963,170.

G. E. D. PARKER.

FEEDING MACHINE.

APPLICATION FILED MAY 23, 1908.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

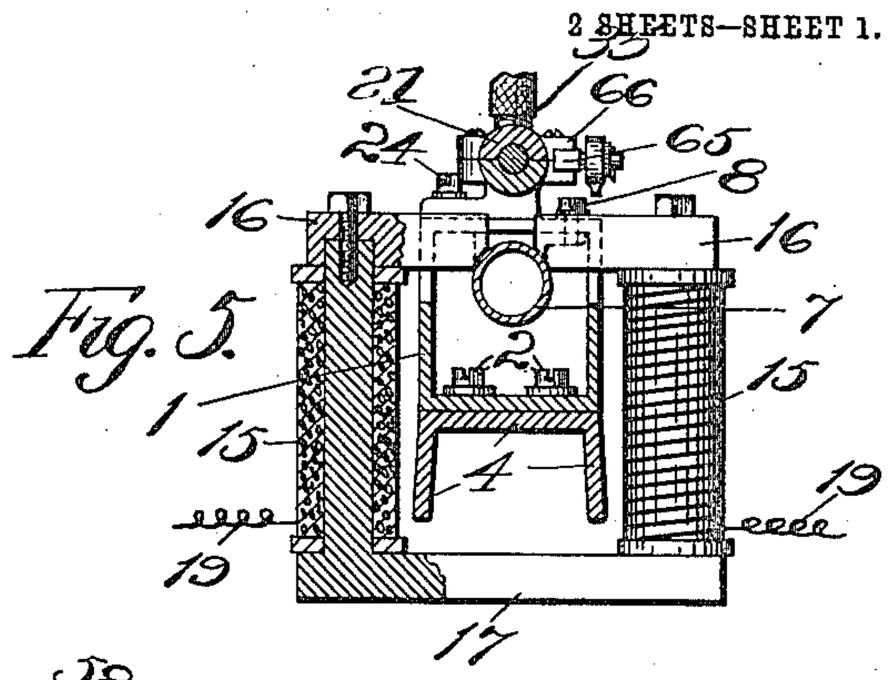

Fig. 5.

Fig. 1.

WITNESSES:

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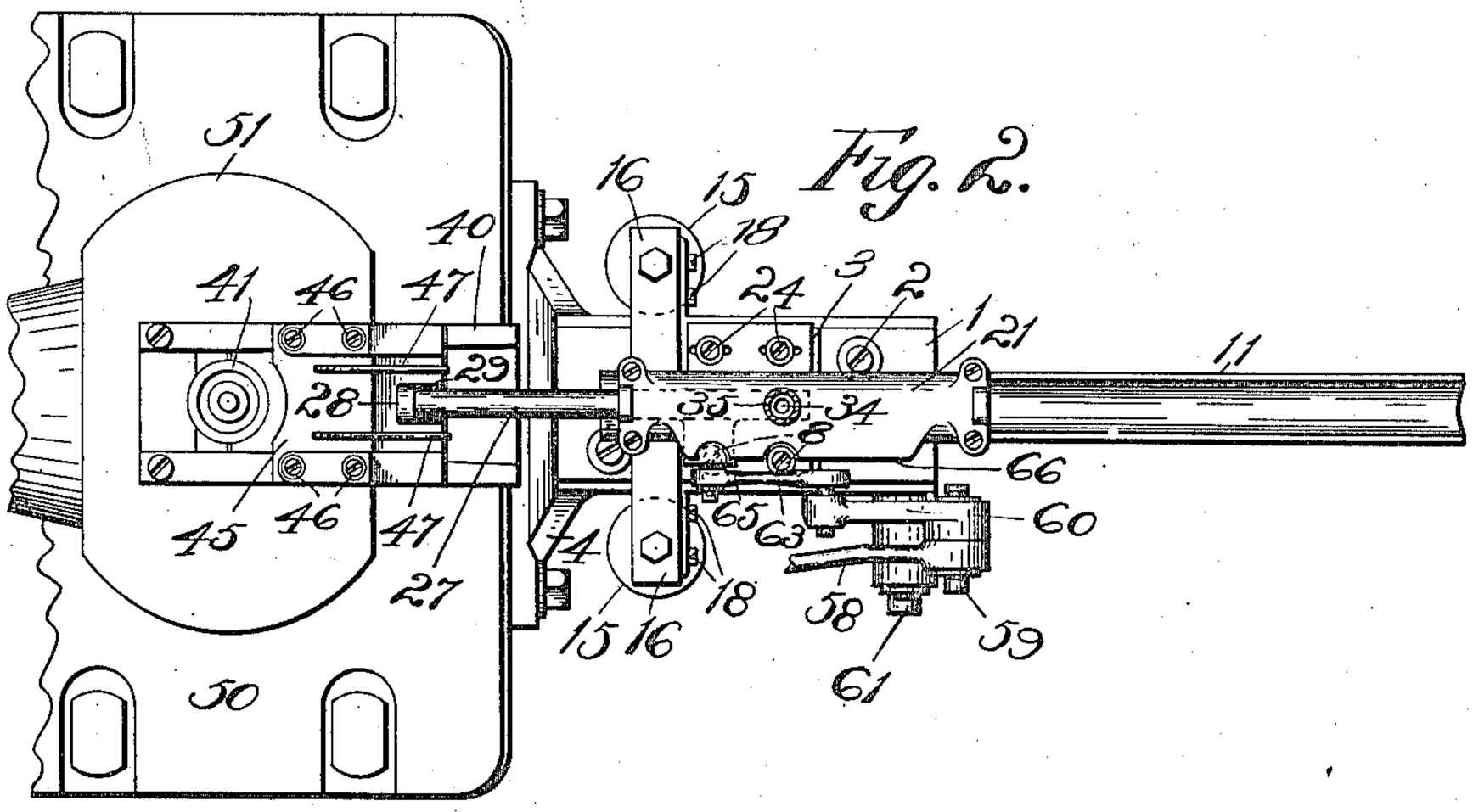

