

No. 843,312.

PATENTED FEB. 5, 1907.

W. N. VANCE.  
MAGNETIC WORK HOLDER.  
APPLICATION FILED SEPT. 20, 1906.

Fig. 1

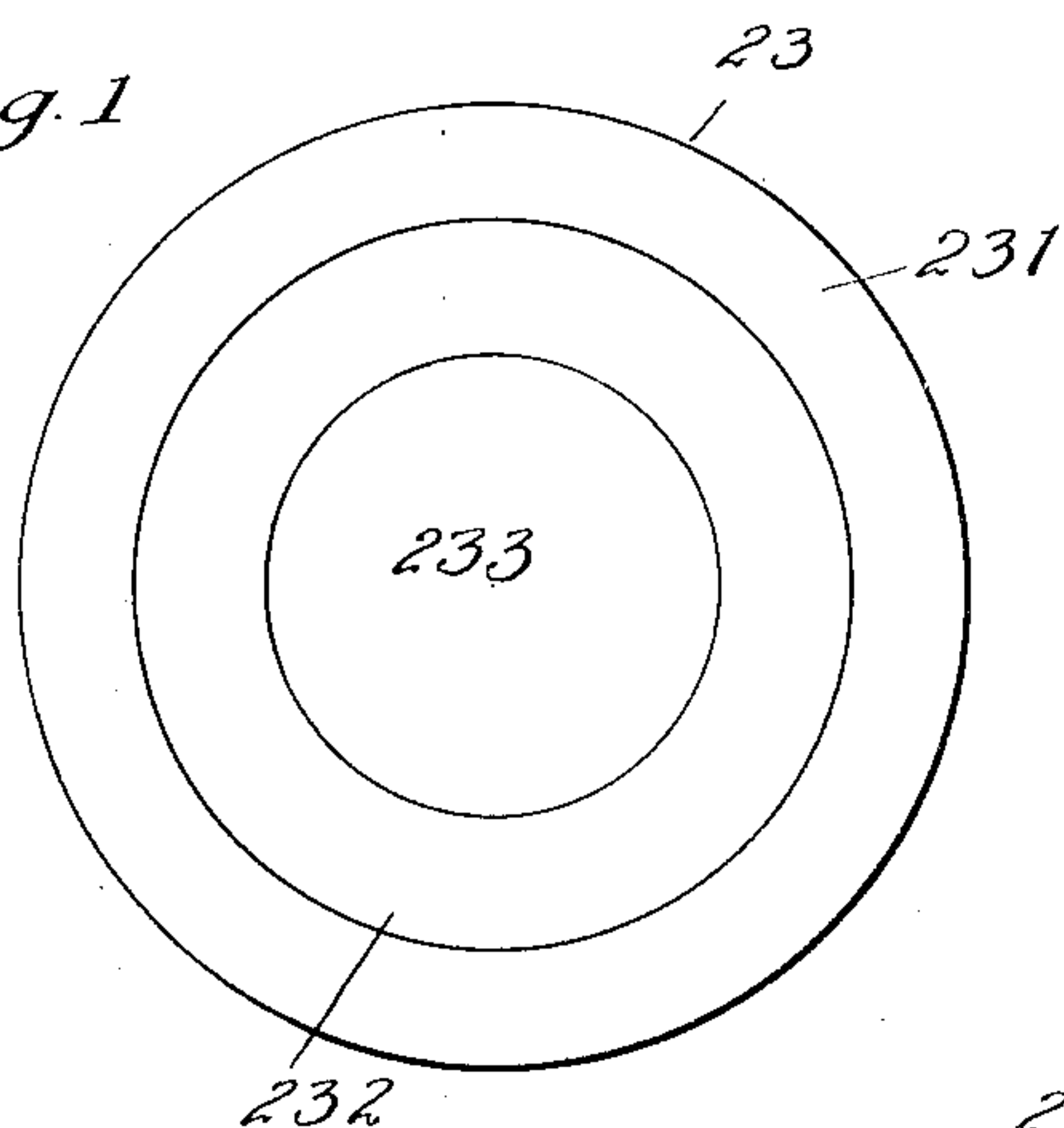


Fig. 2

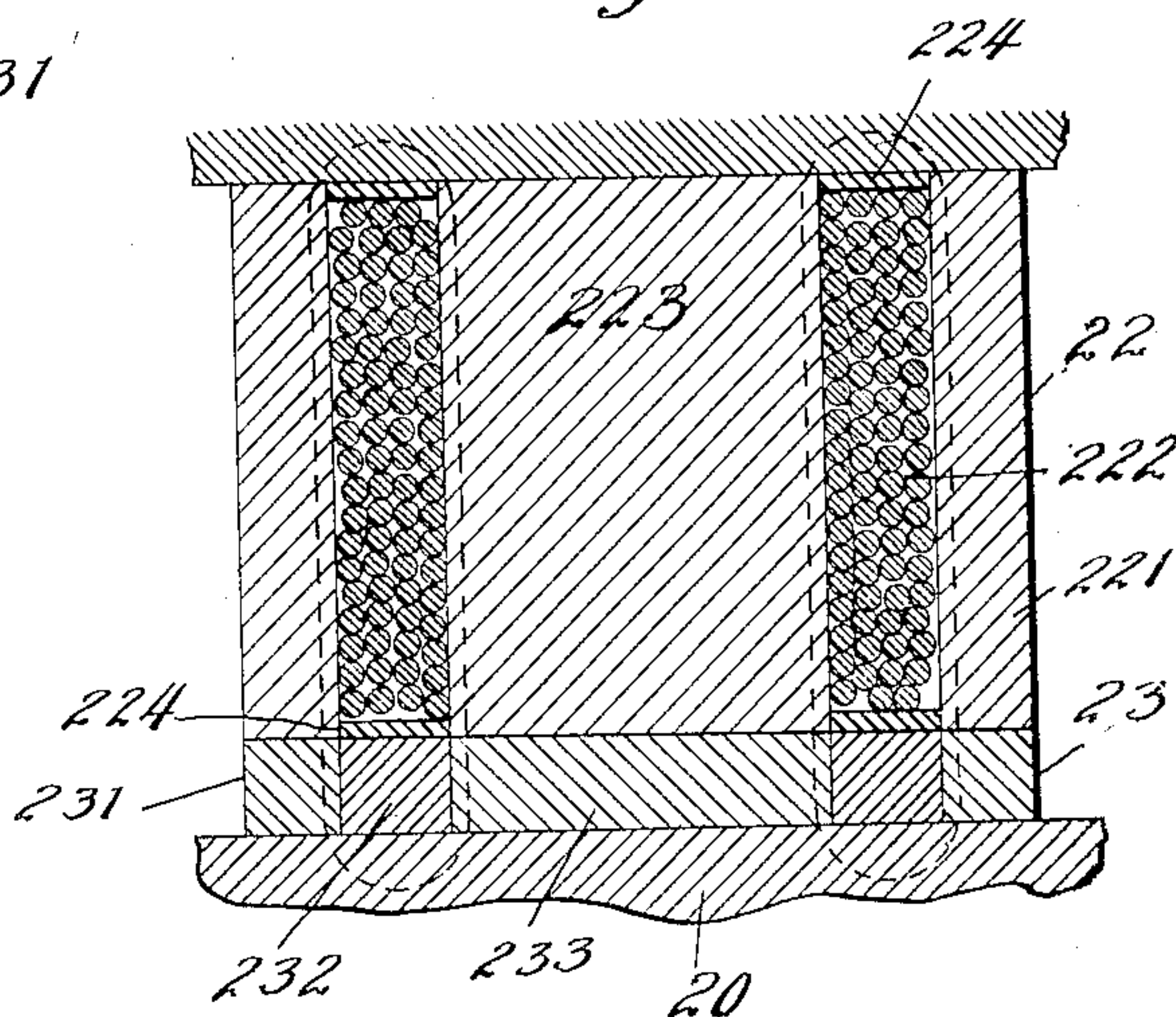


