April 11, 1950 K. A. BLIND 2,503,467

CAN HANDLING MAGNET

Filed Jan. 16, 1948

FIG. 1.

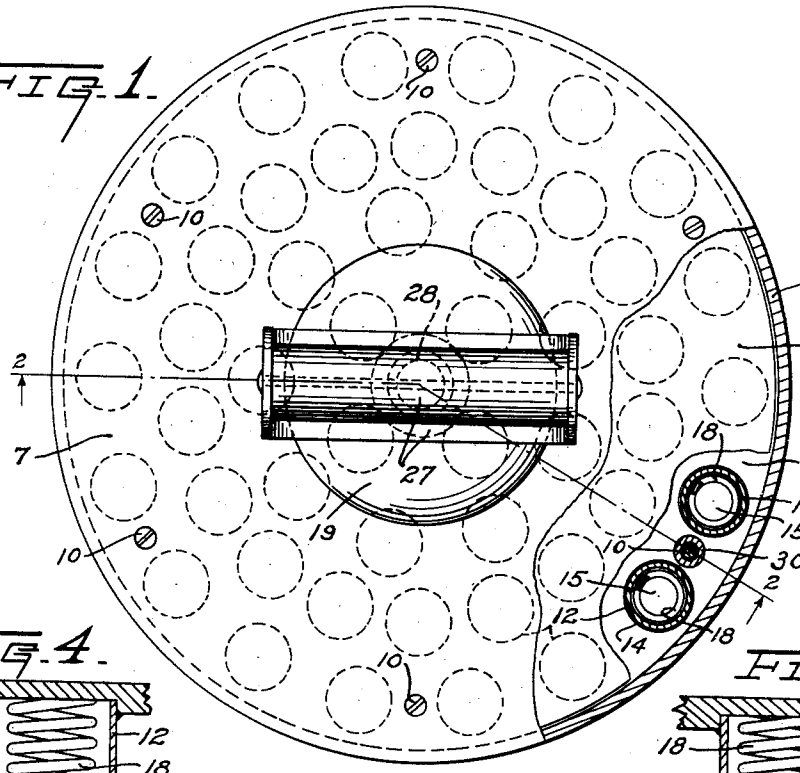


FIG. 4.

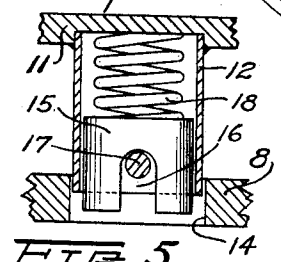


FIG. 3.

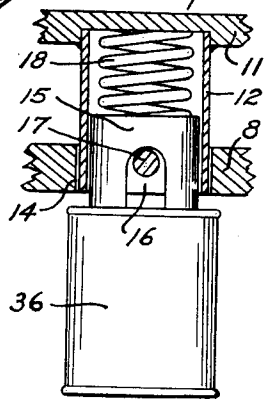


FIG. 5.

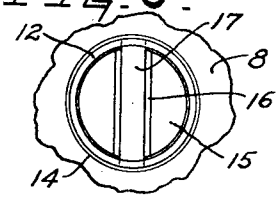


FIG. 2.

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CAN HANDLING MAGNET

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6 Claims. (Cl. 294—65.5)

1

My invention relates generally to improvements in devices for facilitating transportation of food laden containers such as metal cans from place to place in canning factories and warehouses, and relates more particularly to improvements in the construction and operation of permanently magnetized can handling magnets or the like.

The primary object of the present invention is to provide an improved magnet assemblage for attracting and firmly holding one or more relatively frail bodies such as metal cans or metal covered jars, and for releasing the articles from the magnet or magnets.