Fig. 2.

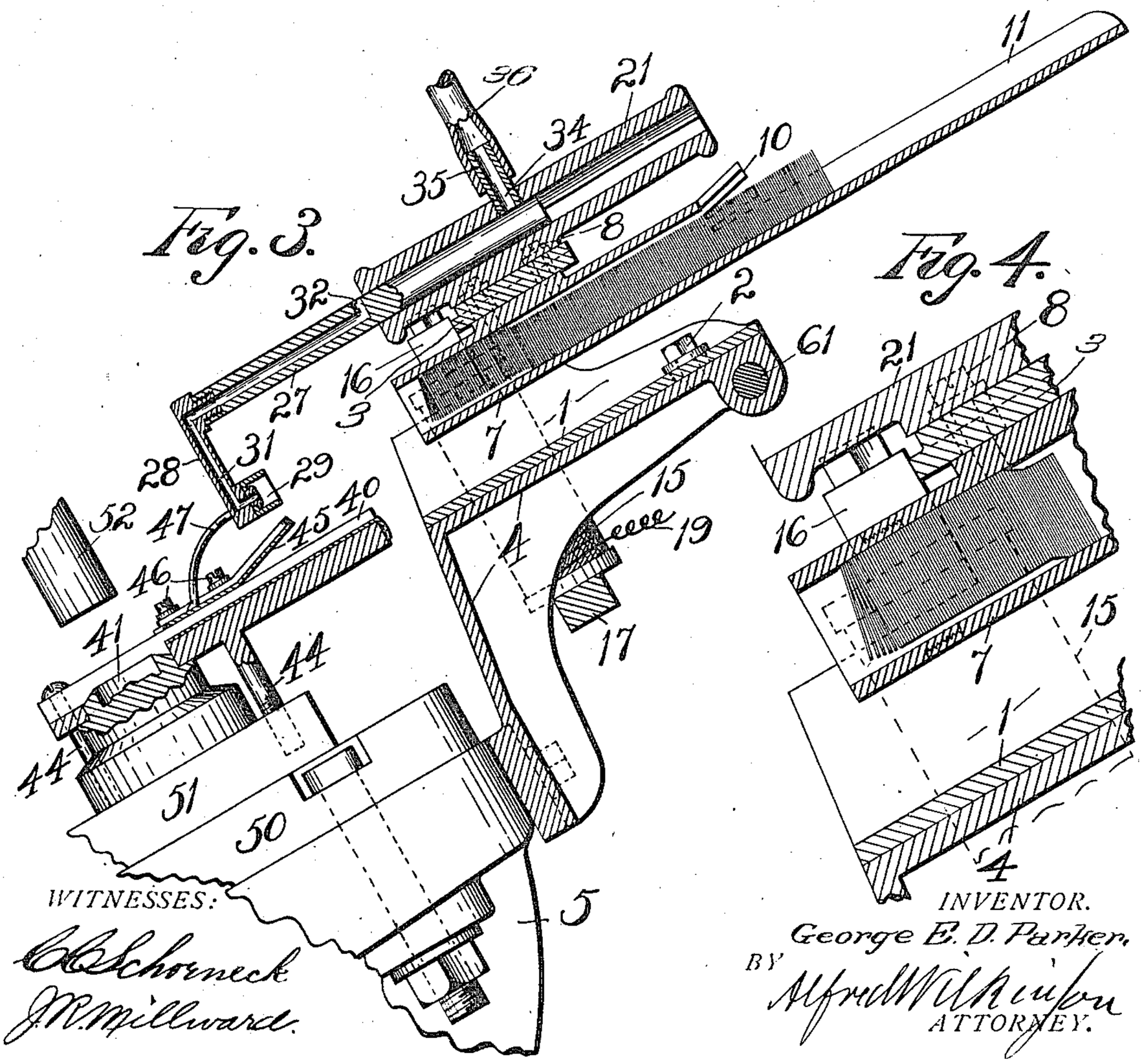

Fig. 3.

Fig. 4.

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FEEDING-MACHINE.

963,170. Specification of Letters Patent. Patented July 5, 1910.

Application filed May 23, 1908. Serial No. 434,546.

To all whom it may concern:

Be it known that I, GEORGE E. D. PARKER, citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Feeding-Machines, of which the following is a specification.

My invention relates to machines for feeding iron, or steel, articles one by one to other mechanisms by which the articles are formed, punched, counted or otherwise operated upon, and relates particularly to the new means and mechanism for retaining and separating the articles which are being fed.

The invention consists essentially in an inclined feed chute, down which the articles tend to slide, and of a magnet whereby the series of articles is held back in the chute and the lowest in the series separated and loosened, so as to be in the best position to be withdrawn one by one, with ease and certainty, and delivered to the punch-press, or other operating mechanism. Any suitable means for engaging with the lowest article in the chute and removing it therefrom may be combined with the magnetic retaining means.

My invention is particularly adapted for feeding sheet metal articles, such as can ends and bodies, which are used in large numbers in the manufacture of cans.