Fig. 3

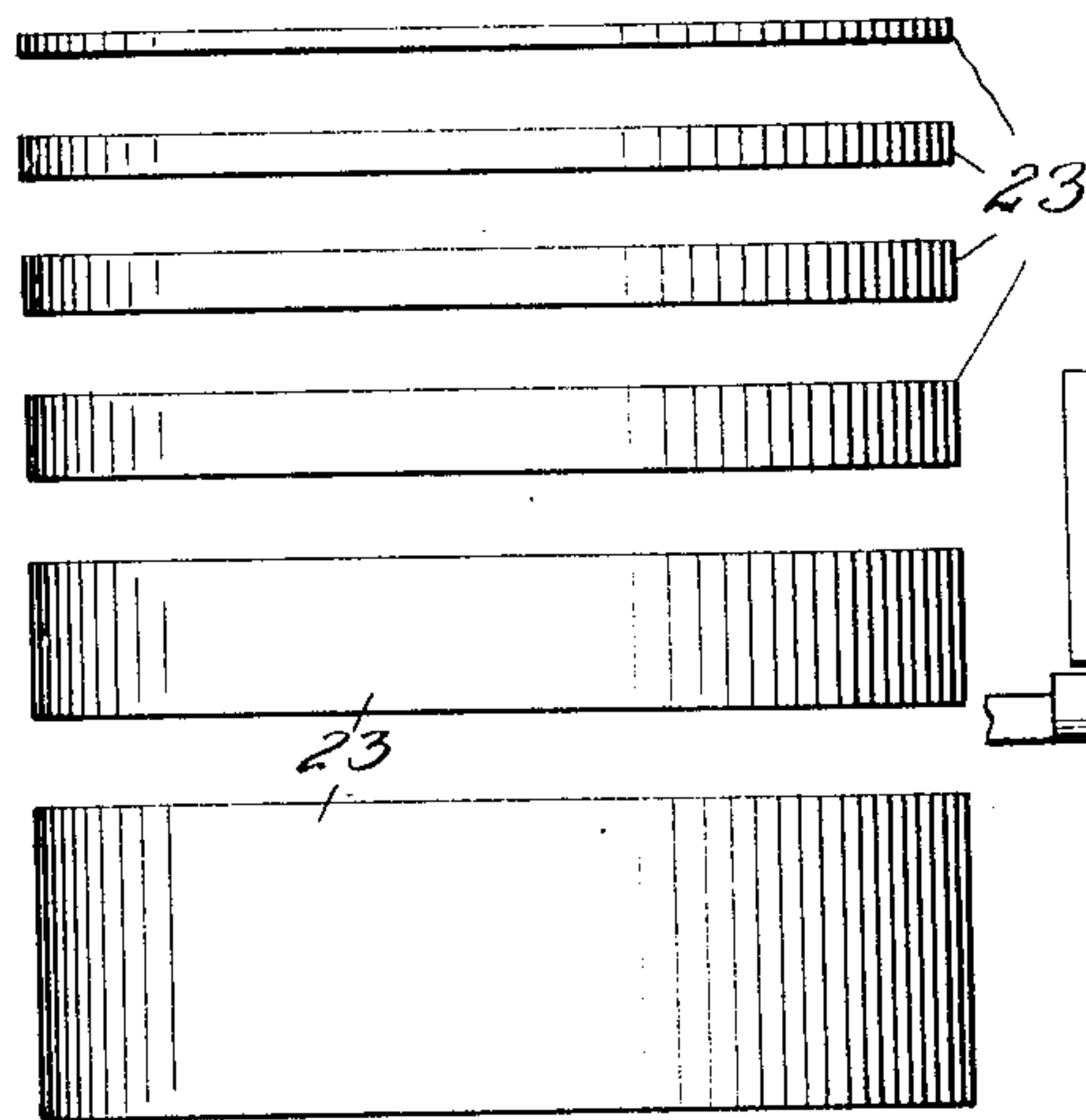
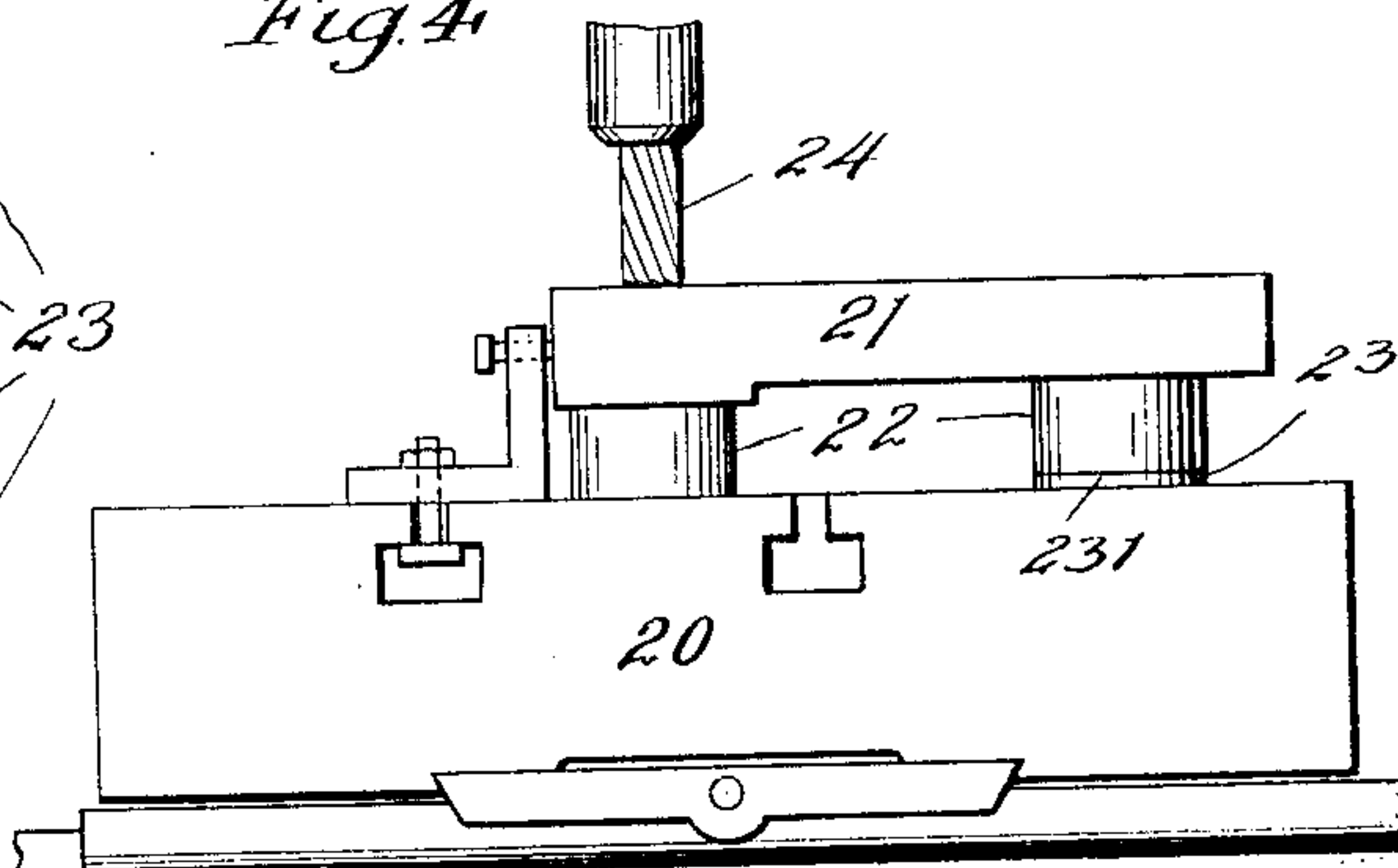


