R. H. LAWSON.

SHOE NAIL RECLAIMING MACHINE.

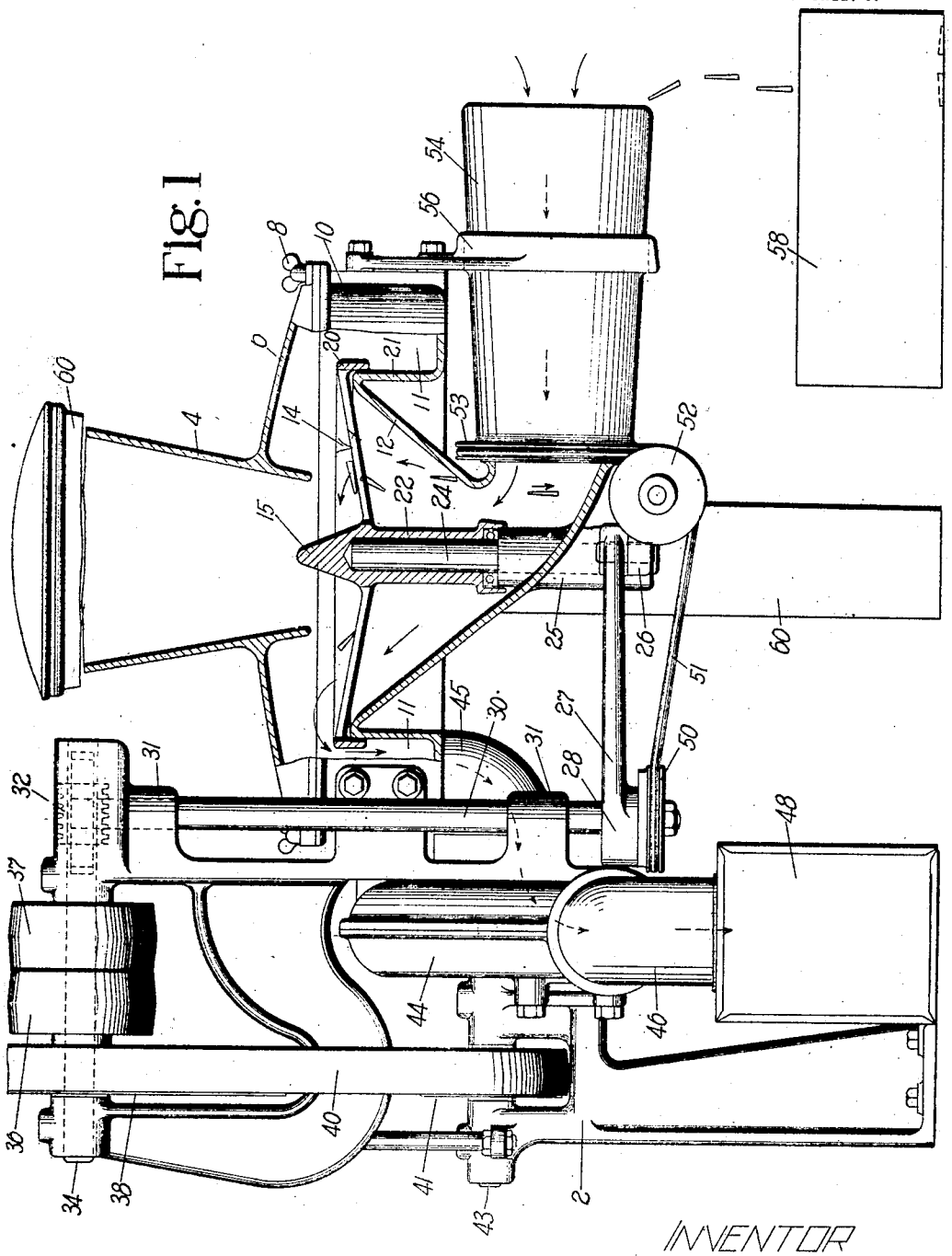
APPLICATION FILED FEB. 7, 1918.

1,376,557.

