

G. GROVE.
PROCESS OF SEPARATING METAL SHEETS.

NO MODEL.

APPLICATION FILED AUG. 14, 1903.

3 SHEETS—SHEET 1.

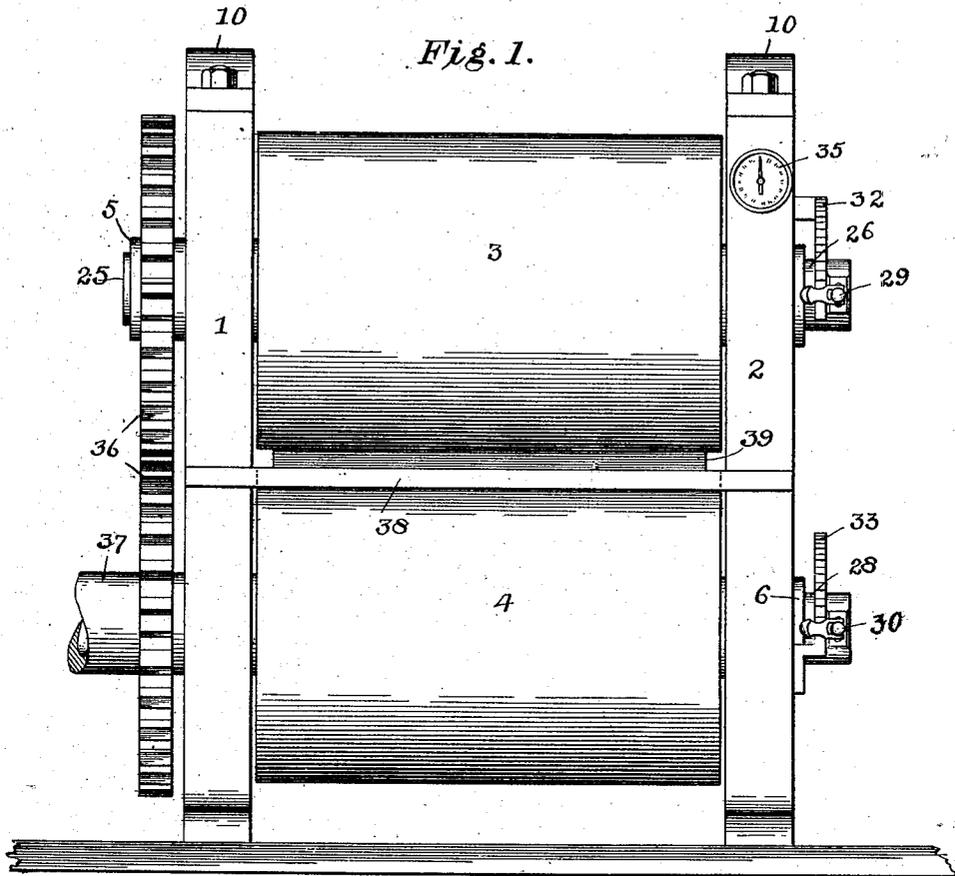


Fig. 6.

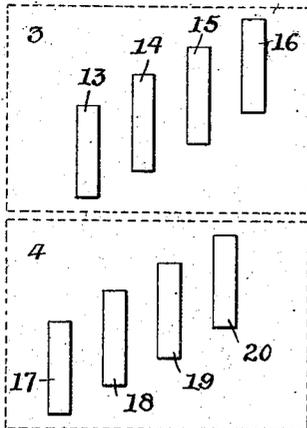
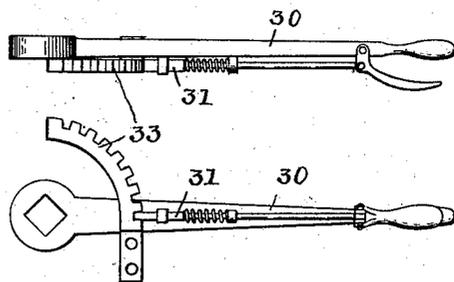


Fig. 7.



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No. 757,454.

PATENTED APR. 19, 1904.

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3 SHEETS—SHEET 2.

Fig. 3.

