O. GAMPER.

MACHINE FOR PACKING NAILS OR OTHER SIMILAR OBJECTS.

APPLICATION FILED SEPT. 8, 1915.

1,249,613. Patented Dec. 11, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

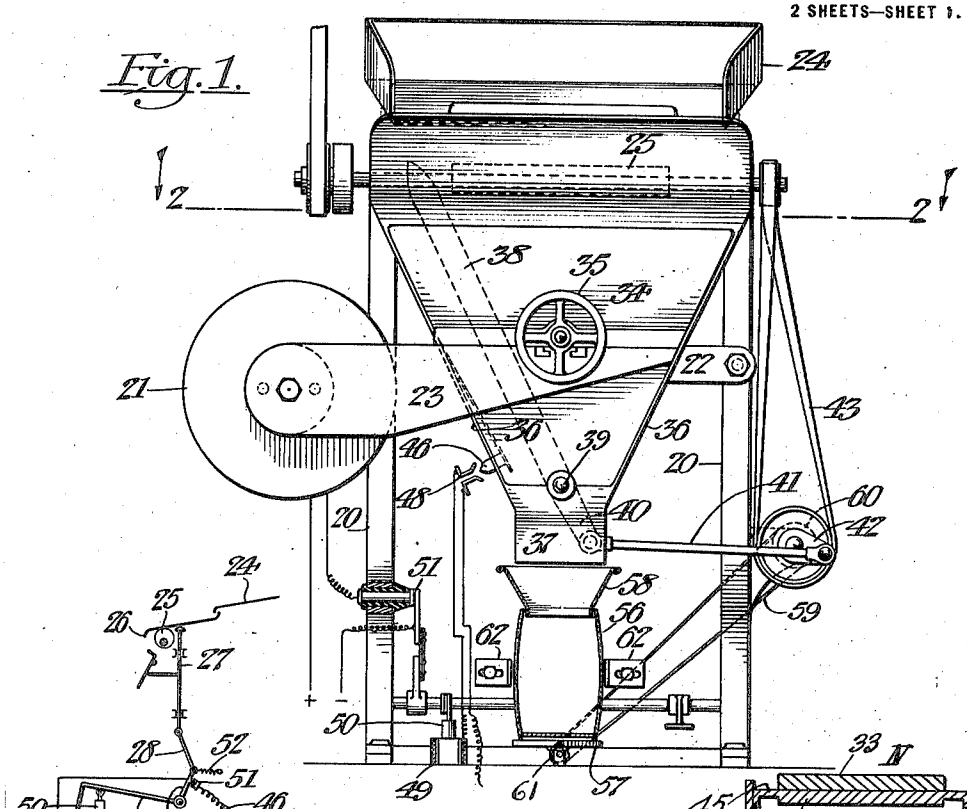


Fig. 4.

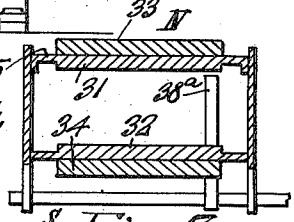


Fig. 3.

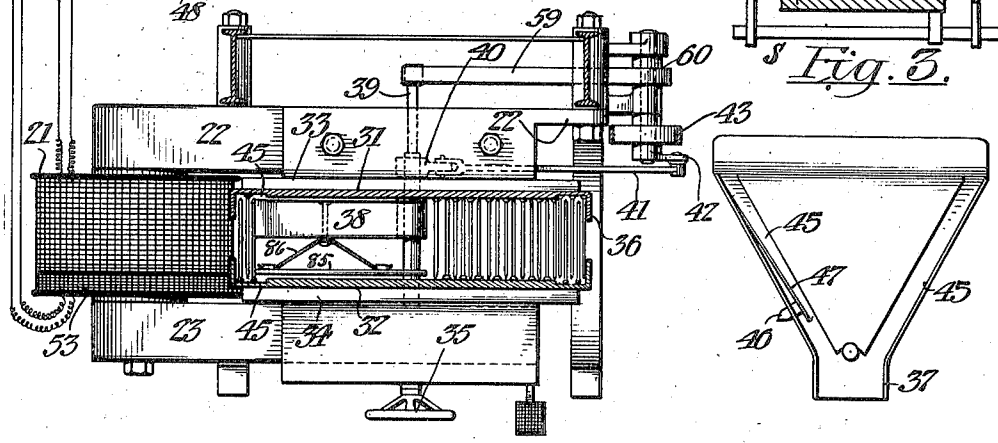


Fig. 2.

