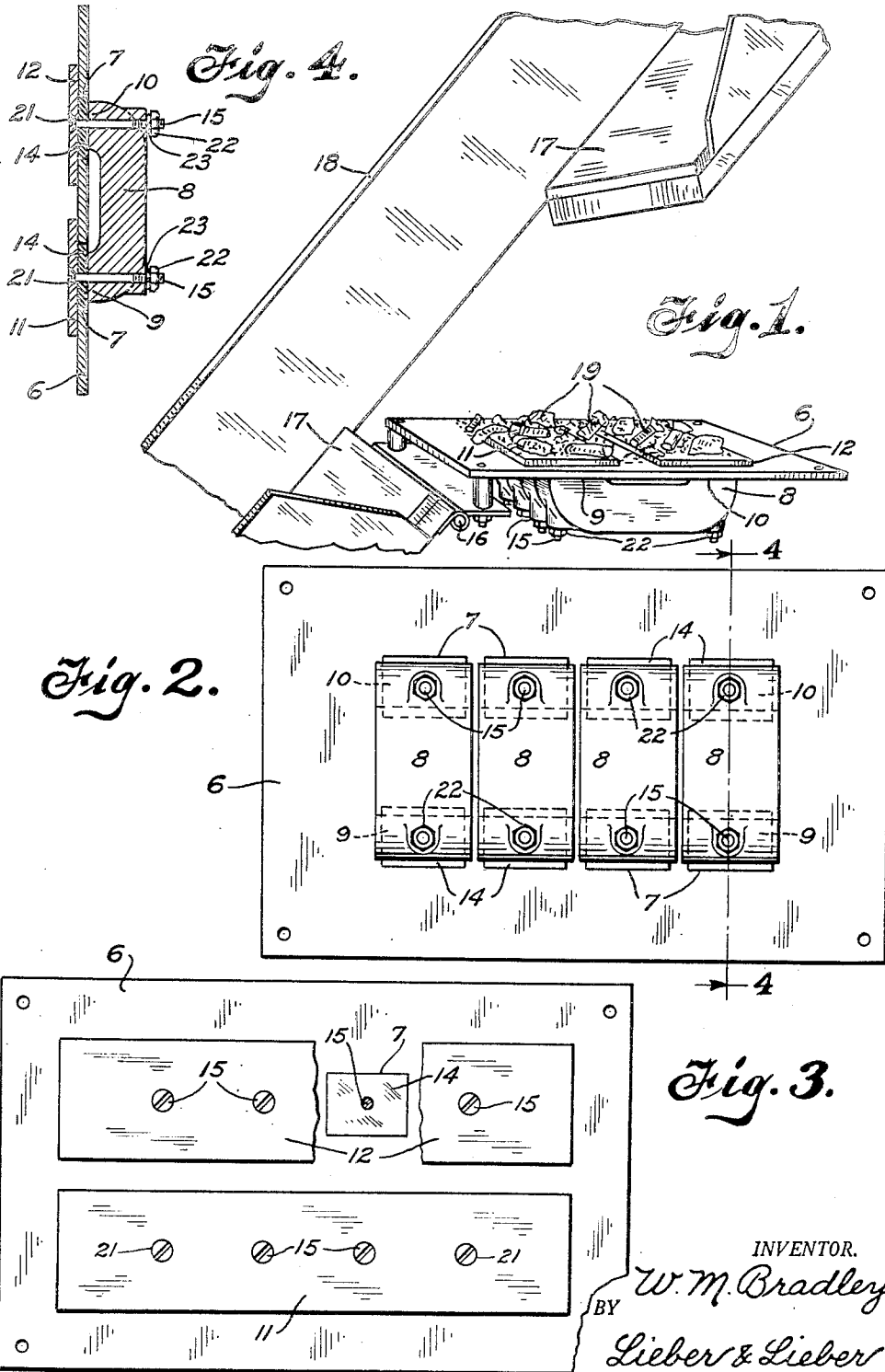


Aug. 1, 1950

W. M. BRADLEY
SPOUT MAGNET ASSEMBLAGE

2,517,174

Filed March 13, 1948



INVENTOR.
W. M. Bradley
BY
Lieber & Lieber
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,517,174

SPOUT MAGNET ASSEMBLAGE

William M. Bradley, Whitefish Bay, Wis., assignor
to Dings Magnetic Separator Co., Milwaukee,
Wis., a corporation of Wisconsin

Application March 13, 1948, Serial No. 14,692

1 Claim. (Cl. 209—223)

1

The present invention relates in general to improvements in devices for removing tramp metal from material being spouted in bulk along an inclined chute or the like, and relates more specifically to improvements in the construction and operation of spout magnet assemblages for effecting such tramp metal removal.

