May 27, 1969 J. N. LIKHACHEV ET AL 3,445,987

DEVICE FOR PACKING FERROMAGNETIC PIECES

Filed Jan. 30, 1967 Sheet 1 of 3

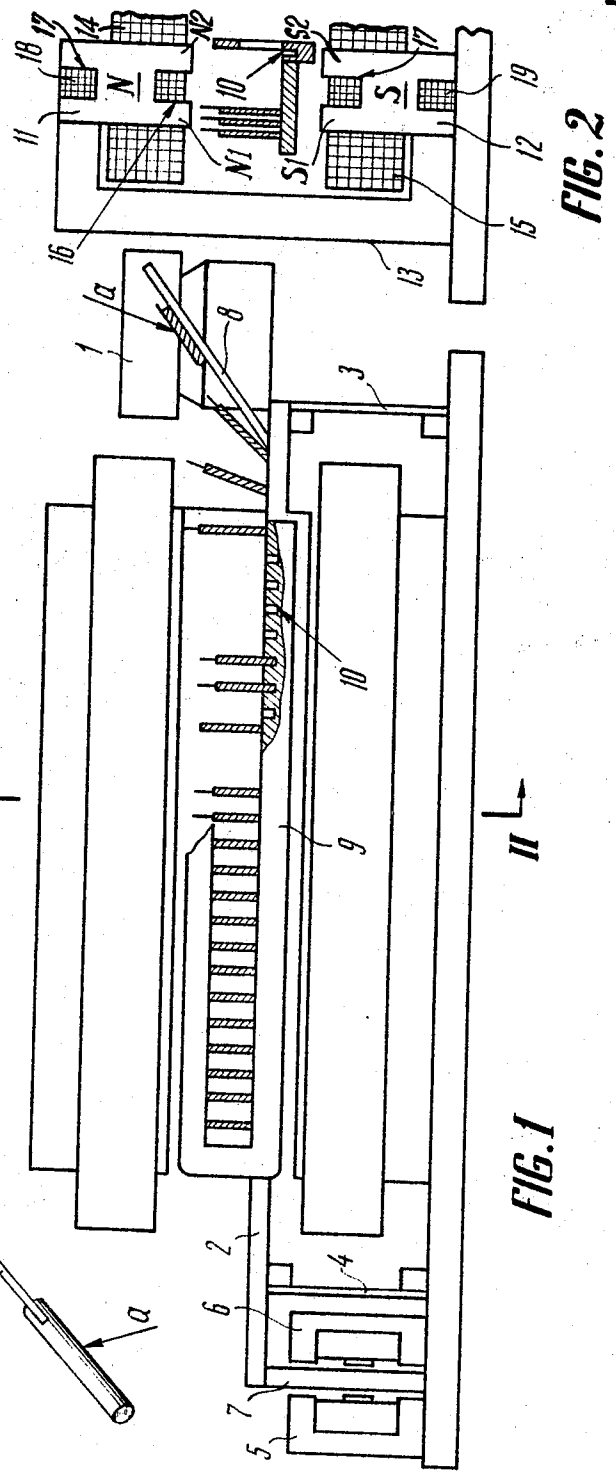


FIG. 2

FIG. 1

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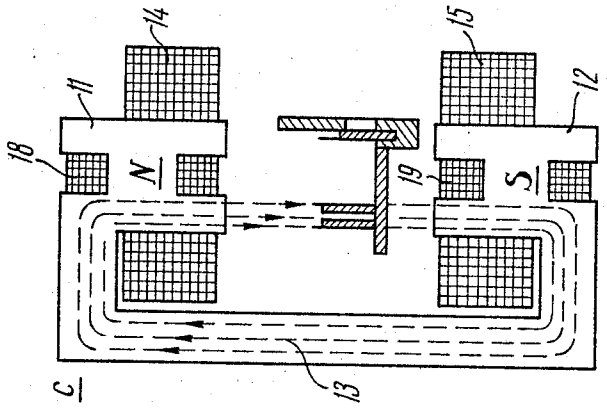


