

May 10, 1927.

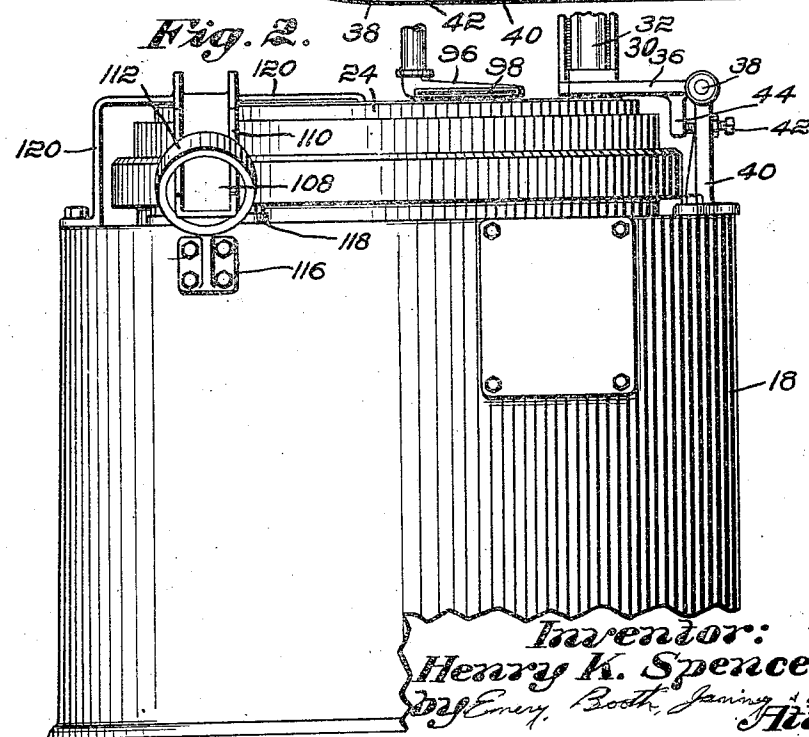
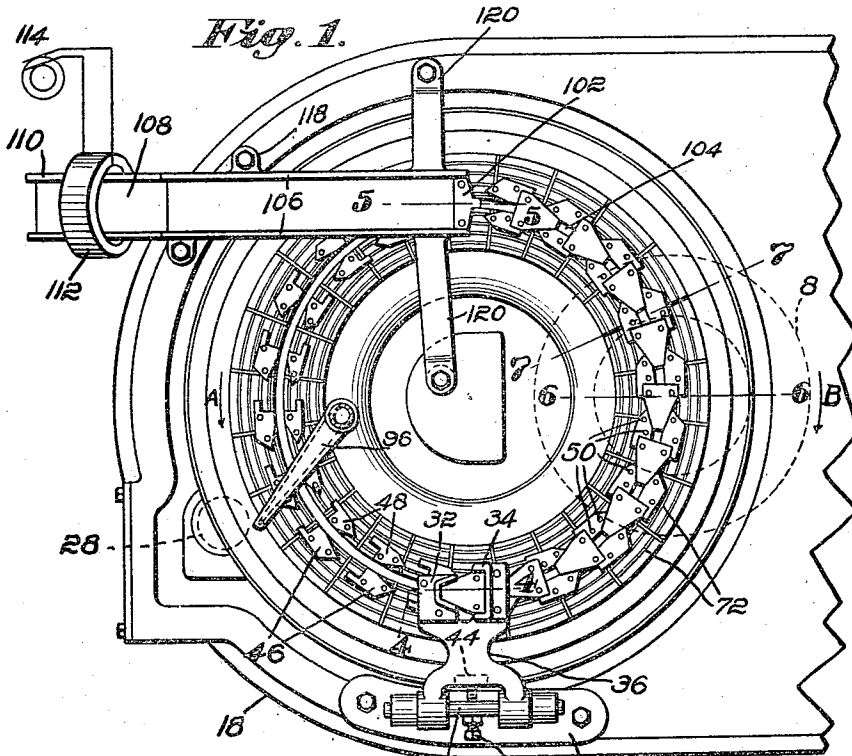
1,628,618

H. K. SPENCER

MEANS FOR HANDLING ARTICLES

Filed Oct. 6, 1922

3 Sheets-Sheet 1



Inventor:
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Fig. 3.