In the drawing herewith I have shown my invention embodied in a form of machine adapted to feed disks, or circular blanks, to a punch-press for forming can-caps or ends.

The reference numerals of the description indicate the corresponding parts in all the figures of the drawing.

Figure 1 is a side elevation showing my feeding machine used in connection with a punch-press. Fig. 2 is a top plan of Fig. 1 with portion of the press broken away. Fig. 3 is an enlarged vertical, longitudinal, axial section of Fig. 2. Fig. 4 is a portion of Fig. 3 further enlarged. Fig. 5 is a cross-section, partially in elevation, on line 5—5 of Fig. 1.

In the drawing 1 indicates the frame of the feeding machine having parallel side-plates, a base-plate and a top-plate, 3. By means of bolts 2, this frame and the entire feeding mechanism are secured to the bracket 4 of the punch press main frame 5. It is desirable to provide slots in the base-plate as indicated in Fig. 3, for said bolts to permit adjustment of the feeding mechanism with reference to the press. On the top-plate of the frame is adjustably secured by means of bolts 8, a tubular magazine, or gravity feed chute, 7, for the articles in question. This feed-chute may desirably be formed with a flaring end 10 and an upper extension 11, more conveniently to receive the articles. As here shown the chute is arranged below the top-plate 3, and is longitudinally adjustable thereon by means of the bolts 8 and slots therefor as indicated in Fig. 3.