Witness:
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Inventor:
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2 SHEETS—SHEET 2.

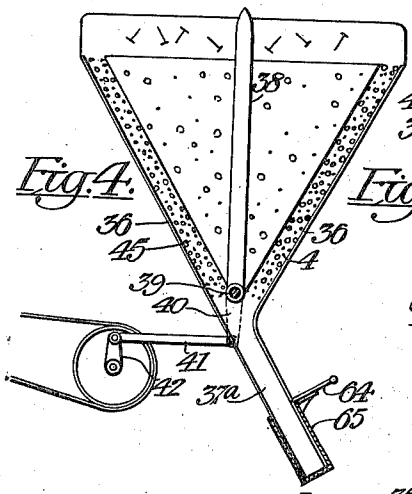


Fig. 4.

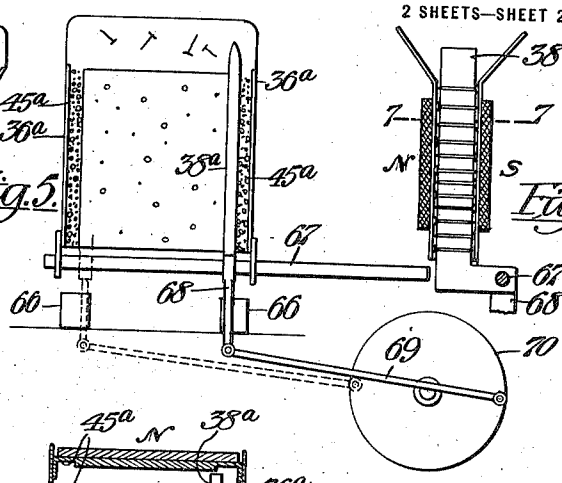


Fig. 5.

Fig. 6.

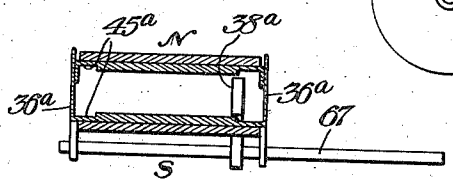


Fig. 7.

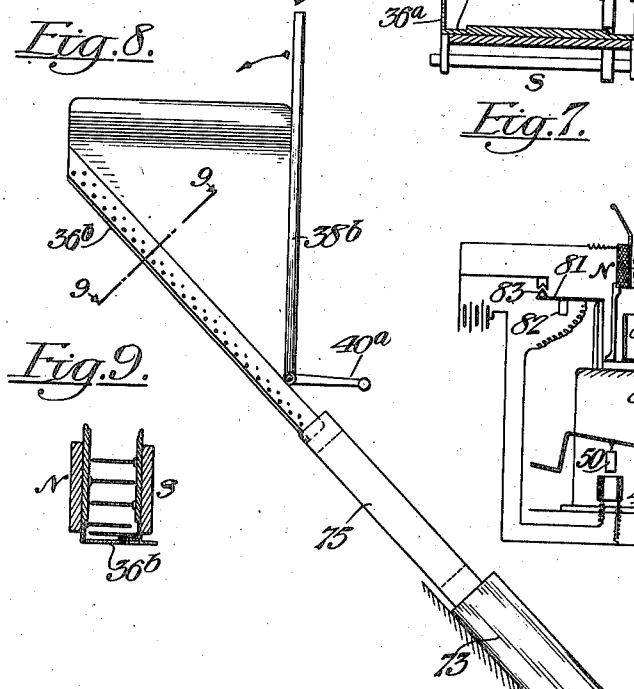
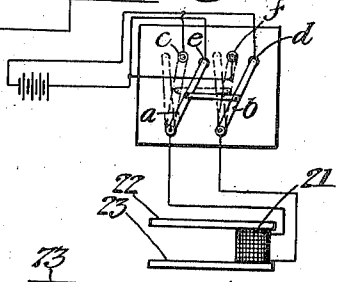


Fig. 8.

Fig. 9.

Fig. 12.

Fig. 13.