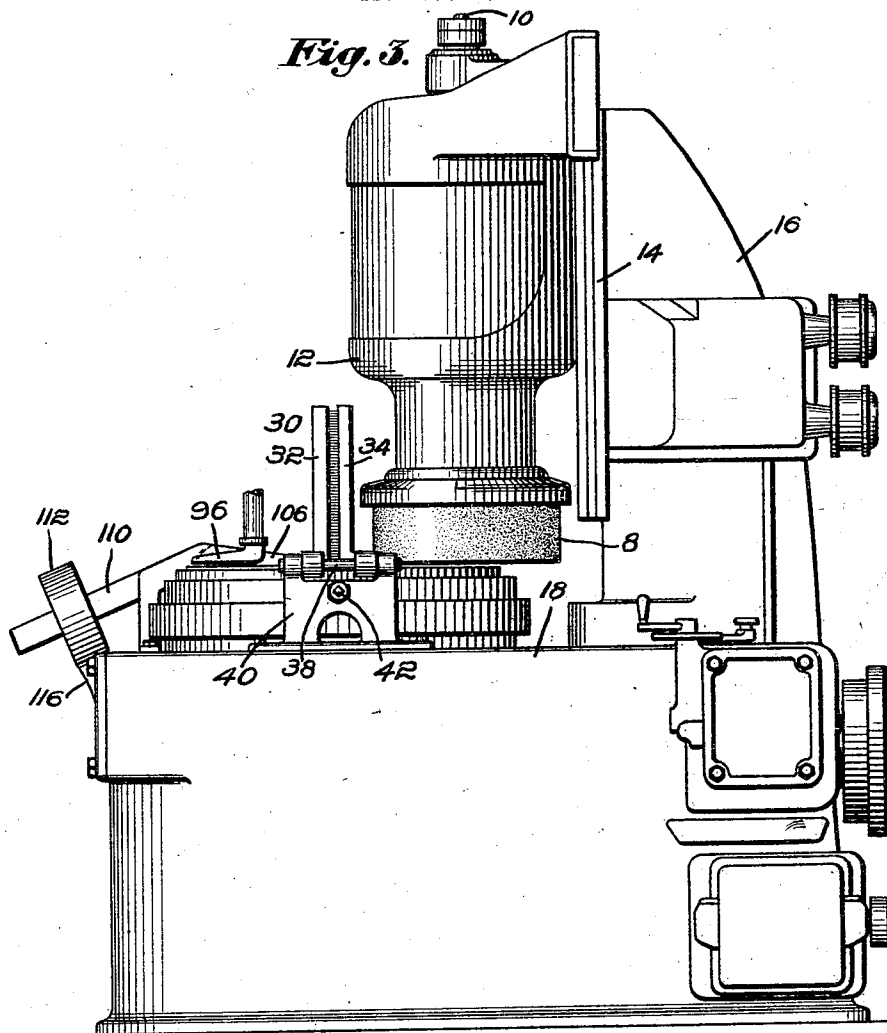


Fig. 4.

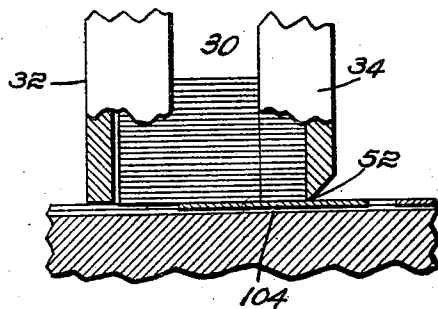
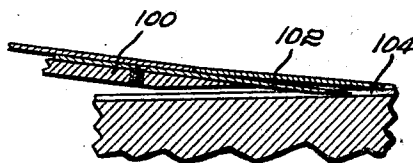


Fig. 5.



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May 10, 1927.