15 is the magnet arranged adjacent to the chute to hold back the entire series of articles in the chute, and to separate the lower articles so that the lowest one is in the most convenient position to be separated. (These articles are shown unlettered in Figs. 3 and 4). This magnet may be of any desirable form and arrangement, but is preferably an electromagnet. In the form here shown, 19 indicates the connecting wires to the coils of the two cores, which are connected below by the cross-bar 17 and are provided at their pole-ends with the pole pieces 16 extending adjacent to the upper surface of the chute. The magnet is secured to the frame 1 by any suitable means, such as bolts 18.

21 is a tubular valve casing arranged above the front, or lower, end of the magazine, or feed-chute, and adjustably secured in place on the top-plate 3 by means of the bolts 24 fitting suitable slots as shown in Fig. 2. 27 is a sliding valve fitted to said casing and provided at its front end with the arm 28 carrying the rearwardly faced vacuum cup, or nozzle 29. From said cup there extends through the arm and the valve a channel 31 to the port 32. When this valve is moved rearwardly in its bearing by mechanism to be described, the port registers with the mouth 34 of the stem 35, connected by a suction pipe 36 to any suitable and convenient air-exhaust mechanism, and at the same time the vacuum cup comes into contact with the lowest blank in the magazine; the exhaust then operating, the cup firmly grips the said blank, to separate it from the series and to withdraw it from the chute on the return stroke, until the valve reaches the position shown in Fig. 3, when, as the port 32 is then open, the vacuum is broken and the blank drops into the slideway 40 whence it is delivered to the die 41 of the press. This slideway may be secured in position on the punch-press by bolts 44, or other suitable

means, and may be provided with a cover 45 secured in place by bolts 46 and having an inclined rear end, the better to receive the blanks. The cup is preferably arranged to engage with the blank above the blank center as best shown in Fig. 3, so that the weight of the blank is below the center of the cup and the blank is more certain to fall away from the cup into the slide-way when the vacuum is broken. A stripper-finger 47 may be arranged on one, or both sides, of the cup to engage with the blank and further to insure its separation from the cup. These stripper-fingers may be carried on the cover 45, or otherwise desirably supported. For extracting the blanks, one by one, from the chute, the vacuum cup mechanism here shown is desirable, but this may be varied in construction or operation, or other and non-pneumatic means may be used.

In the punch-press, 50 indicates the usual bolster plate, 51 the die-plate, 52 the punch on the sliding ram 53, operated by the crank 54 on the crank shaft 55. 56 is an eccentric secured on this crank shaft, to which is fitted the eccentric strap 57 provided with a connecting rod 58 pivotally connected at 59 to the lever 60. This lever is supported at its lower end on a bearing 61 on the bracket 4, and is connected at its upper end by a link 63 to an ear or lug 65 outwardly extending from the sliding valve 27 through a slot between the guides 66. By this means, the vacuum cup and valve are timed to operate in coöperation with the punch press.

70 is a delivery chute for the finished caps.

Referring more particularly to my magnetic retaining and separating means for the blanks, I believe that this is essentially new and I therefore desire to claim it broadly without reference to the particular form and arrangement of the parts, or to the particular mechanism by which the lowest blank is withdrawn from the series.

The magnet may be of different forms, having one or two pole ends, arranged on one or both sides of the chute, and above or below, as may be most convenient for the particular machine in question, the function of the magnet being as aforesaid to hold back the blanks in the chute and to loosen the lower blanks so that the lowest of all is free to be withdrawn, without danger of a second or third clinging to it or coming with it and being delivered to the press at the same time. This mode of operation and result distinguishes my feeding mechanism from all other mechanisms designed for similar purposes, with which I am acquainted. Heretofore in such mechanisms the weight of the whole pile rested on the bottom sheet or blank, so that two or more sheets often clung together, either from the influence of oil, or of air pressure, or from the nesting caused by the rough edges formed in stamping the sheets, and two or more sheets were often fed together which not only disturbed the continuity and certainty of operation, but tended to injure the punch press. Such accidents are fatal to the utility of a feeding mechanism. The lowest sheet or blank was the most difficult to separate. In my machine such an accident has never happened, though many millions of blanks have already been fed thereby, and from the description it will be clear that such an accident cannot happen because it is the blanks higher in the magazine which are most closely compacted while the lowermost are loosened and the force of the magnet tends to separate them, one from the other, at the lowest end. Here the lowest disk is the easiest to separate. Another advantage of my magnetic feeding mechanism is that the small clippings and slivers, often clinging to the blanks, are attracted by the magnet, so that they are not carried into the press where they would interfere with the clean impression made by the die, and would also tend to choke and injure the die and punch.