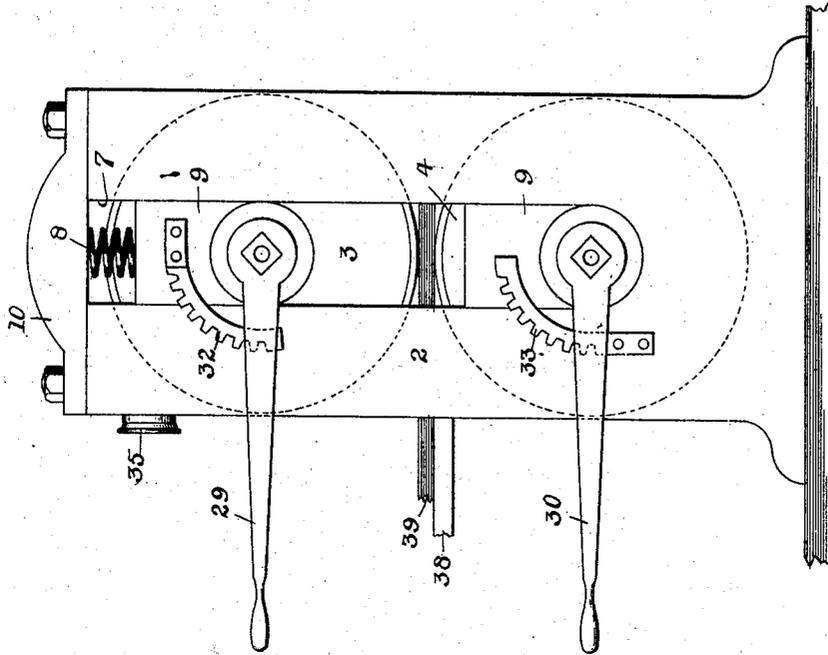
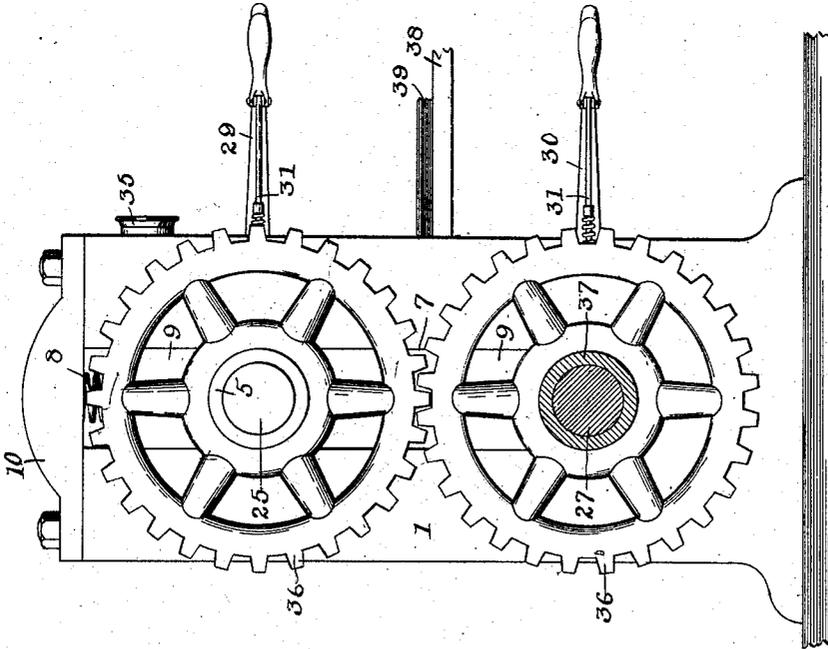


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 5.