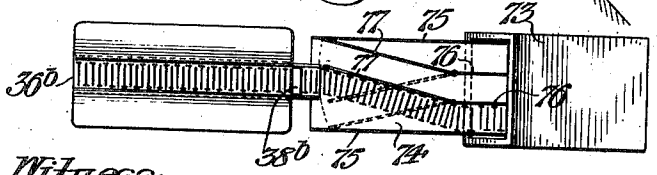


Fig. 10.

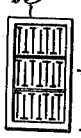


Fig. 11.

Witness:—

Inventor.
Otto Gamper
by his Attorney.
C. M. Fairbank

UNITED STATES PATENT OFFICE.

OTTO GAMPER, OF NEW YORK, N. Y.

MACHINE FOR PACKING NAILS OR OTHER SIMILAR OBJECTS.

1,249,613. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed September 8, 1915. Serial No. 49,471.

To all whom it may concern:

Be it known that I, OTTO GAMPER, a citizen of the Republic of Switzerland, and a resident of New York, borough of Manhattan, in the county and State of New York, have invented certain new and useful Improvements in Machines for Packing Nails or Other Similar Objects, of which the following is a specification.

In my prior Patent No. 1,014,869, issued January 16, 1912, and reissued May 9th, 1914, as Reissue Patent No. 13,731, and in my prior Patent No. 1,080,435, issued December 2nd, 1913, I have disclosed and claimed certain inventions whereby the packing of nails or other oblong objects of magnetic material is facilitated by the dropping of said objects into a magnetic field where the lines of force draw the objects into parallelism.

My present invention relates to machines of this same general character and involves certain improvements designed to greatly increase the capacity of the machine, particularly by reducing the time heretofore required in packing or pressing the nails together after they have been arranged parallel and in removing the nails from the machine.

My improvements are particularly applicable to the type of machine shown in my prior Patent No. 1,080,435, above referred to, although I do not wish to be in any way limited as to the use of the various novel features involving my present invention.

As one important feature, I so arrange the walls defining the magnetic field that upon the stopping of the flow of the lines of force, the nails may automatically drop or slide downwardly to a point beneath the field. Thus when the desired amount of nails has been delivered to the magnetic field, it is only necessary to momentarily break the circuit of the electromagnets used to create the field and the nails instantly leave the field ready for the admission of a fresh quantity. Thus the flow of nails into the field may be interrupted for only a very brief instant.

A further important feature of my invention involves the use of packing means within the magnetic field and so designed that it may be operated to mechanically transfer the nails to a predetermined position either within or beyond the field and pack them together without interrupting the delivery of nails to the field.

A further important feature of my invention involves means for automatically stopping the delivery of nails to the magnetic field when a predetermined quantity has accumulated therein, such means also preferably operating to again start the delivery of nails upon the removal of the parallel nails from the field.

A further important feature of my invention resides in the means employed for facilitating the removal of the nails from the magnetic field without disturbing their parallelism. To secure this result, I provide means for de-magnetizing the poles at the instant the circuit is broken. This prevents any residual magnetism from retarding the free downward movement of the nails between to the poles.

My invention involves various other important features which will be referred to hereinafter and more particularly pointed out in the claims.

Reference is to be had to the accompanying drawings in which similar reference characters indicate corresponding parts in the several views. In these drawings,

Figure 1 is a front elevation of a machine constructed in accordance with my invention, certain portions being shown in section;

Fig. 2 is a transverse section on the line 2—2 of Fig. 1, the arrangement of the electric circuit in respect to certain of the moving parts being shown diagrammatically;

Fig. 3 is a face view of one of the wall members defining the magnetic field;

Fig. 4 is a similar view of a somewhat modified form from that shown in Fig. 3;

Fig. 5 is a similar view of a further modified form;

Fig. 6 is an edge view of a portion of the machine including the parts shown in Fig. 5;

Fig. 7 is a transverse section on the line 7—7 of Fig. 6;

Fig. 8 is a view somewhat similar to Fig. 4 but showing a further modified form;

Fig. 9 is a sectional detail on the line 9—9 of Fig. 8;

Fig. 10 is a top plan view of the parts shown in Fig. 8;

Fig. 11 is an end view of the receptacle shown in Fig. 10;

Fig. 12 is a diagrammatic showing of a

further form, particularly designed for weighing the nails;

Fig. 13 is a wiring diagram and switch which may be employed for destroying the residual magnetism in the poles, and Fig. 14 is a transverse section similar to that of Fig. 7 showing a slightly modified construction.