Patented May 3, 1921.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

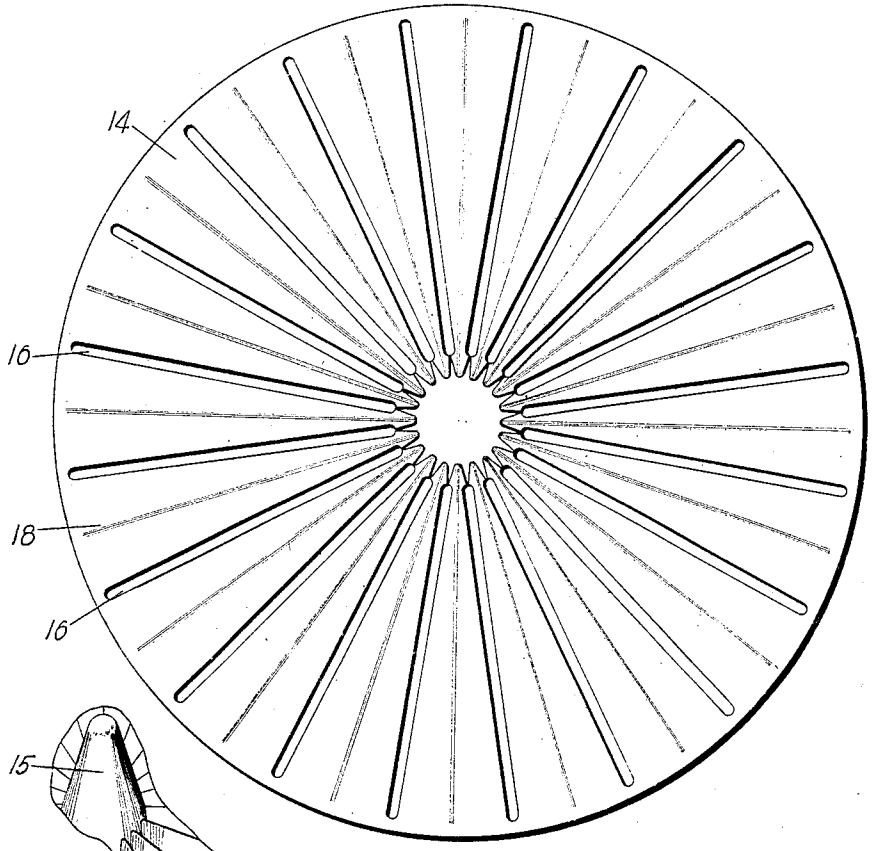


Fig. 2

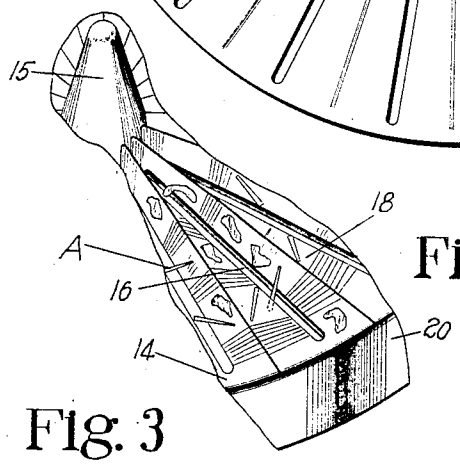


Fig. 3

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UNITED STATES PATENT OFFICE.

ROBERT H. LAWSON, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SHOE-NAIL-RECLAIMING MACHINE.

1,376,557. Specification of Letters Patent. Patented May 3, 1921.

Application filed February 7, 1918. Serial No. 215,769.

To all whom it may concern:

Be it known that I, ROBERT H. LAWSON, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Shoe-Nail-Reclaiming Machines, of which the following description in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for reclaiming nails, and in particular to cleaning mechanism designed to separate the nails which collect on the floor about shoe nailing machines from trash, dirt, or other foreign matter which is swept up with them preparatory to rendering them again available in the shoe nailing machines, or for other purposes. The nails require frequently to be assorted according to their sizes before they can again be used in the nailing machines.

Under modern shoe factory practice the nails such as are used for example in heel nailing machines are transferred from the large wooden boxes in which they are received to the rotary hoppers of the machines usually by boys, who pick up handfuls of nails and lift them from the boxes to the hoppers. As these boys are ordinarily more or less careless in handling the nails, it results inevitably that nails will often be dropped upon the floor, and additionally, nails are frequently dropped from the machines due to the clogging or imperfect working of the nail handling mechanisms. The result is that in sweepings from around the heel nailing machines there are each day a quantity of nails which are wasted, and where a large number of heel nailing machines are in use, the aggregate of the nails which are discarded in the sweepings is so large as to entail serious loss. Consequently, in such factories it is well worth while as a matter of economy to reclaim these nails if it can be done without substantial labor cost.