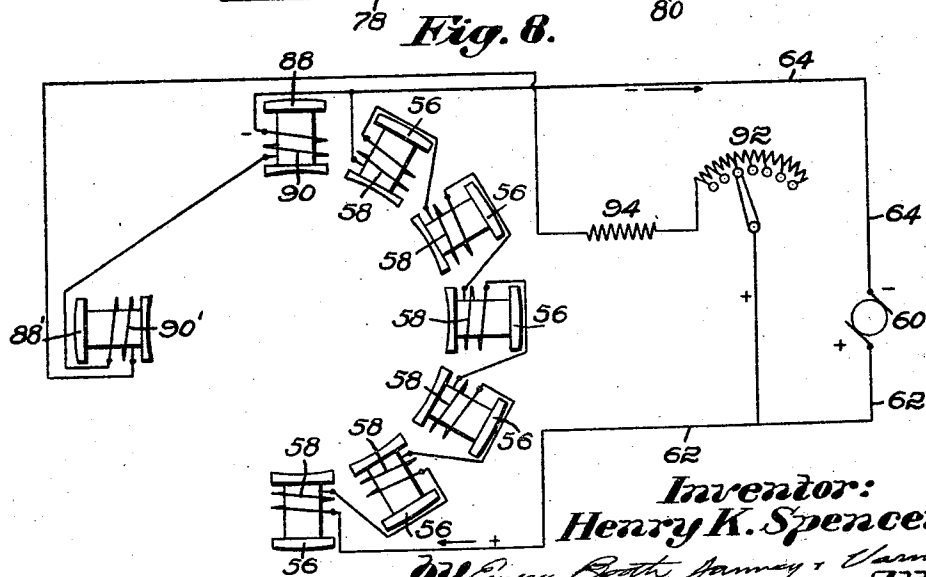
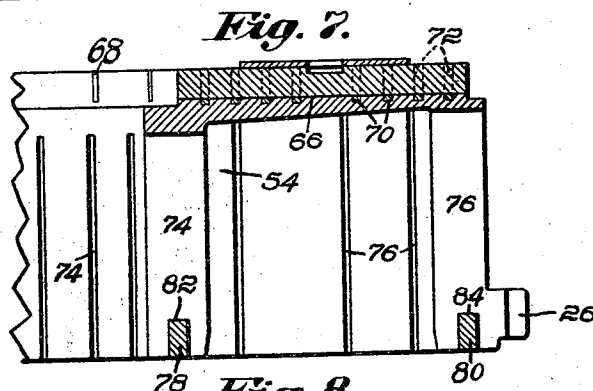
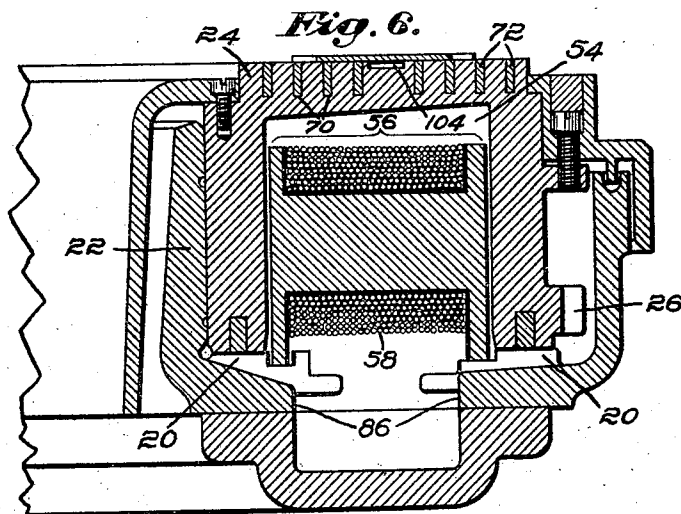
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MEANS FOR HANDLING ARTICLES

Filed Oct. 6, 1922

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

HENRY K. SPENCER, OF WATERTOWN, MASSACHUSETTS, ASSIGNOR TO THE BLANCHARD MACHINE COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MEANS FOR HANDLING ARTICLES.

Application filed October 6, 1922. Serial No. 592,739.

This invention aims to provide a novel and improved means for handling work pieces in connection with metal working machines, such as surface grinders.

5 The invention will be best understood by reference to the following description, when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly
10 pointed out in the appended claims.