It is frequently desirable in many industries and especially in canning factories, to transfer a group of bodies or articles such as commodity laden metal cans and jars having metallic closure caps, from one locality to another, both gently and without undue impact or shock. Such handling and transference of the cans and jars may be readily effected with the aid of one or more electro-magnets or permanent magnets; but due to the relatively frail nature of the commodity containers, the magnets must function so as to avoid excessive impact and to positively hold the receptacles while suspended from the transporting magnets. Then too, it must be possible to quickly grasp and to release the articles from the holding magnets, without danger of denting the thin metallic enclosures thereof; and while the prior electro-magnetic devices are adapted to meet all of these requirements, they are relatively bulky and cumbersome due to the use of energizing solenoids, coils and wires, and the previous permanent magnets have not been sufficiently reliable and easy to manipulate.

It is therefore a more specific object of my present invention to provide an improved permanently magnetized can handling unit, which is simple and compact in construction, and which is also readily manipulable and highly efficient in use.

Another specific object of this invention is to provide an improved permanent magnet for attracting and firmly holding relatively frail metallic bodies in suspension, together with improved instrumentalities for quickly and effectively releasing the articles from the magnet.

A further specific object of the invention is to provide an improved permanently energized magnet assemblage wherein one or more magnets are adapted to hold one or more commodity laden cans or jars of diverse sizes while being transferred from place to place.

Still another specific object of my invention is

2

to provide a plural magnet assembly wherein the several magnets are automatically and independently adjustable so as to accommodate irregular surfaces of the articles engaged by the several magnets.

An additional specific object of the present invention is to provide a plural magnet can lifting device wherein all of the magnets may be quickly and gently applied to and released from one or more of the containers.

Another specific object of this invention is to provide a compact and durable can handling magnet assemblage which may be readily assembled, manipulated, and dismantled, and which may be manufactured at moderate cost for diverse uses.

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

A clear conception of the various features constituting my present improvement, and of the mode of constructing and of utilizing can handling magnet assemblages embody these features, may be had by referring to the drawing accompanying and forming a part of this specification wherein the reference characters designate the same or similar parts in the various views.

Fig. 1 is a top view of a typical plural magnet can handling assemblage having portions broken away to reveal normally concealed structure;

Fig. 2 is a transverse vertical section through the same can handling magnet assembly, taken along the irregular line 2—2 of Fig. 1;

Fig. 3 is an enlarged transverse vertical section through one of the individual magnet units showing the same in action with a can suspended therefrom;

Fig. 4 is a likewise enlarged transverse vertical section through the magnet unit showing the magnet in released position; and

Fig. 5 is a bottom view of the enlarged magnet unit.

While the invention as shown is especially advantageous for use in handling commodity laden cans or metal capped jars, either singly or in multiple, it is not my desire or intent to unnecessarily limit the scope or utility of the improved features by virtue of this restricted showing.

Referring to the drawing, the multiple magnet can handling assemblage specifically illustrated, comprises in general a portable casing having upper and lower plates 7, 8 respectively, firmly attached to an annular wall 9 by means of bolts or screws 10; a magnet suspension disk 11 vertically movable within the casing wall 9 along the screws

10 and having a plurality of tubular guides 12 depending therefrom and slidable within openings 14 formed in the lower casing plate 8; a cylindrical bifurcated magnet 15 slidably confined within each of the guides 12, and each having a pair of laterally spaced lower poles separated by a recess 16 coacting with a transverse pin 17 secured to the adjacent guide 12, and being urged outwardly by a helical spring 18; a circular housing 19 attached to the top plate 7 by cap screws 20 and having a large central bore 21 and a bearing 22 disposed coaxially of the bore; a guiding sleeve 24 coacting with the housing bore 21 and being secured to the magnet suspension plate 11 by means of a clamping plate 25 and cap screws 26; and a manipulating handle member 27 having a rigid stud 28 journalled for rotation in the housing bearing 22 and provided with cam threads 29 coacting with threads formed in the clamping plate 25.