In the specific form of machine illustrated in Figs. 1 to 3 inclusive, I have shown certain features of my invention applied to or constituted in a machine of the general character illustrated in my Patent No. 1,080,435. Such a machine includes frame members 20 serving to support an electromagnet 21, the poles 22 and 23 of which extend transversely of the machine and are spaced apart so as to form the magnetic field therebetween.

At the upper end of the machine is a suitable hopper 24 or other delivery means, whereby the nails are fed to a point above the magnetic field and permitted to drop into the latter. The feeding of the nails from the hopper may be facilitated by a cam eccentric 25 or other suitable device for agitating a plate 26 constituting a portion of the bottom wall or floor of the hopper at the delivery end of the latter. This plate may be raised out of engagement with the cam by means of a pusher rod 27 operated through links 28 and 29 constituting a toggle joint operated by a foot-pedal 30. These parts are illustrated rather diagrammatically in Fig. 2, but as their details form no portion of my present invention, I believe that a fuller illustration is unnecessary.

Between the poles 22 and 23 of the magnet, are mounted walls defining the portion of the magnetic field which may be occupied by the nails. These walls include parallel vertical plates 31 and 32 which may be of brass or other nonmagnetic material and backed up by iron plates 33 and 34 directly connected to the poles. The plates 31 and 33 may be rigid and non-adjustable in respect to the pole 22, while the plates 32 and 34 are adjustable toward and from the opposite wall and in respect to the pole 23. This adjustment may be secured in any suitable manner as, for instance, by an adjusting screw operated by a hand wheel 35. This adjustment permits the distance btween the two parallel walls to be varied in accordance with the length of the nails to be packed.

As an important feature of my invention, I eliminate the bottom wall or trough shown in my Patent No. 1,080,435 or position it at a high angle to horizontal. I utilize a magnet of such strength that the lines of force passing through the magnetic field from one pole to the other will support the desired quantity of nails within said field, but when said lines are broken, gravity will remove the nails to a position beyond the field.

The nail-receiving portion of the magnetic field is defined not only by the two parallel walls 31 and 32, but by one or more downwardly converging end walls 36. These may be separate plates or may be and preferably are formed of inturned flanges on the plates 31 and 32. The opposed flanges may be spaced apart as is indicated in Fig. 2 or one flange may be made considerably wider than the other so that they overlap as shown in Fig. 7 and telescope when one of the parallel walls is adjusted toward or from the other. Beneath the magnetic field the plates 31, 32 and 36 are extended so as to form a chute, conduit, or passageway 37, into which or through which the nails may be delivered from the magnetic field.

Within the magnetic field, I provide a packing or pressing device for moving the nails laterally in the magnetic field and preferably pack them against the downwardly extending walls 36. Such a device in its simplest form includes a movable partition 38 disposed within the field and movable back and forth to remove the nails from the center portion of the field and pack them together. As illustrated, this partition, packer, or nail displacing member, is mounted on a pivot 39 at the lower end of the field so that it may swing back and forth and assume a position parallel to and spaced a short distance from either of the downwardly extending walls 36. The upper end of the member 38 extends above the upper end of the magnetic field so that as the nails fall into the magnetic field and are drawn to parallelism by the lines of force, the member 38 may be used to bodily displace the nails and pack them against the walls 36. This brings the nails into closely packed positions at opposite sides of the field and permits the continued delivery of the nails until the desired amount has been received. The member 38 may be operated continuously or intermittently and either by hand or by the same source of power that operates the hopper agitating mechanism, or from an independent source of power.

As illustrated, the shaft 39 of the packer member projects through one of the parallel walls and has an arm 40 connected by a link 41 to a crank 42 carried by a shaft journaled in a bracket on one of the frame members 20. This shaft is shown as driven by a belt 43 from a pulley on the shaft of the cam 25 to a pulley 44 on the shaft of the crank 42. By means of the mechanism shown, the member 38 will be continuously moved back and forth in the magnetic field and will force the nails laterally toward the side portions of said field.