It has long been common practice to utilize both permanent and electro-magnets associated with the undersides of the inclined bottom plates of spouts or chutes, for the purposes of removing tramp metal from diverse bulk materials flowing downwardly along the upper surfaces of these plates. While some of these prior devices were quite satisfactory, most of them were too complicated and cumbersome, relatively frail and insufficiently durable, and too costly and unreliable in operation for general use.

It is therefore a primary object of my present invention to provide a powerful spout magnet assemblage for effecting tramp metal removal from diverse materials, which is simple and compact in construction, and which is also highly efficient and dependable in operation.

Another important object of this invention is to provide an improved metal catching unit for spouts or chutes, which is exceedingly light but durable in construction and flexible in its adaptations, and which embodies permanent magnets of high intensity associated with readily accessible wear plates.

A further important object of the present invention is to provide an improved spout magnet structure which may be conveniently installed and subsequently manipulated and utilized for the removal of accumulated tramp iron, but which requires no attention while in normal use.

Still another important object of my invention is to provide an improved magnetic device for removing tramp metals from rapidly advancing bulk materials of various kinds, which may be manufactured in units of different sizes and at moderate cost by merely adding or eliminating standard interchangeably similar permanent magnets and certain other parts.

These and other objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the construction and operation of a typical embodiment of my invention, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

2

Figs. 1 is a perspective view of a fragment of a material spouting chute having one of my magnet assemblages applied thereto but swung into inactive position, and showing an accumulation of tramp metal adhering thereto;

Fig. 2 is a somewhat enlarged bottom view of a four magnet spout unit embodying the invention;

Fig. 3 is a similarly enlarged top view of the four magnet unit, but having a portion of one of the face plates broken away in order to reveal one of the normally concealed washers interposed between each magnet pole and the adjacent face plate; and

Fig. 4 is a transverse section through the assemblage of Fig. 2, taken along the line 4—4.

While the invention has been shown and described herein as having been specifically embodied in a four magnet unit having permanent magnets formed of a specific type of material, it is not my desire or intention to unnecessarily restrict the improvement by virtue of this limited showing; and it is also contemplated that specific descriptive terms used herein be given the broadest possible interpretation consistent with the disclosure.

Referring to the drawing, the typical spout magnet assemblage or unit shown therein by way of illustration comprises in general, a rectangular main backing plate 6 having two parallel series of rectangular openings 7 therein; a plurality of laterally spaced permanent magnets 8 each having opposite poles 9, 10 spanning the corresponding openings 7 of the two series and coacting with the underside of the plate 6 beyond the opposite end edges of each opening; a pair of elongated rectangular face plates 11, 12 spanning the two series of openings 7 and coacting with the top or upper side of the plate 6 considerably beyond all edges of these openings; a rectangular washer 14 substantially filling each opening 7; and screws 15 securing the magnets 8, plates 11, 12 and washers 14 to each other and to the main plate 6.

The main supporting or backing plate 6 is preferably formed of relatively stiff and durable non-magnetic material and is provided along one edge with a strong hinge 16 for effecting swinging attachment of the magnet unit to the bottom 17 of a material spouting chute 18, as clearly shown in Fig. 1. The size and shape of the plate 6 and the hinge mounting thereof, should obviously be such that the plate 6 will provide continuity of the inclined spout bottom 17 when the magnet assemblage is in operating position,

and the unit may be detachably retained in such position in any convenient manner. The chute 18 may be utilized for the purpose of spouting various kinds of bulk materials which contain objectionable tramp metal such as cap screws and metallic fragments 19 as illustrated in Fig. 1, and it is the function of the improved magnetic separating unit to remove and retain this objectionable magnetic material as the bulk material flows or advances down the chute 18.

The permanent magnets 8 are of interchangeably similar construction, and are preferably formed of special material such as "Alnico" metal adapted to be intensely magnetized and to permanently retain such magnetism. This material contains aluminum, nickel, cobalt and iron, and the poles 9, 10 of the magnets 8 are formed integral with but project laterally away from the magnet bodies to thus provide horse-shoe shaped magnets. While the magnet poles 9, 10 of each magnet extend beyond the end edges of the adjacent openings 7 in the plate 6, the individual magnets 8 should preferably be spaced apart as shown in order to eliminate necessity of machining and fitting them along the adjacent side faces, see Fig. 2.