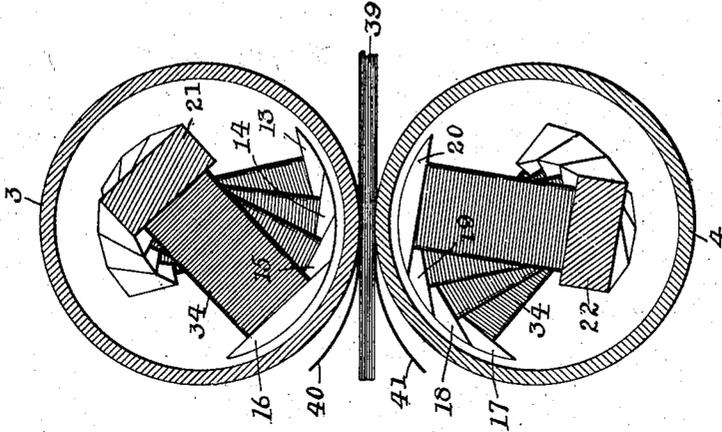
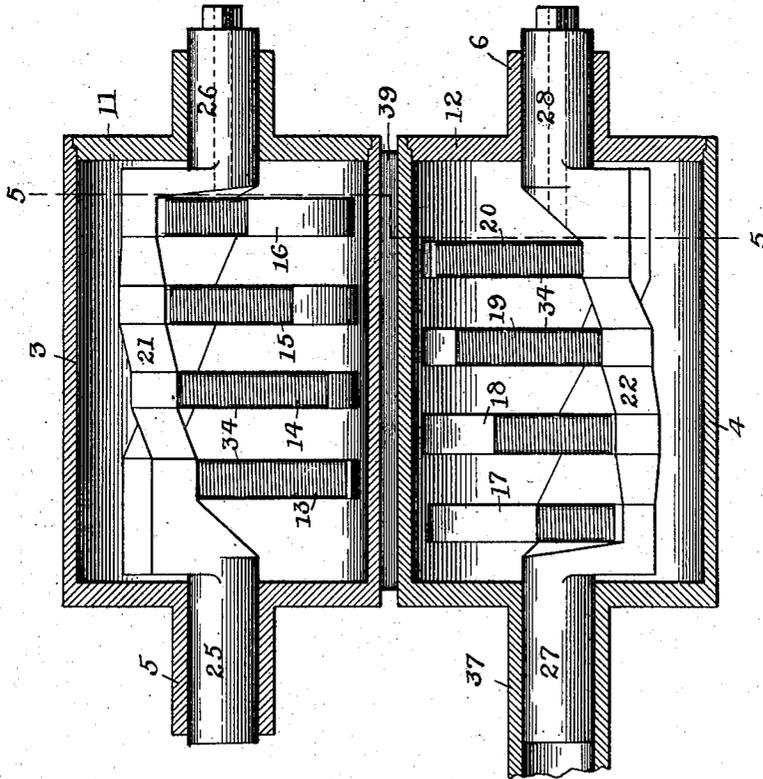


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE GROVE, OF CUMBERLAND, MARYLAND.

PROCESS OF SEPARATING METAL SHEETS.

SPECIFICATION forming part of Letters Patent No. 757,454, dated April 19, 1904.

Application filed August 14, 1903. Serial No. 169,528. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GROVE, a citizen of the United States, residing at Cumberland, in the county of Allegany and State of Maryland, have invented certain new and useful Improvements in Processes of Separating Metal Sheets, of which the following is a specification.

This invention relates to the opening or separating of iron or steel plates or sheets which have been rolled or pressed in a folded or piled form, and while the invention is designed more particularly to be employed in connection with black plates or sheets intended for the manufacture of tin, terne, and galvanized plates or sheets it may also be usefully employed in connection with iron or sheet plates for other analogous purposes.

In the manufacture of black plates or sheets bars of steel or iron are hot-rolled until their thickness is more or less reduced, and they are then doubled or folded and after reheating are again rolled until a pile or block composed of several thicknesses of metal of the required substance or thickness is obtained, and this pile is then reheated and rolled until each thickness or layer thereof is reduced to the required substance. The pile thus formed is next cut or sheared to the size required for the finished plates or sheets, after which the pile is ready for opening or separating. According to the method usually adopted the sheets or plates of a pile which had become adherent, although not actually welded together in the process of rolling, were split up or opened and torn apart or separated by hand; but latterly machinery has been devised for effecting this separation—as, for example, a pair of corrugated rolls, between which the pile of plates is passed, which has the effect of bending them to and fro in a waved or corrugated form, and thereby more or less separating them, after which they are rolled out flat, and the separation is thus completed.

The object of the present invention is to provide a simple and comparatively inexpensive process by the practice of which the plates or sheets of a pack will be separated; and the invention consists in the improved process here-

inafter fully described and afterward specifically claimed.

The improved process may be carried out by machinery of various constructions, and in order to enable others skilled in the art to fully understand the invention I will now proceed to fully describe the same as carried out by means of apparatus or machinery illustrated in the accompanying drawings, in which—

Figure 1 is a view of the machine in front elevation, the feed-table being omitted. Fig. 2 is a view of the same in side elevation looking at the left-hand side. Fig. 3 is a similar view looking at the right-hand side. Fig. 4 is a vertical sectional view taken on a plane cutting longitudinally through the rolls, the ends being broken away and the inclosed electromagnets being shown in elevation. Fig. 5 is a vertical transverse sectional view through the rolls on the plane indicated by the broken line 5 5 of Fig. 4. Fig. 6 is a diagrammatic view illustrating the relative positions of the electromagnets, the magnets being represented as turned to face toward the discharge or rear side of the machine. Fig. 7 is a detail view of one of the magnet-levers.

Like reference characters mark the same parts wherever they occur in the various figures of the drawings.