In order to prevent the nails from returning into the center portion of the field af-

ter they have been pushed over by the member 38, I so design the inner surfaces of the plates 31 and 32 that the nails are prevented from sliding back toward the center portion of said plates. This means may be of any suitable character, although preferably I provide each of the side walls 31 and 32 with grooves 45 extending parallel to the end walls 36 and of a width substantially equal to the depth of nails which it is desired to accumulate in the field before dumping. The grooves are comparatively shallow as it is only necessary to provide a shoulder against which the end of the nail will engage as it tends to slide back toward the center of the magnetic field where the lines of force are strongest.

When the desired quantity of nails has been delivered to the magnetic field, arranged parallel by the lines of force, and forced laterally into compact masses at the opposite sides of the field, the current energizing the coil of the electro-magnet is broken and the nails will instantly slide down the converging walls 36 into the chute 37 and be deposited in any suitable receptacle desired.

For breaking the electric circuit, I may use a simple hand controlled switch or I may employ an automatically operating switch controlled by the amount of nails supported in the magnetic field. One simple form of magnetic switch is illustrated in Figs. 1 and 3, while a further form is illustrated in Fig. 12 and will be described more particularly hereinafter.

The form shown in Figs. 1 and 3, includes a contact member 46 carried by a spring plate 47 in the path of the nails. This member 47 may project in between the two opposed flanges forming one of the walls 36 or it may be carried by one of said flanges. It is supported at its upper end and normally extends downwardly and inwardly from the wall 36 so that as the nails accumulate within the field and are pressed toward the wall 36, it will be forced toward the plane of said wall. When a sufficient amount of nails has accumulated so as to fill the grooves 45 or to fill the space between the packer 38 and the wall 36 when the former is at the end of its stroke, the spring plate member 47 will assume such a position that the contact member 46 will engage with a suitable contact or contacts 48 and close the electric circuit.

Arranged in the circuit with this switch is a solenoid magnet 49, the core 50 of which is connected to the foot lever 30 or a part rigid with the latter. Upon the closing of this circuit and the energizing of the solenoid, the foot lever will be pulled down and the rod 27 will be forced up to disengage the hopper from the agitator and stop the delivery of nails to the magnetic field. At the same time, it may break the main circuit of the main coil of the electro-magnet at a switch 51 so that the nails within the magnetic field may instantly drop from the latter. Thus it will be noted that the accumulation of a predetermined amount of nails in the field serves to break the circuit of the magnet, destroy the lines of force, effect the delivery of nails from the field, and stop the further delivery of nails to the field. As soon as the nails have left the field, the spring plate 47 may return to its normal position, thus breaking the circuit of the solenoid, and a spring 52, a counter balancing weight or any other equivalent means, may operate to raise the foot-lever, start the delivery of nails, and close the circuit of the main electro-magnet generating the lines of force in the field.

In order to prevent the residual magnetism of the poles from holding one end of each nail while the other end swings downwardly and thus destroying the parallelism of the nails, I preferably provide means for destroying this residual magnetism. In the machine shown in Fig. 2, I employ a main coil 21 in the electro-magnet for creating the flow of the lines of force from one pole to the other. It is the circuit of this main coil which is broken when it is desired to discharge the nails from the field. In addition to the main coil, I may employ an auxiliary or supplementary coil 53 which is so constructed as to counteract or buck the main coil. This may be done by making the windings in the opposite direction or by returning the current from the windings in the opposite direction. This bucking coil is preferably of small power in respect to the main coil so that when the main coil is in operation, the effect of the bucking coil is negligible. The bucking coil may be connected in circuit so that the current flows at all times while the machine is in operation, but its effect will only be felt when the circuit of the main coil is broken. After the circuit of the main coil is broken, the effect of the auxiliary coil is to instantly destroy the residual magnetism in the poles and thus there is nothing to interfere with the instant dropping of the nails without disturbing their parallel arrangement. The nails will be entirely out of the magnetic field before the bucking coil can build up new lines of force running in the opposite direction and which would tend to hold back the nails. Even though a small amount of magnetism is imparted to the poles before the nails have entirely left the field, it will be so slight, due to the small capacity of the auxiliary or bucking coil, that it exerts no appreciable effect on the nails.