In the drawings:

Fig. 1 is a plan of a portion of a surface grinding machine exemplifying the invention;

15 Fig. 2 is an elevation of the same as viewed from the left-hand side of Fig. 1;

Fig. 3 is an elevation of the machine as viewed from the right-hand side of Fig. 2;

20 Fig. 4 is a detail, sectional view, on an enlarged scale, on line 4—4 of Fig. 1, illustrating the operation of the magazine;

Fig. 5 is a detail, sectional view on an enlarged scale on line 5—5 of Fig. 1, illustrating an unloading device;

25 Fig. 6 is a sectional view on an enlarged scale on line 6—6 of Fig. 1;

Fig. 7 is a sectional view on an enlarged scale on line 7—7 of Fig. 1; and

30 Fig. 8 is a diagram of the electric circuit arrangements.

Referring to the drawings, and to the embodiment of the invention which is selected for exemplification, there is shown (see Fig. 3) a metal working tool, specifically a vertical surface grinder, whose general characteristics are similar to that which is the subject matter of U. S. Letters Patent No. 1,182,861, issued May 9, 1916, to which reference may be had for details not disclosed
40 herein. The machine is provided with an annular grinding wheel 8, mounted on a vertical spindle 10 carried by a wheel head 12, which is mounted to slide vertically on ways 14 presented by a column 16, the latter being supported by a base 18.

45 Referring now to Fig. 6, the base provides support for annular, horizontal bearings 20, and an annular, vertical bearing 22, for a chuck body 24 of magnetic material. The bearings 20 afford a support for the chuck body, while the bearing 22 holds the same properly centered. The body is rotated by a suitable mechanism, herein a spur gear 26,

conveniently formed as an integral part of the chuck body, and driven by a pinion 28 indicated in dotted lines in Fig. 1. The directions of rotation of the chuck body and the grinding wheel, respectively, are indicated by the arrows A and B. Rotation of the chuck body carries beneath the grinding wheel work pieces supported on the face of the chuck body.

The articles to be ground or otherwise operated on are automatically fed onto the chuck body by feeding means, in this example a vertical magazine 30, herein comprising two channel-shaped guides 32 and 34, in which the articles are placed in a vertical stack. The magazine is mounted on a suitable support 36, which for convenience in removing the magazine from its normal position above the chuck is mounted on a pivot 38 on a bracket 40, which is attached to the base 18. Angular adjustment of the support and corresponding adjustment of the magazine as to height above the chuck may be accomplished by the use of a set screw 42, threaded into the bracket, and affording a fixed stop cooperating with a movable stop, herein a lug 44, carried by the support 36. By simply swinging the support upward and outward on its pivot, the magazine may be swung entirely out of the way of the chuck.

The magazine feeds the articles in succession into pockets carried by the chuck, the character of these pockets depending upon the shape of the articles. Referring to Fig. 1, in the present example, each pocket is formed by four cleats arranged in pairs, the members of each pair being designated, respectively, 46 and 48. These cleats may be secured to the face of the chuck, as by screws 50. The thickness or height of these cleats is such as to enable them to pass beneath the magazine with a slight clearance. That side of the magazine which faces in the direction of travel of the chuck, and in Fig. 4 is exemplified by the channel 34, terminates at a point 52, which is a sufficient height above the face of the chuck to permit the lowermost article to enter one of the pockets and to be carried forward by the rotation of the chuck without interference. Thus the articles are transferred one by one from the magazine to the face of the chuck, and they

are carried in succession beneath the grinding wheel.

While the pockets may be relied upon to prevent displacement of the articles horizontally, yet it is desirable to provide means to hold the articles firmly onto the face of the chuck. To this end, I have provided the magnetic means which will now be described, reference being had at first to Fig. 6. The chuck body 24 presents an annular chamber 54 for one or more, herein a series of magnets 56, having windings 58 (See Fig. 8) wound in the same direction, connected to each other in series and receiving current from a suitable source 60, the terminals of which are connected to the coils by lead-wires 62 and 64. The area of the chuck face served by these magnets is less than the total area, and herein is a zone of somewhat less than 180 degrees. To confine the magnetic flux to this zone, the chuck body is suitably slotted and grooved. In the present example, the face of the chuck body is provided with radial grooves 66 (see Fig. 7), which may be filled with non-magnetic strips 68 to exclude foreign matter therefrom. The face may be further provided with annular grooves 70, filled with non-magnetic rings 72 for a like purpose. These annular grooves divide the face of the chuck body into a multiplicity of small pole pieces, after the manner of the chuck which is the subject matter of U. S. Letters Patent No. 1,125,198, issued to me January 19, 1915. The radial grooves intersect the annular ones, and are preferably shallower than the latter, the annular strips being notched to receive the radial strips, as should be evident from an examination of Fig. 7. The chuck body is further provided with two sets of radial slots 74 and 76, to assist in the localization of the magnetic zone; and, to strengthen the chuck body where it is so cut away, I have provided inner and outer non-magnetic rings 78 and 80, received in grooves 82 and 84, respectively, provided in the chuck body.