The elongated rectangular face plates 11, 12 which span the openings 7 on the side of the plate 6 opposite to that engaged by the magnets 8, are preferably formed of durable wear resistant magnetic material; and the rectangular washers 14 may be constructed of similar material. These washers 14 are of approximately the same size and shape as their receiving openings 7, but may be slightly thinner than the plate 6, so that final application of the screws 15 will cause the main plate 6 to be clamped between the plates 11, 12 and the corresponding magnets 8. Each of the screws 15 is preferably provided at one end with a head 21 embedded within and disposed flush with the upper surface of the adjacent face plate 11, 12; and has its opposite end screw threaded for the reception of a nut 22 coacting with a lock washer 23, see Fig. 4.

When the various parts of a spout magnet unit have been properly constructed as above described, they may be quickly assembled by merely inserting the washers 14 within the main plate openings 7, by thereafter positioning the magnets 8 and the face plates 11, 12 on opposite sides of the washers 14, and by finally applying the screws 15, nuts 22 and lock washers 23 to firmly unite the parts and to clamp the magnets and face plates to the main plate 6. The spacing washers 14 will then coact with the screws 15 to positively prevent subsequent shifting of the magnets 8 and face plates 11, 12; and when the hinge 16 has been mounted upon a chute bottom 17 having a cut-out as shown in Fig. 1, the main plate 6 may be swung into the cut-out and into alignment with the adjacent bottom sections of the chute 18, thereby placing the separator unit in proper position for normal use.

Bulk material containing tramp iron particles 19 may thereafter be spouted down the chute 18, and as these particles 19 enter the intense magnetic field created by the magnets 8 throughout the confines of the spout above the plates 11, 12, they will be caught and firmly held against the upper surfaces of these plates. The main supporting plate 6 may then be periodically released and swung downwardly as in Fig. 1, whenever no material is being spouted, whereupon the objectionable accumulations of tramp metal may be readily removed and the unit may be quickly re-

stored to operating condition. In case the face plates 11, 12 become excessively worn or damaged, they may be readily replaced when the mounting plate 6 is swung to open position, but the unit requires no attention when in operation.

From the foregoing detailed description, it will be apparent that my present invention provides a powerful spout magnet assemblage which is obviously exceedingly simple and compact in construction, while also being highly efficient in operation and flexible in its adaptations. The capacity of the improved unit may be readily varied to meet different conditions of operation by merely increasing or diminishing the number of interchangeably similar powerful but light permanent magnets 8 and washers 14, and by correspondingly varying the length of the plates 6, 11, 12. The several parts of the improved structure may be readily constructed and assembled or dismantled; and by utilizing permanent magnets 8 formed of "Alnico" undesirable electric wiring is obviated and the device may be permanently magnetized to maintain a magnetic field of high intensity.

The use of the washers 14 confined within openings 7 in the main plate 6, not only facilitates attachment of the magnets 8 and wear plates 11, 12 to the mounting plate 6, but also prevents material from passing through the openings and insures firm clamping of the elements to each other; and while the plates 6, 11, 12 and the washers 14 are shown as being of rectangular formation, they may be otherwise shaped in order to meet various operating conditions. The assembled units may be easily installed and subsequently cleaned and manipulated, and may also be manufactured in various sizes for diverse uses at moderate cost; and the devices have proven highly satisfactory and successful in commercial operation for the protection of diverse machines and equipment.

It should be understood that it is not desired to limit this invention to the exact details of construction and to the precise mode of operation and use, herein shown and described, for various modifications within the scope of the appended claim may occur to persons skilled in the art.

I claim:

A spout magnet assemblage comprising, a non-magnetic rectangular mounting plate having two parallel series of spaced rectangular openings therein, a magnetic washer of approximately the same thickness of said plate filling each opening, a rectangular magnetic face plate spanning all of the openings of each series and coacting with one side of said mounting plate beyond opposite edges of said openings, a permanent horse-shoe magnet having poles spanning the corresponding openings of both series and extending beyond opposite edges of the spanned openings, the adjacent magnets being spaced from each other, and means piercing said washers and coacting with said face plates and magnets to clamp the same against the opposite sides of said mounting plates.

WILLIAM M. BRADLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,162,190	Woodford	June 13, 1939
2,293,664	Roberts	Aug. 13, 1942