FIG. 3c

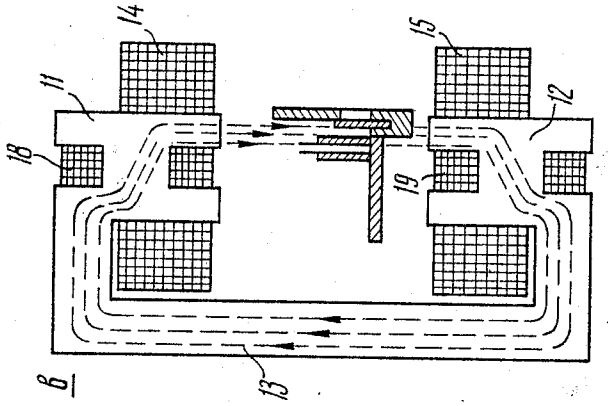


FIG. 3b

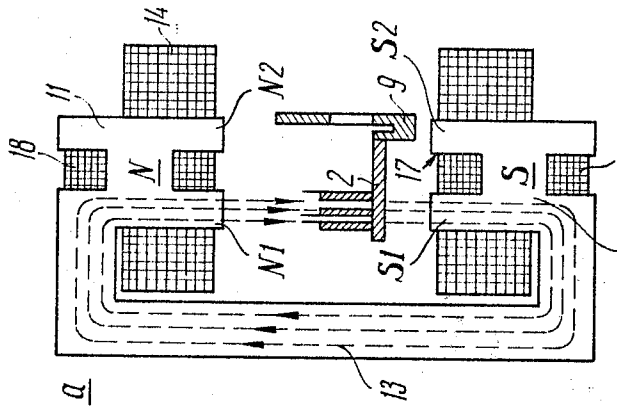


FIG. 3a

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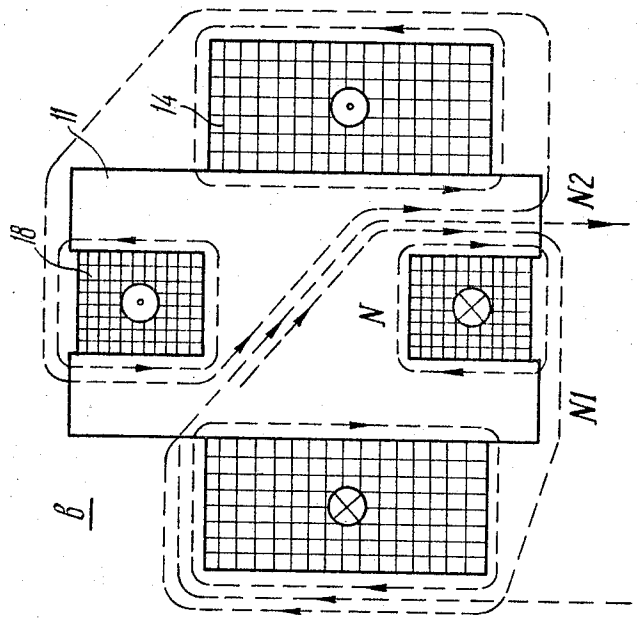


FIG. 4b

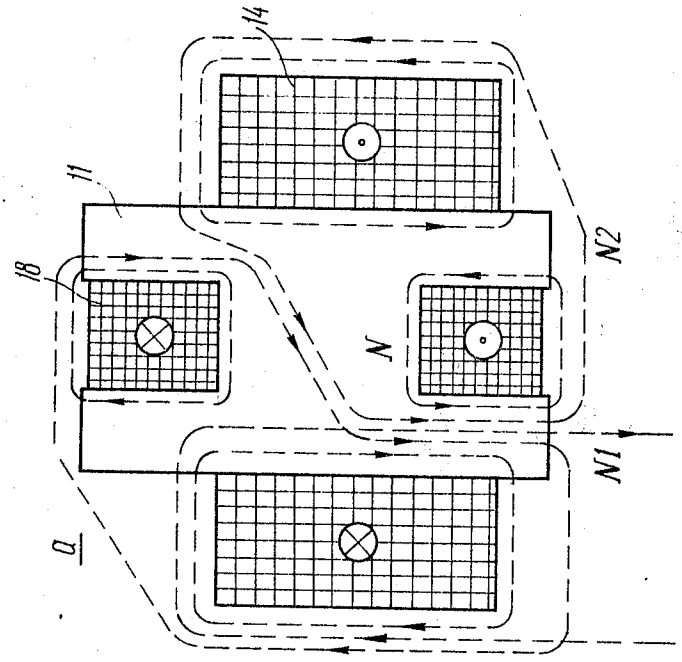


FIG. 4a

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DEVICE FOR PACKING FERROMAGNETIC PIECES

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U.S. Cl. 53—166

2 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to devices for packing ferromagnetic pieces, mostly extended ones, particularly for packing cathode bases in a row with a preset pitch.

Known in the art is a device for packing ferromagnetic pieces, which has a vibrating chute arranged in a gap between the opposite polar tips of a C-shaped electromagnet. Pieces are oriented in the magnetic field of the electromagnet parallel to the working surface of the vibrating chute, move along said chute and then are packed (see the FRG Patent No. 1,072,184).

A disadvantage of said device is that it can be used exclusively for piling pieces, which fact may lead to deformation of the latter.

The object of the present invention is to provide a device free of said disadvantage.

Another object of the invention is to raise labor efficiency by packing pieces in a row with a preset pitch.

In the accomplishment of said and other objects in the device according to the invention magnetizing coils arranged around the outer surface of the polar tips are so fashioned as to induce a magnetic field perpendicular to the working surface of the vibrating chute on which detachable magazines are flush-mounted, said device having additional magnetizing coils placed so that a change in the direction of the magnetic field causes nonuniformity of the main magnetic field in the direction of the magazines and from them, thereby ensuring reciprocating motion of the pieces relative to said magazine.