While the chuck body is mounted to rotate, the magnets in the present example are fixed, and they are conveniently supported on a non-magnetic ring 86, on which the bearings 20 and 22 are formed. It will be evident from an inspection of Fig. 7 that there is comparatively little of the chuck body which presents a continuous annular connection between the segments formed by the described radial grooves and slots,—so little, in fact, that the magnetic leakage from one to another is very slight. It is therefore apparent that the influence of the magnets will extend practically to only the chuck body segments with which they are associated. In other words, the magnetic zone is substantially confined to the area which is adjacent to the magnets. The commencement of the magnetic zone may be directly

beneath the magazine, and the magnetic pull may be utilized to assist gravity in the operation of feeding articles from the magazine into the pockets carried by the chuck. This arrangement is shown in the drawings, there being a magnet directly under the magazine. In handling some classes of articles, however, the best results are secured by relying on gravity alone to feed the articles from the magazine to the pockets, and in such cases, the magnet, which as herein shown is directly beneath the magazine, is omitted.

It should be evident from the foregoing that, during the passage of the articles through the magnetic zone, they are held in place magnetically on the chuck face, and they are additionally held against horizontal displacement by the lateral walls of the pockets. It should here be noted that the articles themselves may be magnetic pieces, or non-magnetic articles may be secured to magnetic holders. Various kinds of work, such as grinding, may be performed on the work pieces during their passage through the magnetic zone, and after the work is completed, the articles pass out of the magnetic zone into the non-magnetic zone, where they are released and can be removed by hand or by automatic means, such as that presently to be described.

To ensure prompt demagnetization and release of the magnetic pieces, and to assist in confining the influence of the magnetizing coils to the desired area, there may be provided any suitable number of releasing magnets, herein a magnet 88 having a winding 90 suitably connected in circuit with the source of current 60, there being provided a rheostat 92 in series with the magnet for the purpose of varying the effectiveness of the latter. This is found desirable in practice, as large and small, and hard and soft, pieces of work differ in the extent to which they become magnetized, and in the corresponding strength required of the releasing magnet to demagnetize or release them. I prefer to provide in addition to the rheostat a resistance coil 94 in series with the rheostat and the releasing magnet, as the use of this resistance permits the employment of a rheostat smaller in size than would otherwise be necessary.

To ensure the release of particles of magnetic material which might adhere to the face of the chuck and thereby interfere with the accurate placing of subsequent work pieces thereon, I prefer to provide a second releasing magnet 88', having a winding 90' located at a suitable point rearwardly of the magazine, considered with reference to the travel of the chuck. Removal of such particles from the chuck face may be accomplished by the use of appropriate cleaning means, herein a nozzle 96 (see Figs. 1 and

2), having a long, narrow outlet orifice 98 directed outwardly and obliquely with relation to the path of the chuck face, as shown in Fig. 1. Water supplied under pressure to this nozzle flushes the surface of the chuck body with sufficient force to dislodge the particles, and to carry them off the chuck face.

The removal of the articles from the chuck face may be accomplished automatically by the use of suitably arranged, fixed means, herein a simple plough or scraper, such as a plough 100 (see Fig. 5) disposed adjacent the releasing magnet 88, and presenting an inclined plane 102, which lifts the articles from the face of the chuck. Preferably, the latter is provided with an annular groove 104, into which the plough extends, the depth of the groove being greater than that of the pockets in which the articles are held. It follows that the terminal of the plough is below the plane of the lower faces of the work pieces, and hence removal of the latter is effected in a positive manner, as will be evident from an inspection of Fig. 5.

The articles, having thus been lifted from the chuck, propel one another end to end along and between guides 106 to a downwardly inclined chute 108 having similar lateral guides 110, which may direct the articles into an appropriate receptacle (not shown). If the nature of some work pieces is such that they are not completely demagnetized by the releasing magnet at the point of removal from the chuck, it is desirable to provide a further demagnetizing means such as a coil 112, encircling the chute 108, and connected in circuit with a source of alternating current 114. As the articles pass through this coil, they are subjected to repeated reversals of magnetism decreasing in intensity from the middle of the coil to its outlet, thereby removing measurable, residual magnetism. The coil may be supported on the base of the machine, as by a bracket 116. The chute and plough may be supported by brackets 118 and 120, respectively.