An important object of the present invention is to provide a machine organized to perform satisfactorily the first step in reclaiming the nails found in the sweepings in shoe factories, namely, cleaning these nails, preparatory to the second step in such operation which consists in assorting the cleaned nails according to their sizes. This latter operation may be performed subsequently to the cleaning operation, by a machine of the type described and claimed in my companion application Serial No. 215,770, filed of even date herewith.

Another object of the invention is so to organize the machine that its operation will be as nearly automatic as practicable. The automatic mechanism for separating the nails from dirt and trash found in the sweepings from shoe factories, as contemplated by the present invention, results in recovering for use at a minimum of labor cost large quantities of nails which would otherwise be lost.

An important feature of the invention comprises the provision of a separating member for receiving the shoe nails and the foreign matter commingled therewith, said member having openings formed therein of relatively great length to permit the nails when alined therewith to pass through them readily, and of relatively small width so as to arrest the passage of large pieces of material therethrough and cause such material to be delivered separate from the nails, and being provided with means for alining the nails with the openings. In the construction shown and in accordance with another feature of my invention, the separating member is in the form of a disk arranged to receive the shoe nails and foreign material and constructed to permit the nails to pass readily therethrough and to arrest large pieces of material and separate them from the nails and deliver them over the peripheral edge of the disk.

My invention in another aspect resides in inclosing the separating member, constructed to permit the shoe nails to pass readily therethrough and be separated from the large pieces of material, in an air chamber and in the provision of means for producing a flow of air through the openings of the separating member in a direction opposite to the passage of the nails therethrough so as to carry off the light dirt and trash from the mass of commingled nails and foreign material delivered to the separating member. Preferably and as shown, the separating member is agitated in order to facilitate the separation of the large pieces of material, the shoe nails, and the light dirt and other foreign matter which is car-

ried away by the air-current producing means. Preferably, also the nails are discharged from said member into a rotatable tumbler in which they are submitted to further agitation, the current of air being also caused to pass through the tumbler so as to remove more effectually and completely the dirt and other foreign matter. As illustrated, the nails are delivered from the rotatable tumbler into a collecting receptacle from which they may be taken to the assorting machine.

To applicant's knowledge and belief, it had not been proposed prior to his invention to provide a machine organized to reclaim the shoe nails from the sweepings from about the nailing machines, and it is believed that the invention is in this sense of a pioneer character. It is recognized that the construction in which the invention is herein shown as embodied is capable of being varied as to its details of construction and arrangement of parts without departing from the broad principles of the invention, and it is accordingly to be understood that the invention is not intended to be limited in its scope to the construction herein illustrated and described except as required by the appended claims. Moreover, the machine in which this invention is embodied and certain features thereof, although especially designed for cleaning shoe nails, may be used in other relations, and it is intended to claim the same in their various applications.

Other objects and features of the invention will be apparent as the description proceeds.

In the accompanying drawings,—

Figure 1 is a view in side elevation, partly sectional, of a machine embodying the invention;

Fig. 2 is a plan view, enlarged, of the separating member upon which the nails are deposited, and

Fig. 3 is a fragmentary view, in perspective, of the separating member.

The frame 2 of the machine is provided with a hopper 4, having a lower cover portion 6, which is secured by thumb nuts 8 to an annular casing 10, comprising spaced inner and outer walls forming a chamber 11. The conical discharge throat 12 extends from the top of the inner wall and is connected with one end of a tumbler 54, which is supported for rotation in an annular bearing 56, the latter being bolted or otherwise secured to the outer wall of the casing 10.

Immediately below the hopper 4 is located an oscillatory dished, or concaved, separating member 14 in the form of an annular disk which receives the heel nails commingled with trash, dirt, and other foreign matter from the hopper. The member 14 is provided centrally with a deflecting cone 15, and has at its periphery a downwardly extending skirt 20, which surrounds and overlaps the upper edge of the inner wall 21 of the casing 10.

