

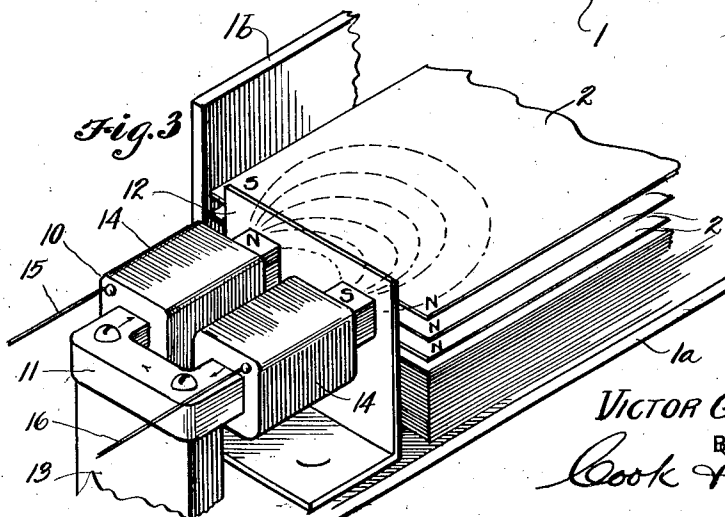
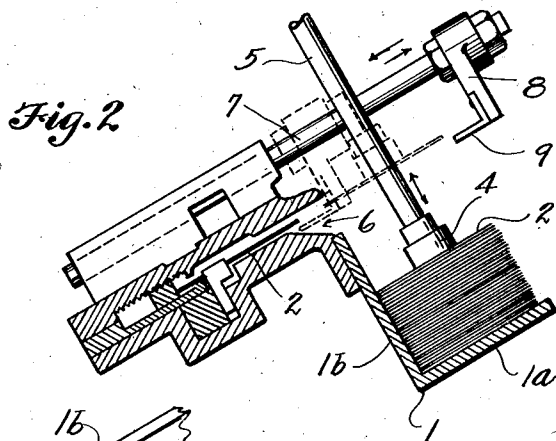
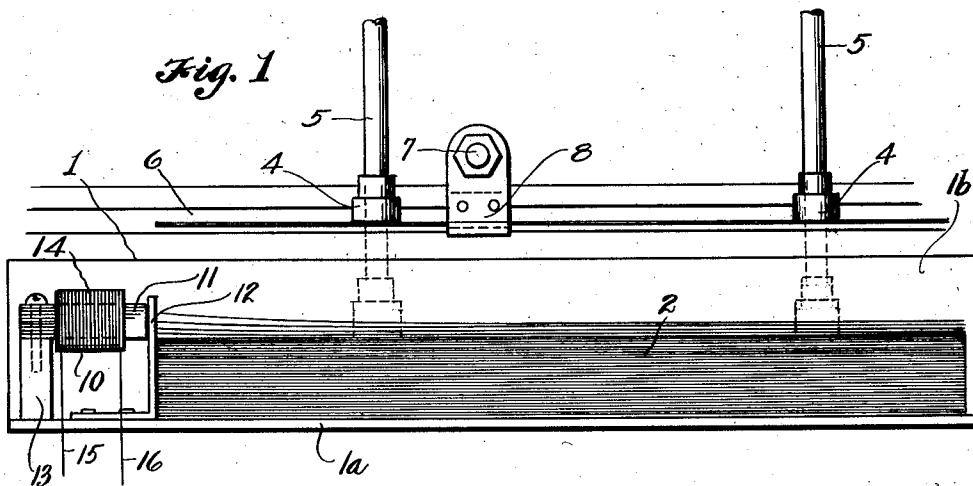
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METHOD OF AND MEANS FOR SEPARATING METAL SHEETS

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METHOD OF AND MEANS FOR SEPARATING METAL SHEETS.

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This invention relates to means for separating stacked sheets of metal. More particularly it relates to a sheet separating means designed for use in connection with a feed mechanism whereby sheets of metal are lifted from a supply stack one at a time for advancement to mechanism which performs various operations on them.

In various machines, such for example as punch presses, can body making machines, and the like, sheets of tin plate are stacked on a feed table or in a hopper and are fed successively from this stack into the machine. These sheets have a tendency to and very frequently do stick together with sufficient adhesiveness that the feed mechanism will deliver more than one at a time into the machine. This result is very undesirable as it not only places the machine under abnormal strain but also causes waste. The sticking together of the tin plates may be caused by the getting between them of any sticky substance but most frequently it is due to the presence of oil that is applied to their surfaces as a preventative of rust and also as a means of preventing damage to the dies when acting on the material.