The general operation and advantages of the machine should be evident from the foregoing without further description.

Having thus described one embodiment of the invention, but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

1. In a work-handling mechanism, the combination of a generally horizontal, rotary work-support presenting an annular groove, means for causing work-pieces to be deposited in a row upon said work-support over said groove which travels horizontally, means to cause said work-pieces to be held against upward and horizontal displacement while being worked on, and means ex-

tending into said groove to cause the work-pieces to be lifted from said work-support and discharged therefrom.

2. In a work-handling mechanism, the combination of a generally horizontal, rotary work-support presenting an annular groove, means for causing work-pieces to be deposited in a row upon said work support over said groove, means for creating a magnetic zone into and out of which the work-pieces are carried by said work-support, and means extending into said groove to cause the work-pieces to be lifted from said work-support after passing out of said zone.

3. In a work-handling apparatus, the combination of a magazine for holding a stack of work-pieces, a travelling conveyor to which the work-pieces are delivered in succession from said magazine, means for creating a magnetic zone into and out of which said work-pieces pass, and means for removing said work-pieces from said conveyor after passing out of said magnetic zone.

4. In a work-handling apparatus, the combination of a magazine for holding a stack of work-pieces, a travelling conveyor to which the work-pieces are delivered in succession from said magazine, means for causing said work-pieces to be held magnetically on said conveyor, and means for subjecting said work-pieces to repeated reversals of magnetism of diminishing intensity to demagnetize said work-pieces.

5. In a machine for operating on articles, the combination of a generally upright magazine for holding a stack of the articles, a generally horizontal conveyor to which the articles are delivered in succession from said magazine, means carried by said conveyor to predetermine the positions of said articles on said conveyor, means for creating a magnetic zone into and out of which said articles pass while being fed, means for operating on said articles while they are in said zone, and means for causing the discharge of said articles from said conveyor after they have been operated upon.

6. In a machine for operating on articles, the combination of a conveyor, means for delivering a succession of articles onto said conveyor, means for performing work on the articles while on said conveyor, and means presenting an upwardly inclined plane for utilizing the forward movement of the articles to lift them from said conveyor and a downwardly inclined plane for utilizing gravity to discharge the articles.

7. In a machine for operating on articles, the combination of a conveyor presenting a depression, means for delivering a succession of articles onto said conveyor above said depression, means for performing work on the articles while on said conveyor, and

means presenting an upwardly inclined plane extending into said depression for utilizing the forward movement of the articles to lift them from said conveyor and a downwardly inclined plane for utilizing gravity to discharge the articles.

8. In a metal working machine, the combination of a travelling conveyor, means for causing metal articles to be held magnetically on said conveyor, means for removing metal from said articles while so held, means for demagnetizing the articles after they pass the point where the metal is removed, means for causing the removal of the articles from said conveyor, and means for causing the discharge of the removed metal from said conveyor.

9. In a metal working machine, the combination of a travelling conveyor, means for causing metal articles to be held magnetically on said conveyor, means for removing metal from said articles while so held, means

for demagnetizing the articles after they pass the point where the metal is removed, means for causing the removal of the articles from said conveyor, means for demagnetizing the removed metal, and means for causing the discharge of the removed metal from said conveyor.

10. In a metal working machine, the combination of a travelling conveyor, means for causing metal articles to be held magnetically on said conveyor, means for removing metal from said articles while so held, means for demagnetizing the articles after they pass the point where the metal is removed, means for causing the removal of the articles from said conveyor, and means for utilizing a fluid jet to cause the discharge of the removed metal from said conveyor.

In testimony whereof, I have signed my name to this specification.

HENRY K. SPENCER.

CERTIFICATE OF CORRECTION.

Patent No. 1,628,618.

Granted May 10, 1927, to

HENRY K. SPENCER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 62, claim 1, strike out the words "which travels horizontally" and insert the same before the comma and after the word "groove" in line 60; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of June, A. D. 1927.

Seal.

M. J. Moore,
Acting Commissioner of Patents.

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