The separating member 14 arrests the large pieces of material which are commingled with the heel nails, and such material is delivered by centrifugal action over the edge of the member 14 into the chamber 11 between the inner and outer walls of the casing 10. The heel nails as indicated in Fig. 3 are relatively long and slender tapering gradually from the head end to the point end. Openings or slots 16 are provided in the separating member 14, and, in order to permit the heel nails to pass readily therethrough, such slots are made of a length greater than the length of the heel nails. In order, however, to prevent large pieces of foreign material from passing through the slots 16, they are made relatively narrow, being nevertheless wide enough to permit the slender heel nails to pass through them freely when alined therewith. As shown, the slots 16 are radial and extend from points near the center of the separating member substantially to the periphery thereof. The separating member 14 is formed or provided intermediate of the slots 16 with raised portions or ridges 18, the inclined sides of which converge downwardly to the slots 16 and act to aline the nails which fall upon said member with said slots and to guide and direct the nails to the slots. As clearly appears from Figs. 1 and 3 of the drawings, the apices of the ridges 18 are arranged in the horizontal plane of the upper surface of the peripheral ring or skirt 20, and the apices of the channels intermediate between the ridges 18 converge toward the apices of the ridges from the center of the separating disk 14 toward its periphery. The nails are thus prevented from escaping too readily from the periphery of the disk 14 with the result that a negligible number only of them fails to pass through the openings 16. The tendency of the material to pass off over the periphery of the separating disk is manifestly dependent upon the characteristics of the material to be operated upon such, for example, as the weight of its particles and upon the speed of operation of the disk. The degree of inclination of the apices of the channels to the plane of the disk which will obtain the best results will therefore vary as the conditions above mentioned vary, wherefore, such conditions are taken into consideration in determining the form imparted to the channels of the separating disk. The greater the tendency of the material to pass off over the peripheral edge of the disk, the more the apices of the channels should be inclined to the plane of the upper surface of the periphery of the disk so as to enhance the retardation of the movement of the ma-

terial away from the center of the disk. The member 14 is also provided with a downwardly extending sleeve 22 within which is received the upper portion of a shaft 24, rigidly secured to said sleeve. The lower portion of the shaft 24 is received in the bore of a hub 25 which passes through the lower inclined wall of the discharge throat 12, and suitable ball bearings are interposed between the lower portion of the sleeve 22 and the upper end of the hub 25.

The lower end of the shaft 24 is rigid with one end of a crank 26 whose opposite end is connected to a link 27 having one end formed as an eccentric strap and surrounding an eccentric 28 which is fastened to the lower end portion of a shaft 30, the latter being supported for rotation in bearings 31, 31, carried by the frame 2. A pulley 50 is secured to the shaft 30 below the eccentric 28 and a belt 51 passes from said pulley around an idler 52, and thence around a pulley 53 carried by the tumbler 54. Rotation of the shaft 30, therefore, will impart, through the described connections, oscillating movement to the bottom member 14, and rotary movement to the tumbler 54.

The operation of the separating member in the manner hereinabove set forth serves to deliver the large pieces of trashy material over the edge of said member and by agitating the commingled mass thereon causes the heel nails to be positioned by the ridges 18 into alinement with the slots 16 so that they pass therethrough. If it be assumed that a heel nail falls upon the bottom member 14 in the position indicated at A (Fig. 3) *i. e.*, in substantially transverse arrangement to a slot 16, it will be understood that when it is agitated by the operation of the separating member, the sloping sides of the ridges 18 will cause it to turn into alinement with the slot 16.

The shaft 30 is provided with a worm gear which meshes with a worm 32 carried by a shaft 34, which is supported in suitable bearings on the machine frame. The shaft 34 is provided with the usual tight and loose pulleys 36, 37, and receives power through a belt from any suitable source of power. The shaft 34 is additionally provided with a pulley 38 from which extends a belt 40, the latter passing over a pulley 41 on a shaft 43 which is connected with a rotary or other suitable blower 44. A pipe 45 establishes communication between the interior of the casing 10, and the suction inlet of the blower 44, which latter discharges through a pipe 46 into a receptacle 48.

Means are provided for preventing large pieces of material which might cause injury to the blower from passing from the annular chamber 11 to the pipe 45. Such means may be in the form of a screen (not shown) provided over the inlet to the pipe 45, and, in such case, the meshes of the screen are of a size to permit particles such as could not cause injury to the blower to pass through the screen without impediment. When the blower is in operation, suction created thereby causes a current of air to flow through the tumbler 54, upwardly through the discharge throat 12 and member 14, and thence through the pipe 45 to the blower which discharges into the receptacle 48. A removable cover 60 may be provided for the upper end of the hopper 4 for use when desired, to prevent the entrance of air through the hopper so that the full force of the blower may be applied in creating suction through the tumbler, discharge throat, and nail receiving member 14, for effectually removing the dust, dirt or other debris from those portions of the apparatus through which the nails are being discharged.