Referring specifically to the drawings, 1 and 2 indicate housings of any approved form in which are mounted to rotate two hollow rolls 3 and 4, preferably of bronze, the journals 5 and 6 of the rolls being also hollow and mounted in a vertical slot 7 in the housings, the upper roll normally resting upon the lower and being pressed thereupon yieldingly by means of springs 8, bearing upon blocks 9, resting upon the journals of roll 3 and held down by caps 10 of the housings 1 and 2 in a well-known manner, the rolls being provided with removable ends 11 and 12, carrying one of the journals of each roll and secured to the body of the roll in any suitable manner—as, for instance, by means of screw-threads.

13, 14, 15, and 16 indicate electromagnets mounted in the roll 3, and 17, 18, 19, and 20 are similar magnets mounted in the roll 4 upon supports 21, 22, and 23, respectively, arranged

longitudinally in the rolls 3 and 4 and secured to or formed with the shaft ends 25 and 26 in the journals of roll 3 and shaft ends 27 and 28 in the journals of roll 4, the shaft ends 25 and 27 projecting beyond the housings and journals and carrying at their outer ends handle-levers 29 and 30, respectively, each of which is provided with a pawl, as at 31, Fig. 7, adapted to be engaged with curved racks 32 33, secured to the housings, whereby the electromagnets and their supports may be rotated in the rolls and fixed at any suitable position therein for the purposes hereinafter explained.

The winding-wires 34 of the electromagnets leading from any suitable source of electricity pass through a controller 35 of any approved construction, whereby the strength of the magnets may be suitably regulated.

The magnets are placed on the supports 21 and 22, with spaces between adjacent magnets preferably slightly wider than the opposite magnets, and the magnets 13, 14, 15, and 16 in roll 3 are placed opposite the spaces between the magnets 17, 18, 19, and 20 of roll 4, being staggered in position for the purpose of locating the respective magnets as far as possible out of the magnetic fields of the magnets in the opposite roll. The magnets are also preferably arranged in different radial positions with reference to the rolls, the magnet 16 being in advance in roll 3 and the magnets 15, 14, and 13 being graduated in position in the rear thereof, while in roll 4 the magnet 17, which is at the opposite end of the rolls from magnet 16, is in advance, and the magnets 18, 19, and 20 each follow in graduated positions in rear of the magnet 17. This arrangement still further removes the magnets of each roll out of the magnetic fields of the magnets of the opposite roll, so that there will be as little waste of magnetic power in the operation of the machine as possible.

The rolls are geared together, as shown at 35 and 36 in Fig. 1, while the lower roll may be rotated by any power applied to shaft 37.

At 38 I have shown a feed-table of any ordinary construction from which the pile or pack 38 of adhering sheets are fed between the rolls 3 and 4, (see Fig. 5,) in which the top and bottom sheets 40 and 41 of the pack are shown partly separated from the remainder, the forward left-hand corner of sheet 40 being first raised by the action of magnet 16 and the forward right-hand corner of sheet 41 being first lowered by the action of magnet 17, the other magnets acting successively upon the sheets 40 and 41 to continue to raise and lower them respectively, until when the pack has passed through the rolls the top and bottom sheets will be entirely separated from the remainder of the pack, which remainder

is again entered from table 38 and passed between the rolls, another sheet being separated from the top and bottom of the pack at each pass until the whole pack is separated, the separations taking place gradually in diagonal directions, due to the arrangement of the magnets hereinbefore described.

While I have described the separation of the single top and bottom sheets from the pack at each pass, in practice this order is not always observed. In some packs the top or bottom sheet adheres more firmly than some other sheets of the pack adhere together, and as the separation will always occur between those sheets which have the least adherence the pack will sometimes be separated into two smaller packs, each of which will be passed through the rolls until the sheets are all separated.

While I have described my process as carried out by means of the illustrated machine, it will be readily obvious that it may be carried out by many other forms or constructions of mechanism, it being only necessary to provide, in order to practice such process, two magnets arranged to act upon opposite sides of a pack of sheets and means (manual or otherwise) for causing the pack to pass between such magnets.

By this process the sheets are quickly and gradually separated from each other without injury by bending or otherwise mutilating the sheets and without the expenditure of the enormous and slow manual power formerly required, thus economizing greatly both time and power.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The process herein described for separating metal sheets from packs which consists in causing the pack to pass between magnets arranged to act in opposite directions on opposite sides of the pack.

2. The process herein described for separating metal sheets from packs which consists in causing the pack to pass between two magnets arranged to act in opposite directions on opposite sides of the pack.

3. The process herein described for separating metal sheets from packs which consists in causing the pack to pass between magnets acting in opposite directions upon the opposite sides of the pack in lines diagonal to the line of travel of the pack.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE GROVE.

Witnesses:

CHAS. H. WALFORD,
JOHN G. MILLER.