The cylindrical bifurcated magnets 15 are preferably formed of material such as "Alnico" metal having high magnetic energy characteristics, this metal containing aluminum, nickel, cobalt, copper and iron, and being susceptible of intense permanent magnetization. The gap width or pole spacing should be designed for maximum surface strength with relatively small range. The mechanical combination of the magnet and spring in each sub-assembly facilitates mechanical contact between each magnet and the article to be lifted. Surface strength combined with sufficient range to magnetically attract the articles through an air gap, requires considerable energy and permanent magnet material. The springs 18 obviate the factor of range, and considerable economy in material and weight results from their use. The tubular magnet guides 12 as well as the plates 8, 11 and the annular wall 9 should preferably be formed of non-magnetic material in order to concentrate the fields of magnetic influence at the magnets. The helical compression springs 18 which coact with the upper surfaces of the magnets 15, constantly urge the latter toward their stop pins 17; and these pins are secured to the adjacent guides 12 as shown in Fig. 5, while the tubular guides may be rigidly attached as by fusion of metal, to the suspension plate 11.

The casing plates 7, 8 may be firmly but detachably secured to the ring wall 9 by means of the screws 10 which also guide the suspension plate 11 near its periphery; and each of the screws 10 is embraced by a stop collar 30 beneath the plate 11 and by a helical compression spring 31 above the plate 11. The collars 30 serve to limit the downward movement of the plate 11 and magnet guides 12, while the springs 31 constantly urge the plate 11 downwardly; and the guiding sleeve 24 which is firmly but detachably secured to the movable plate 11 by means of the clamping plate 25 and cap screws 26, is freely slidable within the housing bore 21, whenever the handle member 27 is manipulated to positively move the magnets 15. The handle member 27 may be of any desired formation, preferably loop shaped in order to readily cooperate with a crane hook or the like, and the spindle stud 28 may be welded to the handle and is provided with an annular groove 32 within the bearing 22 and with which a set-screw 34 is cooperable so as to prevent axial displacement of the spindle relative to the housing 19, see Fig. 2.

The cam threads 29 formed on the spindle stud 28 and which coact with similar threads formed

in the clamping plate 25, are preferably of the quick pitch type, and may be replaced by any other cam formation capable of quickly moving the magnet suspension plate 11 up or down whenever the spindle is rotated in the bearing 22; and the plate 25 may also be provided with a stop washer 35 as shown, adapted to coact with the top of the housing 19. The assemblage is obviously so constructed, that when the plate 11 is lowered as in Fig. 2 the bottom of the plate 11 will engage the stop collars 30 and the lower extremities of the tubular guides 12 will be flush with the lower face of the casing plate 8; whereas elevation of the plate 11 until the stop washer 35 engages the housing 19, will withdraw the guides 12 and magnets 15 upwardly into the adjacent openings 14 as illustrated in Fig. 4. Such lowering and raising of the magnet suspension plate 11 may be quickly and conveniently effected by merely twisting the handle member 27 in the proper direction relative to the main casing and housing 19.

When the improved can handling magnet assemblage has been properly constructed as above described, it may be manipulated as follows to transfer one or more food laden cans 36 or the like, from place to place. While the cans 36 are resting upon a support, the magnet assembly with the individual permanent magnets 15 protruding beyond the lower plate 8 as in Figs. 2 and 3, may be lowered to cause the magnet poles to engage the can tops, whereupon the magnets will attract and become firmly attached to the cans. The backing springs 18 will permit the individual magnets 15 to automatically adjust themselves to unevenness in the can surfaces so as to insure most effective contact at the pole faces, and when the assemblage is subsequently lifted away from the initial can support, the cans 36 will be lifted and held in suspension by the magnets 15 coacting therewith. After the suspended cans 36 have been transferred to the desired locality, they may be brought in contact with a new support, and they may then be released from the magnets 15 by merely twisting the handle member 27 so as to positively elevate the plate 11, guides 12 and magnets 15 as depicted in Fig. 4, thus freeing the cans.