Fig. 4



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# UNITED STATES PATENT OFFICE.

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## MAGNETIC WORK-HOLDER.

No. 843,312.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed September 20, 1906. Serial No. 335,398.

*To all whom it may concern:*

Be it known that I, WALTER N. VANCE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Magnetic Work-Holders, of which the following is a specification.

This invention relates to an improvement in magnetic work-holders; and it consists in providing the ordinary work-holder with a supplement or lift-piece so constructed as to lift the work-holder magnet a determined distance above the bed of the machine, and thus lift the work that much farther up, and at the same time to cause the magnet to be attracted by the bed by reason of the lines of force about said holder-magnet being compelled to pass through the metal of the bed in order to complete their circuit. This is accomplished by making the supplement or lift in two parts or pieces of magnetic metal, as steel, and separating the two pieces by a piece of non-magnetic material, as copper, the whole being so arranged that the magnetic material will prolong the poles of the workholder-magnet.

In the accompanying drawings, which form a part of this specification, Figure 1 represents a top or plan view of one of my improved supplementary lifts. Fig. 2 represents a vertical section of a portion of a machine-bed to which work is to be held, of the work to be so held, of an ordinary workholding magnet, and of one of my supplementary lifts. Fig. 3 shows an edge view of a series of the supplementary lifts to illustrate the use of a set of them of varying thicknesses in aliquot parts of an inch, and Fig. 4 is a fragmentary elevation of a machine-bed with the work thereon and held by a magnetic work-holder by aid of one of my supplementary lifts.