In the particular form of machine and application of my invention here shown, the entire series of blanks is fed down in the magazine by gravity, but is held in position and prevented from sliding through by the attraction of the magnet exerted on the lowermost blanks, being those in the magnet field; the magnet is arranged conveniently with its pole pieces adjacent to the upper surface of the chute, so that its pull holds and raises the blanks in its field thus retaining the entire series in the chute. The magnet also tends to turn the blanks flat, but, as this turning is prevented by the wall of the chute, the blanks at the lower, or forward, end of the chute remain substantially suspended, by their upper edges, with their lower edges loose and practically free; they are in the path of the vacuum-cup, with the surface of the lowest blank substantially parallel to the cup and therefore in the best position for the suction grip thereof. As aforesaid the lowest blank hangs most loosely and therefore is separated easily from the series without any possibility of the next blank clinging thereto.

The magnet ends, or pole-pieces, are arranged adjacent to the forward ends of the chute but not too near, otherwise the turning effect of the magnet on the blanks would tend to deliver them out of the open end of the chute. For this reason particularly the chute is mounted adjustably.

It will be understood that the power of the magnet must be proportioned to the weight of the whole pile of blanks in the chute, that is, the magnet must be powerful enough to hold up the pile by the attraction it exerts on the lower blanks, lying in the magnetic field, and yet must not be too

strong to oppose, or render difficult, the separation and withdrawal of the lowest blank by the extractor. To that end an electro-magnet is most convenient in which the current can be regulated. The current is, of course, constant while the machine is in operation, and when the machine stops the current can be turned off.

The chute is desirably made of brass, or other suitable non-magnetic material, for if made of steel, it would be magnetized and easy movement of the blanks would be prevented.

As shown in Fig. 4, the front end of the chute may be made detachable, so as to be renewed when necessary, for the withdrawal of the blanks by the vacuum-cup tends to wear it. If desired to use a one piece chute, it could be made of hardened material, for instance glass.

While I have shown a cylindrical chute, any suitable form may be used, for instance a chute of square cross-section in feeding square blanks. I have used a V-shaped chute with good results, for disks of various sizes find a bearing in the bottom thereof.

I have shown a desirable arrangement of the feeding machine, but it may be set at a different inclination or vertically or otherwise arranged.

Having thus described my invention, what I claim is:—

1. In a machine for feeding plates made of magnetic material the combination with an inclined chute to receive a series of the plates, said chute being so arranged that the series of plates will tend to slide down therein by their own weight, of an electro-magnet arranged adjacent to the lower end of the chute and adapted by its attraction on the lower plates of the series to hold up the entire series in the chute and to separate the lowest plates, one from the other.

2. In a machine for feeding iron or tin plates the combination with a downwardly inclined chute to receive a series of the plates, of an electro-magnet arranged adjacent to the lower end of the chute to hold up the series in the chute against the force of gravity and to loosen the lowest plate from the series and of means to engage with the plates in the lowest position and to extract them one by one from the chute.

3. In a machine for feeding small metallic plates of a material subject to magnetic attraction, the combination with a downwardly inclined chute to receive a series of the plates, of an electro-magnet having a double polepiece and of means to energize the magnet at will, said magnet being arranged adjacent to the downwardly arranged end of the chute and having the pole-pieces on opposite sides thereof, and said pole-pieces having their ends arranged adjacent to the upper surface of the chute, so as to retain the entire series of plates in the chute and to tend to raise the lower plates of the series toward the upper surface of the chute.

4. In a machine for feeding tin disks for can-cap ends to a cap forming machine, the combination with a downwardly inclined cylindrical chute, or magazine, to receive the disks set on edge therein and to permit them to slide down therein by their own weight, of an electro-magnet arranged outside of the chute and adjacent to the lowermost, or forward, end thereof, said magnet having the ends of its pole-piece, or pole-pieces, arranged adjacent to the upper surface of the chute, so as to tend to raise the lower disks of the series toward said upper surface at said lowermost end to loosen the lower disks of the series one from the other, of a vacuum cup of a size suitable to enter the lowermost end of the chute and to engage with the lowest disk therein, of means to reciprocate the cup so to engage, of means to create a vacuum in the cup when engaging with the disk and of means to cut off the vacuum when the said disk has been withdrawn from the chute.