The nails delivered from the lower end of the magnetic field upon the breaking of the lines of force in the latter may pass to

any suitable form of container. If the container be a rectangular box, it may be arranged to telescope with the lower end of the chute 37 so that the nails will fall into the receptacle in parallelism. If the receptacle be in the form of a keg, I preferably provide means for rotating the keg either continuously or intermittently while the machine is in operation.

In Fig. 1 I have shown a keg 56 mounted upon a rotatable platform 57 and having a hopper 58 for receiving the nails from the chute and transferring them to the keg. It is of course evident that all of the nails will not remain in absolute parallelism in the keg, but they will all have a general horizontal position in the keg and thus a very much larger amount of nails may be packed in a keg of a predetermined size or a smaller keg may be used for packing a predetermined quantity of nails than if they were dumped in in the ordinary way.

The support for the keg may be rotated by hand or by machine. As shown, I pivot the support 57 at its center and provide a friction wheel for engagement with the under side adjacent the periphery. This may be driven through a belt 59 and pulleys 60 and 61 or in any other suitable manner. For centering the keg on the platform, preventing the lateral movement during rotation, I may provide any suitable form of adjustable guides 62.

The chute at the lower end of the magnetic field may, if desired, serve as a storage receptacle for the nails and it may be extended so as to telescope with the receptacle into which the nails are to be delivered. In Fig. 4, I have shown a chute 37^a provided with a transversely movable wall or partition 64 which, when closed, permits the accumulation of nails within the chute above the partition and all in parallelism. The portion of the chute below the partition or valve 64 may extend into a carton 65 to the bottom of the latter. Upon placing the carton over the end of the chute and opening the valve 64, the nails will slide down to the bottom, and the valve may then be closed, and as the carton is lowered from the end of the chute, the nails will slide into the carton and will lie properly stacked in parallel relationship in the carton. The receptacle portion of the chute 37^a between the valve and the lower end of the magnetic field may be increased to any desired extent so as to hold enough to fill several cartons if desired.

It is not essential that the walls 36 converge as shown in Figs. 1 and 4. The downwardly extending walls may, if desired, be vertical and parallel as shown in Figs. 5, 6 and 7. Here the walls 36^a are downwardly extending but not inclined. In this construction, the grooves 45^a will follow the walls 36^a and two separate receptacles 66 may be employed, one directly beneath each side of the field. In this construction, the packing member is so mounted as to come to extreme positions parallel to the opposite walls 36^a. As shown, this member 38^a is carried by a reciprocating rod 67 mounted in suitable guides at the lower end of the field. As the rod moves back and forth, it carries the nails from the center portion of the field to the side edges and packs them into close formation. When a sufficient quantity of nails have accumulated, the lines of force are broken and the nails are permitted to drop into the receptacles. Due to the fact that they are closely packed, they may drop substantially vertically without disturbing their parallel relationship.

The packing member 38^a may be moved back and forth by hand or may be moved mechanically, or either continuously or intermittently. As shown, I connect an arm 68 to a link 69 pivoted on a crank disk 70, the diameter of the disk being substantially equal to the maximum desired movement of the packing member 38^a.

Any other suitable means might be employed for operating the packing member. Instead of having the downwardly extending walls 36^a formed of two spaced flanges as in Fig. 2, I may make one flange materially wider than the other so as to telescope as is clearly indicated in Fig. 7.

The packing member shown in Figs. 1, 4 and 5 is arranged so as to deliver part of the nails in one direction and part in the opposite direction from the center of the magnetic field. I may arrange the packer so as to force all of the nails toward one side if desired. In Fig. 8, I have shown a construction in which a packing member 38^b is pivoted at its lower end and mounted to be operated by a hand lever 40^a or other suitable device. The magnetic field is substantially triangular in form with one downwardly extending inclined wall 36^b and opposite to this is the packing member 38^b which normally extends vertically. When the quantity of nails has been delivered to the magnetic field and is distributed through the latter, the upper end of the packing member 38^b may be swung in the direction indicated by the arrow until it reaches a position substantially parallel to the wall 36^b. Upon immediately returning it to the position indicated in the drawing, a further quantity of nails may be delivered to the magnetic field. In this form, it is desirable to interrupt the delivery of nails during the packing action resulting from swinging the member 38^b.

