, held in grooves in the same plane on its lower face by retaining-rings B′ C′ and strips B^2 C^2, preferably of brass or some equivalent material. These coils are in parallel and so wound that the central pole-piece A′ and the outer annular pole-piece A^3 are of the same polarity, while the intermediate annular pole-piece A^2 is of the opposite polarity. By this arrangement the magnetic flux flows evenly and strongly from the intermediate pole toward the poles on each side thereof, thus having the flux extend over a great distance with the intensity usual upon a short distance. This gives the lifting-magnet a capacity for taking hold over a greater area of the material to be lifted and satisfactorily solves the problem heretofore presented by the increased reluctance. The separate coils are wound in parallel, and their terminals B^3 C^3 are protected by means of a casing A^4, integral with the frame and having a covering A^5 of mica or similar material. The frame A is provided with the usual eyebolts A^6. It will of course be obvious that this construction may be enlarged indefinitely, since I may extend the frame and provide a third coil, which shall be so wound that its outer pole-piece shall be of the same polarity as the pole-piece between the first two coils. This is simply a further development of the principle which I have shown and not a departure therefrom.

My reason for connecting up the coils in parallel instead of in series is to obtain a certain manipulative advantage whenever small articles, as castings, are handled.

When such material is transferred to the point of discharge, either the entire lot may be dropped at once by opening the circuits of all the coils at the same time or the material may be dropped gradually by opening the circuits of each coil successively, beginning with the outer coil. This latter procedure may be used to advantage where it is desired to distribute the material handled.

I claim—

1. A lifting-magnet comprising a top plate having a plurality of pole-pieces depending therefrom and a plurality of coils arranged on said depending pole-pieces and wound to create a number of magnetic poles in excess of the number of coils.

2. A lifting-magnet comprising a top plate having pole-pieces depending therefrom and a plurality of coils arranged on said depending pole-pieces and wound to create practically concentric zones of magnetic poles, the alternate zones being of the same polarity.

3. A lifting-magnet comprising a top plate having pole-pieces depending therefrom disposed around a center and so arranged that a radial line from the center of the magnet outward will cut at least three polar faces, the winding for the pole-pieces arranged on said depending pole-pieces and wound to have at least one less coil than the number of pole-pieces.

4. A lifting-magnet comprising a top plate having pole-pieces depending therefrom dis-

posed around a center and so arranged that a radial line from the center of the magnet outward will cut at least three polar faces alternate as to their polarity, the winding for the magnet arranged on said depending pole-pieces and wound to have at least one less coil than the number of pole-pieces.

5. A lifting-magnet having coils wound to form poles some of which are enveloped within the others, the number of poles at one end of the magnet always being in excess of the number of coils.

6. A lifting-magnet having a succession of at least three pole-pieces, one pole-piece being encircled by the others and coils wound to cause the lines of force of each pole-piece to pass to or from the adjacent pole-piece.

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

CHARLES E. F. AHLM.

Witnesses:
J. M. WOODWARD,
ALBERT H. BATES.