5. In a machine for feeding small iron or steel plates, the combination with a delivery chute to receive a series of the plates means tending to advance the series within said chute, an electro-magnet having pole pieces oppositely arranged and extending adjacent to the upper surface of the chute and at the lower end thereof, so as to retard the advance of the whole series of plates and to raise the forward plates within the chute, a valve casing adjustably supported, a slide-valve within the casing, an arm on the forward slide-valve end, a vacuum-cup carried by said arm and adapted to engage the first plate of the series within the chute when in rearward position, means to reciprocate the valve slide, and means to create a vacuum within the cup when in rear engaging position, whereby the plate will be withdrawn, and means to break the vacuum when in its forward position to release the plate.

6. In a machine for feeding small tin plates, the combination with a delivery chute to receive a series of the plates, said chute being inclined so that the plates will tend to slide down therein, an electro-magnet having pole pieces oppositely arranged and extending adjacent to the upper surface of the chute and at the lower end thereof, so as to retard the advance of the whole series of plates and to raise the lower plates within the chute, a valve casing adjustably supported, a slide-valve within the casing, an arm on the forward slide valve end, a vacuum cup carried by said arm and adapted to engage the first plate of the series within the chute when the cup is in rearward position, means to reciprocate the valve slide,

means to create a vacuum within the cup when in rear engaging position, whereby the plate will be gripped, means to break the vacuum when in its forward position to release the plate, and stripper-fingers arranged to engage and strip the plate from the cup when in said forward position.

7. In a feeding mechanism for small tin plates the combination with a punch-press, of a suitable frame secured thereon and adjustable in its relation to the press, a feed-chute on the frame for the plates, said chute being inclined to permit the feeding of the articles by gravity, an electro-magnet arranged adjacent to the lower or forward end of the chute, said magnet having a cross bar below, cores and coils on each side of the chute and pole-pieces inwardly extending adjacent to the upper surface of the chute, a valve casing secured on the frame, a sliding valve fitting within the casing, an arm on the forward end of the slide-valve, a vacuum cup carried by said arm, said valve casing having an exhaust port, said valve slide having a valve port and a channel from the vacuum cup to the valve port, said valve port arranged to communicate with the open when in extreme forward position and to register with the exhaust port when the valve slide is in rearward position, means to reciprocate the valve and cup, said cup being arranged to engage the first plate within the chute when in said rearward position and slightly above the center of said first plate, whereby upon forward movement of the slide said plate will be withdrawn, and means to exhaust the air from the exhaust port, substantially as described and shown.

8. In a feeding mechanism for tin plates, the combination with a punch press, of a suitable frame secured thereon, having side plates, a base plate and a top plate, a feed chute for the tin plates carried by the frame immediately beneath said top plate, said chute being inclined to permit the feeding of the tin plates by gravity, an electro-magnet having pole pieces extending adjacent to the upper surface of the chute and adjacent to the lower end thereof, a valve casing adjustably secured on the frame, a sliding valve within the casing, an arm on the forward slide-valve end, a vacuum cup carried by said arm, a rock-arm pivotally supported on the frame, a lug on the valve slide, outwardly extending through a slot in the casing, connections between said lug and the rock-arm, a punch-press crank shaft, connections between the said crank-shaft and the rock-arm whereby said arm is rocked to reciprocate the valve-slide, said casing having an exhaust port, said slide having a valve port and a channel from the vacuum cup to the valve port, said valve port being arranged to communicate with the open when in extreme forward position and to register with the exhaust port when the valve slide is in rearward position, whereby upon forward movement of the slide said tin plate will be withdrawn, and means to exhaust the air from the exhaust port, substantially as described and shown.

9. In a machine for feeding small articles of magnetic material, the combination with a downwardly inclined chute to receive a series of the articles, of a magnet arranged adjacent to the lower end of the chute to hold up the series of articles therein, and supplemental means to engage with the lowermost article of the series and to withdraw said articles one by one from the chute.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE E. D. PARKER.

Witnesses:
C. C. SCHOENECK,
PEARL PEARSALL.