The nails may be delivered from the machine to any suitable receptacle or container, for instance, as shown in Fig. 1 or as shown in Fig. 4. In connection with this form, I have shown means whereby nails may be con-

veniently packed in a receptacle of a length approximately equal to the multiple of the length of the nail. I have shown in Figs. 8, 10 and 11 a receptacle 73 adapted to receive three separate columns or stacks of nails. For delivering the nails to the receptacle, I provide a guiding mechanism, including a bottom plate 74, side plates 75 and two partitions 76 between the side walls 75 and spaced from each to leave three passageways each of a width substantially equal to the length of the nails to be packed. The guiding mechanism is so mounted that a receptacle may be slipped over the lower end thereof and it is so mounted and so designed that the nails from the machine may be delivered into any one of the spaces between the partitions and side walls. As shown, the two partitions 76 each have movable or pivoted extensions 77 which may be moved back and forth between the side walls 75 so as to vary their relationship to the delivery end of the groove or channel of the machine. As illustrated in Fig. 10, the two partitions are swung to the limiting position in one direction and the nails are guided to one side compartment of the receptacle. By swinging them to an intermediate position, the nails may be deflected to the center compartment and by swinging them to the opposite limiting position, shown in dotted lines, the nails will go to the other side compartment. After several compartments have been filled, the receptacle 73 may be moved downwardly off the lower end of the guiding means and the nails will remain in the receptacle in a plurality of separate stacks or columns.

Upon removing the receptacle and nails from the machine, the separate columns will not be separated by any partitions, but this is immaterial. I may, if desired, provide partitions which will remain in the receptacle and permanently hold each column or stack of nails separate from the others.

In Figs. 1 and 3, I have illustrated one means for automatically stopping the delivery of nails when a predetermined quantity has accumulated in the magnetic field. This controlling means, as previously indicated, is dependent for its operation upon the pressing of a circuit closer into position when the nails have accumulated in the machine to make a layer of a predetermined thickness.

I may utilize variations in the weight of the nails in the field as a means for controlling the operation of the machine. In Fig. 12, I have shown rather diagrammatically a machine in which the main working parts are the same as in the machine shown in Figs. 1 and 2 except that the coil, poles and walls defining the magnetic field are mounted for vertical movement independently of the main frame. In this form, I mount the means for forming the magnetic field on the platform 80 of a pair of scales. The beam 81 of the scales has an adjustable weight 82 and a circuit closer 83 so that when the weight of the means forming the magnetic field and the nails accumulated therein reach a predetermined amount, the circuit will be closed to stop the further delivery of nails and deënergize the main magnet. This may be done by the use of a solenoid for pulling down the foot pedal in the same way as is shown in Figs. 1 and 2. The machine may be so set that when the weight on the platform 80 increases by an addition of a predetermined number or weight of nails, the machine will stop and the nails will be deposited in a receptacle 84 mounted beneath the magnetic field. If the electro-magnet is of such strength that it will support in the magnetic field the total weight of nails which it is desired to place in one receptacle or container, that receptacle or container may rest directly upon the platform of the scales, and the machine when once stopped by the accumulation of the predetermined amount of nails will remain out of operation until after the filled container has been removed from the scales and an empty one substituted.

If the receptacle will hold more nails than the magnetic field will support, then the scales may be so adjusted as to dump the nails into the receptacle when one-half, one-third, one quarter, or any other simple fraction of the total desired amount has accumulated. In this case the receptacle should be supported independently of the platform of the scales.

In Fig. 2 I have shown one means which may be employed for destroying the residual magnetism in the poles, the said means including a bucking coil separate from the main coil. A somewhat similar result may be secured by omitting the bucking coil and by providing means for directing the current through the main coil in the reverse direction for a very brief instant after the breaking of the circuit to dump the nails.

In Fig. 13, I have shown a wiring diagram of a simple switch which might be used for this purpose. The terminals of the main coil 21 are shown as connected to two parallel, pivoted switch members *a* and *b* insulated from each other. One pole of the battery is shown as connected to two contacts *c* and *d* while the other terminal is connected to two contacts *e* and *f*. With the switch members in the position shown in solid lines, that is, in engagement with the contacts *e* and *d*, the current from the battery will flow through the coil in one direction. By moving the switch members into engagement with the contacts *c* and *f* the current will flow in the opposite direction while continuing the movement to the

position shown in dotted lines, and the circuit will be broken. The device would be so made that the switch members would be in the position shown in full lines when the machine is in operation. When it is desired to stop the operation, the switch members might be operated, so as to rapidly move them to the dotted line position. In reaching this position they will first break the circuit as they leave the contacts *c* and *d*. They will then make and instantly break the circuit as they pass over the contacts *e* and *f*. Thus, as the switch members are being moved, they operate to send the full current for an extremely brief interval through the main coil in the opposite direction from that in which it was flowing during the main operation of the machine. This serves to completely destroy the residual magnetism in the poles without remagnetizing them with the opposite polarity.