In view of the undesirability of having the sheets of tin plate stick together, it has been the object of the present invention to provide a means for effectively separating them so that the feed mechanism of machines with which it is used will deliver but one sheet at a time into the machine. More specifically, the invention resides in the provision of an electro-magnetic means for effecting the separation of the sheets so that the top sheet, or those sheets that are nearest to the feed mechanism will practically be held in suspension in air.

It is also an object of the invention to adapt this electro-magnetic sheet separating means to punch presses, or other machines wherein the feed is from the top of the stack of material.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein—

Fig. 1 is an upper face view of a part of a punch press equipped with tin plate separating means in accordance with details of the present invention.

Fig. 2 is a cross sectional view of the same. 55

Fig. 3 is a perspective view illustrating the device and the theory of the separation of the sheets of tin.

Referring more in detail to the drawings—

In the present drawings I have illustrated the sheet separating means as used in connection with the tin plate feeding mechanism of a punch press of a common type, but it is to be understood that this type of machine has been shown only for the purpose of explanation since the present means is applicable for use just as well on other kinds of machines where the sheets of material to be operated on are stacked and are delivered one at a time from the top of the stack into the machine. 70

The mechanism herein illustrated requires a brief descriptive introduction in order that its mode of operation and the application of the sheet separating device may be better understood. The press comprises a frame structure from which an angle bar 1 is horizontally supported in such manner as to provide a sort of trough within which a stack of tin plates 2, or sheets of other metal may be contained so that the base of the stack will rest on the base plate 1^a of the trough and a side of the stack will rest against the upstanding flange 1^b so that the sheets are held in readiness for advancement into the machine. From the top of the supply stack the sheets or plates 2 are picked up one at a time by suction cups 4 at the ends of rods 5. These are reciprocally actuated downwardly against the top of the stack to pick up the top sheet and then are moved upwardly away from the stack to position the sheet above the stack for lateral advancement into the press magazine 6 by means of a pair of reciprocally actuated rods 7 which have heads 8 at their ends fitted with angle irons 9 to properly engage the sheets for this purpose. The means for reciprocating the rods 5 and the rods 7 is not herein illustrated but it is to be understood that this may be done by any suitable mechanism. 100

For the purpose of separating the top sheet of material from those lower in the stack so that but one sheet will be delivered into the press magazine at a time, I have provided an electro-magnet 10 having a core bar 11 of the conventional horse shoe form disposed with its poles against or adjacent to the outside face of a brass guide plate 12 that is fixed 105

on the bar 1 and against which one end of the stack of tin plates is abutted. This magnet is supported horizontally from an insulating block 13 also fixed on the bar 1, so that its poles are slightly above the normal level of the top of the stack. The windings 14 of the magnet are connected with suitable circuit wires 15 and 16 that lead to a source of electricity.

It will be here stated that while I have shown a magnet at but one end of the stack, a similar magnet could, if this is desired or required be placed similarly at the other end of the stack. This may be desired if the metal sheets are of considerable length.

With the device so constructed and applied, its operation and the theory of operation is as follows: The passing of an electric current through the coils of the magnet produces a magnetic field with lines of force emanating from the north pole of the magnet and passing back to the south pole in circularly curved paths somewhat as is indicated in dotted lines in Fig. 3, and passing through the adjacent ends of the stacked sheets of tin plate. The magnetism produced in the core 11 lifts the top sheets of the stack and the flux passing through them magnetizes the sheets thus producing in them the north and south poles which in Fig. 3 have been indicated respectively by reference letters N and S. On account of the established law that like poles repel each other these magnetized sheets of material repel each other while at the same time they are held in suspension above the stack by the magnet; the strength of which may be made sufficient for this purpose dependent on the

weight or character of the metal in the stack, and the sheets are thus caused to be separated from each other and practically held in suspension in air. Thus the suction cups 4 are actuated downwardly against the stack and are then lifted, the top sheet only is removed, the next lower sheet having been detached or separated therefrom by the action of the magnet.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent is:

1. The method of separating stacked sheets of metal which consists of producing a magnetic field adjacent the stack, the flux of which so magnetizes the individual sheets that a repellent action between them sufficiently to effect separation is produced.

2. The combination with means for supporting sheets of metal in stacked relation and a movable sheet feeding mechanism, of a magnet placed adjacent to the stack, the flux of which so magnetizes the sheets that a repellent action between them is produced and whereby the top sheet is held in suspension above the stack for reception by the feed mechanism.

3. In combination, a support for stacked sheets of metal, a non-magnetic guide plate fixed to the support and against which one end of the stack is abutted and an electro-magnet disposed with its poles adjacent the plate and slightly above the top level of the stack, for the purpose set forth.

Signed at Seattle, King County, Washington, this 5 day of August, 1927.

VICTOR G. ROSS.