The apices of the ridges 18 diverge outwardly from the deflecting cone 15 as illustrated in Figs. 2 and 3, the spacing of the apices of said ridges adjacent to the cone 15 being preferably less than the length of the nails being operated upon. A certain proportion of the nails delivered to the disk 14 about the base of the cone 15 are disposed transversely of the ridges 18 and bridge across the inner ends of the slots 16. Such nails tend to deflect nails subsequently delivered to the disk 14 toward the periphery of the disk. Manifestly, nails remain bridged across the slots 16 for a short time only, inasmuch as the oscillation of the disk soon moves them outwardly to points where the apices of the ridges 18 are spaced apart by a distance greater than the length of the nails. During such time, however, as they remain in bridged relation to the channels of the disk, they enable the nails previously delivered to the channels adjacent to the base of the cone 15 to pass through the slots 16 with a minimum of interference from the subsequently delivered nails. Consequently, the hereinbefore described arrangement of the ridges 18 not only effects a relatively wide distribution of the nails to the channels of the disk but obviates all likelihood of the nails becoming congested in the inner ends of the channels to an extent such as to interfere with their discharge through the slots 16 or the efficient separation of the light trash therefrom by the blower 44.

In the use of the machine, the operatives collect the sweepings from the floor of those portions of the shoe factory where nails are employed, as in heel nailing machines, and deposit the same in the hopper 4. The machine being started, the receiving member 14 is oscillated and the tumbler and blower are rotated. The nails, together with the foreign matter commingled therewith, are

received upon the separating member 14 the oscillations of which cause the large pieces of trashy material to be separated from the nails and deposited in the chamber 11 and cause the nails to gravitate through the slots 16 into the discharge throat 12, from which they pass into the tumbler 54, and are finally discharged into the collecting box 58. The air current induced by the blower 44 while the nails and debris are being agitated, draws the light rubbish away from the nails, and deposits it in the receptacle 48, the agitation of the nails and rubbish effected through the oscillations of the member 14 resulting in a separation of the nails from the rubbish, and facilitating the removal of the latter. Any rubbish that may not have been removed from the nails during their passage through the discharge throat 12 is entrained by the air current in its passage through the tumbler, and is removed prior to the final discharge of the nails into the receptacle 58.

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

1. A machine of the class described having a separating member for receiving shoe nails commingled with trash, dirt, or other foreign matter and having openings of relatively great length to permit the nails to pass readily therethrough when alined with the openings and of relatively small width so as to arrest the passage of large pieces of material therethrough and separate them from the nails, said member being provided with inclined surfaces converging downwardly toward said openings for directing the nails toward and alining them with said openings.

2. A machine of the class described comprising a separating member in the form of an annular disk having rectilinear and substantially radial openings of relatively great length to permit nails to pass readily therethrough when alined with the openings and of relatively small width to arrest the passage of large pieces of material therethrough so as to separate them from the nails, and having its surfaces between the openings inclined in a direction to direct the nails toward and aline them with said openings.

3. A machine of the class described comprising a separating member in the form of a disk having rectilinear openings of relatively great length to permit nails to pass readily therethrough when alined with the openings and of relatively small width to arrest the passage of large pieces of material therethrough so as to separate them from the nails, and means for delivering the commingled nails and other material to be separated to the disk adjacent to corresponding ends of said openings, said disk being constructed and arranged to discharge the material which does not pass through said openings at a point adjacent to the other ends of said openings, and being formed to provide members intermediate between said openings and extending above said openings and having their upper portions diverging in the direction of movement of the nails on the disk.

4. A machine of the class described comprising a perforated disk for receiving nails commingled with trash, dirt, and other foreign matter and having openings of relatively great length to permit the nails to pass readily therethrough when alined with the openings and of relatively small width so as to arrest the passage of large pieces of material therethrough and separate them from the nails, and means on said disk providing surfaces converging downwardly toward said openings for alining the nails with said openings.

5. A machine of the class described, comprising a perforated disk, operating means for said disk, and means for delivering shoe nails commingled with trash, dirt, and other foreign matter upon said disk, said disk being constructed and arranged to permit the nails to pass readily therethrough and to arrest the passage of large pieces of material and cause them to be delivered from the periphery of the disk, and being formed with members extending above the openings of the disk and operable to agitate the material on said disk.