It will be apparent that the cans 36 may thus be quickly and conveniently attached to and released from the magnets 15, and obviously one or more of these magnets may be caused to cooperate with one or more of the cans 36. When very large cans 36 are being handled, all of the magnets 15 may cooperate with the individual cans, but in every instance the springs 18 permit the magnets to properly engage the can surfaces. The springs 31 which coact with the upper surface of the magnet suspension plate 11 aid in urging this plate downwardly when the magnets are lowered, and also eliminate undesirable lost motion, and the tubular guides 12 and sleeve 24 cooperate with the parallel screws 10 to effectively guide the plate 11 during its movement. The pins 17 also coact with the recesses 16 to permit slight rocking motion of the magnets 15; and the specific formation of the gaps formed by these recesses 16 combined with the springs 18, is an extremely important feature of the present improvement.

From the foregoing detailed description, it will be apparent that the present invention provides a can handling magnet assemblage which is in fact simple, compact and durable in construction, and which is also readily manipulable and effec-

tive in use. The improved device comprises relatively few simple parts which may be easily manufactured and assembled, and which may also be readily dismantled for inspection. Many of these parts such as the magnets 15 are interchangeably similar thus reducing the cost of construction to a minimum, and by utilizing "Alnico" metal in the magnets a powerful permanently magnetized assemblage results. The improved assemblages may also be produced in diverse sizes for various uses, and the cam release makes it possible to quickly and effectively simultaneously remove all of the cans 36 from the magnets 15 while the resilient backing of these magnets permits them to be gently applied to the can surfaces without damaging the articles. The improvement has proven highly satisfactory and successful in actual use, and obviously obviates many complications inherent in electro-magnetic devices of this kind.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of operation of the can handling magnet, herein shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art; and it is also intended that specific descriptive terms used herein be given the broadest possible interpretation consistent with the disclosure.

I claim:

1. In a can handling magnet assemblage, a portable casing having a series of lower openings, a suspension plate reciprocable within said casing and having a series of tubular non-magnetic guides slidable within said openings, a permanent magnet slidably confined within each of said guides, and means for resiliently urging each of said magnets outwardly beyond the adjacent guide.

2. In a can handling magnet assemblage, a portable casing having a series of lower openings, a suspension plate reciprocable within said casing and having a series of tubular non-magnetic guides slidable within said openings, a permanent magnet slidably confined within each of said guides, means for resiliently urging each of said magnets outwardly beyond the adjacent guide, and means for lifting said plate relative to said casing to simultaneously retract all of said guides and magnets into said casing.

3. In a can handling magnet assemblage a portable casing having a series of lower openings, a suspension plate reciprocable within said casing and having a series of tubular non-magnetic guides slidable within said openings, a permanent magnet slidably confined within each of said

guides, a spring for constantly urging each of said magnets outwardly beyond its guide, and cam means for lifting said plate relative to said casing to simultaneously elevate all of said guides and magnets beyond the lower confines of said casing.

4. In a can handling magnet assemblage, a portable casing having a series of lower circular openings, a suspension plate guided for reciprocation within said casing and having a series of hollow cylindrical non-magnetic guides slidable within said circular openings, a cylindrical permanent magnet slidably confined within each of said guides, and means for resiliently urging each of said magnets outwardly beyond the adjacent guide.

5. In a can handling magnet assemblage, a portable casing having a series of lower circular openings, a suspension plate guided for reciprocation within said casing and having a series of hollow cylindrical non-magnetic guides slidable within said openings, a cylindrical permanent magnet slidably confined within each of said guides, means for resiliently urging each of said magnets outwardly beyond the adjacent guide, and rotary cam means for lifting said plate relative to said casing to simultaneously retract all of said guides and magnets into said casing.

6. In a can handling magnet assemblage, a portable casing having a series of lower openings, a suspension plate reciprocable within said casing and having a central opening provided with quick-pitch threads and also having a series of tubular non-magnetic guides slidable within said casing openings, a permanent magnet slidably confined within each of said guides, a spring for constantly urging each of said magnets outwardly beyond its guide, and a spindle stud journalled in said casing and having quick pitch threads cooperable with said plate threads to lift said plate relative to said casing and to thereby simultaneously elevate all of said guides and magnets beyond the lower confines of said casing.

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REFERENCES CITED

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

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Number	Name	Date
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FOREIGN PATENTS

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