In my patent No. 807,517, dated December 19, 1905, I show a work-holder composed of two magnets, one movable upon the other, for purposes of adjustment as to height or as to relative inclination of the upper and lower poles or holding-faces. These holders may be used handily to hold almost any kind of work, even though made only in one part; but whether the magnetic holder is made thus in one part in the form of a rigid integer or in two parts, one movable on the other and involving two energizing-coils, I find it extremely convenient to provide for use with

such holders a set of the supplementary lifts herein to be described.

In the said drawings, 20 represents the bed of an ordinary shaping-machine.

22 are the holding-magnets that hold the work 21 to the bed by magnetic attraction.

23 is one of the supplementary lifts shown in position at Figs. 2 and 4, and 24 is the cutting-tool to operate on the work held on the bed or table.

The holding-magnet selected to illustrate is the simplest form of a one-part magnet composed of the outer steel shell 221, the coil 222, connected to an electric current, the inner steel core 223, and the copper closing-plates 224.

The supplementary lift 23, as illustrated, is made in circular form to correspond to the form and size of the holder-magnet and is shown to be composed of an outer ring or shell 231, corresponding in size and shape laterally with the shell 221 of the magnet, an intermediate copper annulus 232, corresponding in lateral dimensions with the coil of the magnet, and an inner core 233, corresponding to the core of the magnet. The outer shell 231 and the inner core 233 of the lift are made of magnetic metal, steel preferred.

In Fig. 3 a series or set of the lifts such as is above described is shown, the set consisting of six different thicknesses of lift, the thickest being one inch in height, the next half an inch, the next one-fourth of an inch, the next three-sixteenths of an inch, the next one-eighth of an inch, and the next one-sixteenth of an inch. By use of such a series employing a single lift or more than one piled together any ordinary amount of required raise of the holding-magnet may be attained.

The lift or lifts are used as follows: Suppose a piece of work is to be held to the bed and its upper surface milled to a plane parallel to its under surface or some part thereof, a condition that often happens, and suppose, further, that the under surface of the piece has a shoulder or offset—for example, like the piece of work shown in the machine at Fig. 4—also a thing that often occurs, and it is desired to hold the piece with the upper surface true and solid, and yet in such manner that the piece may be easily and quickly replaced when finished by another of the same kind. To do this, the workman selects a lift of the same thickness or height as the



offset or shoulder and places it under one of the magnets. This makes the two magnets of differing heights, one being higher than the other by the depth of the shoulder or offset, so that the upper surface of the piece of work is maintained parallel to the face of the bed, and consequently parallel to the under face of the piece. The reason why the supplementary lift is able to hold the work to the bed is because the construction of the lift is such that the lines of magnetic force cannot return to themselves without passing through the bed of the machine when the lift is used. These lines are represented by the dotted lines in the Fig. 2, for example. It will be seen that to complete the circuit of these lines through magnetic metal they must pass through the work above and also through the bed below, as they will not go through the copper annulus.

By combining with the set of magnetic holders—three usually constituting such set—a set of the supplemental lifts to coact therewith and with the work of magnetic metal and the machine-bed of magnetic metal almost any piece of work, however troublesome its offsets, can be held and successfully milled, the lifts of varying thickness enabling the workman to adjust the piece so that its upper surface will be in the proper

plane to be cut as desired, and this can be done with magnets of an integral core.

I claim—

1. The supplemental lift for work-holder magnets consisting of a core and shell, corresponding to the core and shell of the magnet and made of magnetic metal, and a dividing part made of non-magnetic material, whereby, when the lift is used with a holding-magnet the lines of force are compelled to go through the machine-bed and thus to polarize the lift; substantially as specified.

2. The combination with the machine-bed of magnetic metal, and the magnetic work-holder, designed to hold a piece of work of magnetic-metal work to said bed, of a supplementary lift, made of magnetic metal in shape and form to correspond to the magnetic metal of the holding-magnet, and having non-magnetic parts so arranged that, when the lift is placed between the magnet and the bed, or attracted part, the lines of magnetic force will be compelled to pass through the said bed or attracted part; substantially as specified.

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Witnesses:

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