6. A machine of the class described comprising a separating member in the form of a disk for receiving nails commingled with trash, dirt, and other foreign matter constructed and arranged to permit the nails to pass readily therethrough and to arrest the passage of large pieces of material, means for operating said disk to deliver such material separate from the nails, an air chamber inclosing said disk, and means for producing a flow of air through said disk in a direction opposite to the passage of the nails therethrough.

7. A machine of the class described comprising a separating member in the form of a disk for receiving nails commingled with trash, dirt, and other foreign matter constructed and arranged to permit the nails to pass readily therethrough and to arrest the passage of large pieces of material and deliver such material separate from the nails, means carried by said separating disk for agitating the material on said disk upon operation of said member, an air chamber inclosing said disk, and means for producing a flow of air through said disk in a direction opposite to the passage of the nails therethrough.

8. In a machine for separating shoe nails from commingled trash, dirt, and other

foreign matter, a casing formed to provide an annular chamber, a perforated disk having its peripheral edge spaced from the walls of said chamber throughout substantially its whole extent and constructed and arranged to deliver large pieces of material over substantially any part of its peripheral edge into said chamber and to permit the nails to pass therethrough, and means for producing a current of air through said disk in a direction opposite to the passage of the nails therethrough.

9. A machine for reclaiming nails having, in combination a perforated disk, means carried by said disk for agitating nails commingled with foreign matter and for discharging the nails through the perforations of said disk, means for rotating said disk, and means for creating a current of air flowing counter to the direction of discharge of said nails to remove the foreign matter from said nails.

10. A machine for reclaiming shoe nails having, in combination, a hopper, a chamber communicating therewith, a nail receiving member in said chamber provided with discharge slots constructed to permit heel nails to pass readily therethrough and to arrest the passage of large pieces of material, means for oscillating said member to agitate the nails and other material being operated upon, and means for inducing a current of air through the chamber to separate the foreign matter from the nails with which it is commingled, and to discharge said matter at a point remote from that at which said nails are discharged.

11. A machine for reclaiming nails having, in combination, a hopper, a disk-shaped nail receiving member arranged to receive commingled shoe nails and other material from said hopper and provided with discharge slots constructed to permit the nails to pass readily therethrough and to arrest large pieces of material, means for oscillating said member, means carried by said member for agitating the material being operated upon and alining the nails with said slots, and means for causing a current of air to flow through the slots in said member in a direction counter to the direction of the passage of the nails therethrough.

12. A machine for reclaiming nails having, in combination, a separating disk, means for operating the disk, means carried by the disk for agitating a mass of nails and foreign matter, rotary means for further agitating the mass, and means for subjecting said mass to a current of air flowing in a direction counter to the direction of discharge of said mass through the apparatus.

13. A machine for reclaiming nails having, in combination, a separating disk having elongated discharge slots, means for oscillating the disk, means carried by the disk for agitating a mass of nails and foreign matter and for alining the nails with said slots, means for subjecting the nails during the passage through said slots to a current of air flowing counter to the direction of discharge, and a rotary device for thereafter agitating the nails prior to their final discharge from the apparatus.

14. A machine for reclaiming nails from foreign matter having, in combination, an air chamber formed with inner and outer walls disposed to provide an annular space between them, a disk-shaped nail receiving member having a plurality of radial discharge passages, and having its periphery extending over the inner of said walls and provided with a depending flange disposed along the outer surface of said wall, means for operating said member, and means for subjecting the nails to a current of air during their discharge from said member.

15. A machine for reclaiming nails having, in combination, a nail receiving member provided with alternating elevations and depressions and radial discharge slots in said depressions, means for oscillating said member, discharging means for the nails, and means for inducing a current of air flowing counter to the direction of discharge to separate the nails from the foreign matter.

16. A machine for reclaiming nails having, in combination, a dished receiving member provided with alternately arranged radial elevations and depressions and slots in said depressions, means for receiving nails discharged from said member, and means for inducing a current of air through the apparatus in a direction counter to the direction in which the nails are discharged to separate said nails from the foreign matter.

17. A machine for reclaiming nails having, in combination, a receiving member provided with alternately arranged radial elevations and depressions and radial discharge slots in said depressions, a contracted throat for receiving the discharging nails and means to cause a current of air to flow through the apparatus in a direction counter to the direction of discharge for separating the nails from foreign matter.