It is preferable to make the polar tips H-shaped and arrange the additional coils in the tip grooves perpendicularly to the main magnetizing coils.

Further on the invention will be made apparent by a description of a preferred embodiment thereof, reference being had to the accompanying drawings, wherein:

FIG. 1 is a general front view of the device according to the invention;

FIG. 2 is a section on line II—II of FIG. 1;

FIGS. 3*a*, *b*, and *c* show the position of the pieces on the vibrating chute within the magnetic field of the electromagnetic coils when the device is in operation and the additional magnetizing coils are cut in; and

FIGS. 4*a* and *b* show the direction of the magnetic power lines within the magnetic field of the device when the additional coils are cut in.

The device has a vibrating bin **1** (FIG. 1), a vibrating chute **2** mounted on springs **3** and **4**, two vibrators **5** and **6** shifted in phase and placed on both sides of an armature **7** rigidly secured to the vibrating chute **2**. Mounted in the right end of said vibration chute is a feeding chute **8** connected with the vibrating bin and inclined at such an

angle as to insure the vertical position of the cathode bases *a* when they get onto the vibrating chute **2**. The front side of the vibrating chute **2** carries a magazine **9** having pockets **10** (FIG. 2) whose shape corresponds to the section of the packed cathode bases *a*. The magazine **9** is flush-mounted on the working surface of the vibrating chute **2** so that the top edge of the pocket **10** be precisely as high as the upper surface of the vibrating chute **2**. The vibrating chute is to be mounted between the opposite polar tips **11** and **12** of a C-shaped electromagnet **13**, said polar tips being H-shaped. Wound around the tips **11** and **12**, on their outer portions, are magnetizing coils **14** and **15** which induce a magnetic field perpendicular to the working surface of the vibrating chute **2**. Wound in the grooves **16** and **17** are of the H-shaped polar tips **11** and **12** are additional coils **18** and **19** which are perpendicular to the magnetizing coils **14** and **15** and divide the tips **11** and **12** into two pairs of polar tips N_1S_1 and N_2S_2.

The device of the invention operates as follows.

From the vibrating bin **1** a cathode base *a* oriented with its connector **20** backwards goes onto the vibrating chute **2** from the inclined feeding chute **8** and is maintained in the vertical position with the aid of butts provided on the surface of the vibrating chute under the effect of the magnetic field induced by the magnetizing coils **14** and **15**. By successively switching on the vibrators **5** and **6**, the vertically positioned cathode bases *a* are uniformly distributed on the vibrating chute **2**. When loading the vibrating chute the coils **18** and **19** are so connected that the magnetic field is concentrated between the poles N_1S_1 of the tips **11** and **12** (FIGS. 3*a* and 4*a*), the cathode bases *a* being located within the zone of a maximum magnetic flux, i.e., between the poles N_1S_1. Then the direction of the current in the control coils **18** and **19** is changed for the opposite one, and the magnetic field is concentrated between the poles N_2S_2 (FIGS. 3*b* and 4*b*) of the tips. With both vibrators in operation, the cathode bases *a* move along the vibrating chute **2** toward the magazine **9** falling into its pockets **10**. Once said pockets **10** are filled, the magazines **9** change the direction of the current in the control coils **18** and **19** for the opposite one, the magnetic flux is concentrated between the poles N_1S_1 of the tips **11** and **12** (FIG. 3*c*), and the cathode bases *a* return to their initial position. The magazines **9** filled with by the cathode bases *a* are removed and exchanged for the empty ones. After that the cycle is repeated.

The realization of the present invention will make it possible to avoid deformation of the pieces when packing the latter, and to pack them in a row with a preset pitch, which brings about a considerable increase of labor efficiency.

We claim:

1. A device for packing ferromagnetic pieces, comprising: an electromagnet of a C-shaped section; magnetizing coils arranged around the outer surface of the opposite polar tips of said electromagnet; a vibrating chute provided between said polar tips with the magnetizing coils so that the magnetic field in a gap between said tips is perpendicular to the working surface of said vibrating chute; detachable magazines with pockets for pieces, flush-mounted on said vibrating chute; additional magnetizing coils arranged so that a change in the direction of their magnetic field causes nonuniformity of the main

magnetic field in the direction of the magazines and from them, said nonuniformity insuring reciprocating motion of the pieces relative to said magazines.

2. A device as claimed in claim 1, wherein the polar tips are H-shaped, and said additional magnetizing coils are placed in the grooves of said H-shaped coils perpendicuarly to the main magnetizing coils.

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THERON E. CONDON, *Primary Examiner.*

NEIL ABRAMS, *Assistant Examiner.*

U.S. Cl. X.R.

29—203, 211; 53—236; 198—41; 214—1