18. A machine for reclaiming nails from trash, dirt and other foreign matter having, in combination, a nail receiving member constructed to permit the nails to pass therethrough, a contracted discharge throat for the nails, a rotatable tumbler in communication with said throat, and means for causing a current of air to flow through the apparatus in a direction counter to the direction of nail discharge therethrough.

19. A machine for reclaiming shoe nails having, in combination, a hopper, a dished

nail receiving member below the hopper having a central nail deflector and discharge slots constructed to permit the nails to pass readily therethrough, and means to cause a current of air to flow through said member in a direction counter to the direction of nail discharge therethrough.

20. In a machine of the class described, a separating member formed with alternate ridges and channels extending substantially in line with the point of supply of the material to be separated to said member and the point of discharge of material from said member, said channels being slotted to permit the discharge of the smallest particles of the material to be separated therethrough and being formed with their apices converging toward the apices of the ridges in a direction from the point of supply to said member to the point of discharge from said member.

21. In a machine of the class described, a separating member in the form of an annular disk provided with alternate ridges and channels extending substantially radially of said disk, said channels being slotted to permit the passage of the smallest particles of the material to be separated therethrough and being formed with their apices converging toward the apices of the ridges in the direction from the center of the disk toward its periphery.

22. In a machine of the class described, a separating member in the form of a horizontally arranged annular disk provided with alternate ridges and channels extending substantially radially of the disk, said ridges having their apices arranged substantially in the plane of the upper surface of the periphery of the disk and said channels being slotted to permit the passage of the smallest particles of the material to be separated therethrough and being formed with their apices converging upwardly toward the apices of the ridges in a direction from the center of the disk toward its periphery.

23. A machine of the class described comprising a disk-shaped separating member having elongated slots disposed substantially radially of said member through which nails are adapted to pass and having ridges disposed above said slots and on opposite sides of the inner ends of the slots, said ridges being spaced from each other by a distance less than the length of the nails on which the machine is designed to operate.

24. A machine of the class described comprising a disk-shaped separating device provided with elongated slots which extend from their inner ends toward the periphery of the device and having ridges disposed above said slots and on opposite sides of the inner ends of the slots and constructed and arranged to support nails above said slots in transverse relation thereto.

25. A machine of the class described comprising a disk-shaped separating device provided with elongated slots which extend from their inner ends toward the periphery of the device and having means associated with the inner ends of the slots for preventing the delivery to such portions of the slots of nails occupying certain relations thereto so as to prevent congestion of the nails at the inner ends of the slots.

26. A machine of the class described comprising a disk-shaped separating device provided with elongated slots which extend from their inner ends toward the periphery of the device and having inclined surfaces disposed on opposite sides of the slots and diverging toward the outer ends of the slots, said surfaces being constructed and arranged to support nails above the inner ends of the slots in transverse relation thereto in order to effect a relatively wide distribution of nails on said member.

27. In a machine of the class described, a disk-shaped separating device having a central deflecting cone and being provided with slots extending radially outwardly from said cone, and means associated with the inner ends of the slots for preventing the delivery to such portions of the slots of nails occupying certain relations thereto so as to prevent congestion of the nails at the inner ends of the slots.

28. In a machine of the class described, a disk-shaped separating device having a central deflecting cone and being provided with diverging slots extending radially outwardly from said cone, and means associated with the inner ends of the slots for preventing the delivery to such portions of the slots of nails occupying certain relations thereto so as to prevent congestion of the nails at the inner ends of the slots, said means being constructed and arranged to permit the passage of such nails through the slots upon movement of the nails toward the periphery of said device.

29. In a machine of the class described, a disk-shaped separating device having a central deflecting cone and being provided with diverging slots extending radially outwardly from said cone and ridges disposed on opposite sides of said slots and diverging toward the periphery of said device, said ridges being constructed and arranged to support nails adjacent to said cone in transverse relation to said slots.

30. In a machine of the class described, a separating member having slots extending from the point of delivery of nails thereto toward the point of discharge of the nails therefrom and means disposed above said slots and constructed and arranged to support nails adjacent to the point of delivery of the nails to said member in transverse relation to said slots.

31. In a machine of the class described, a separating member having slots extending from the point of delivery of nails thereto toward the point of discharge of the nails therefrom, and members extending above said slots and diverging toward the point of discharge of the nails from said separating member, said members being constructed and arranged to support nails adjacent to the point of delivery of the nails to said member in transverse relation to said slots.

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

ROBERT H. LAWSON.