In the foregoing description, I have referred to certain alternative constructions whereby the main objects of my invention may be secured. I do not wish to be limited to these specific forms as it is evident that various other alternative constructions might be designed within the spirit of my invention and without departing from the scope of the appended claims.

In the description and in the following claims I have used the term "nails" as defining the objects arranged in parallelism and packed by the machine. Although the machine is primarily intended for packing nails, yet it is equally adaptable for packing any oblong objects of magnetic material such, for instance, as bolts, screws, spikes, or the like. I do not use the term "nails" in any limiting sense and desire it to be interpreted as the equivalent of the phrase, "magnetic objects of oblong shape."

I have shown a good many of the parts of the machine rather diagrammatically particularly where the details of construction form no portion of my invention and may be varied at will. I have also shown the switches, wiring and other parts diagrammatically as it is evident that any one skilled in the art might provide the necessary details of construction from the foregoing description.

In the various forms illustrated, the device employed for moving the nails mechanically in the magnetic field after they have been arranged parallel with the lines of force, leaves said nails in a predetermined portion of the field where they are still held in parallelism by the lines of force. It is understood that the arrangement may be such that the packer device will move the nails entirely out of the magnetic field. Such arrangement is shown in Fig. 14 wherein the magnetic poles 34 are made to extend not the entire length of the walls or plates 31, 32 but merely up to the lateral grooves 45, so that when the packing member 38[a] reciprocates through the magnetic field it will move the nails into the grooved portions which lie outside of the field.

It may be of uniform or constant width as shown in Figs. 5, 6 and 7, or it might be so constructed that the width could be adjusted either automatically or mechanically. In Fig. 2, I have shown the member 38 mounted closely adjacent to the stationary plate 31 and provided with a section 85 slidable along the rock shaft 39 and connected to the body portion 38 of the member by a spring 86 so that the part 85 will remain closely adjacent to the adjustable wall 32. As the wall 32 is adjusted toward the wall 31, the spring 86 will permit the two sections of the packing member to come together.

The machine, when used for comparatively long nails, may have the walls 31 and 32 positioned at a distance apart, slightly greater than the length of the nails, so that the ends of all of the nails will lie in substantially the same parallel planes. When using the machine for very much smaller nails, the walls may be positioned at a distance from each other materially greater than the length of the nails and this distance may be several times the length of the nail. As nails are delivered to the magnetic field they abut against one or the other of the parallel plates. These nails, upon becoming magnetized, would act as magnets to support other nails and the entire space between the plates would be bridged by nails all arranged parallel but having their ends at varying distances from the plates.

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

1. A machine of the class described, including means for forming a magnetic field of a width greater than the length of the nails, means for delivering the nails thereto, and mechanical means for moving the nails laterally to a predetermined portion in respect to the field after they have been drawn into parallelism with the lines of force.

2. A machine of the class described, including a magnetic field, walls defining the same and including substantially parallel side walls and a downwardly extending wall, and means for moving the nails laterally in the field toward said downwardly extending wall.

3. A machine of the class described, including means for forming a magnetic field, and walls defining said field, said walls including two substantially parallel walls spaced apart to a distance greater than the

length of the nails and a downwardly extending wall.

4. A machine of the class described, including means for forming a magnetic field, parallel walls defining said field, and mechanical means for moving the nails within said field to a position from which they may drop out of the field.

5. A machine of the class described, including means for forming a magnetic field, and walls defining said field, said walls including two substantially parallel walls spaced apart to a distance greater than the length of the nails and a pair of opposed downwardly converging walls spaced apart at their lower ends to form an outlet through which the nails may be discharged upon the breaking of the lines of force.

6. A machine for arranging nails in parallelism including two opposed magnetic poles, substantially parallel vertical walls spaced apart and disposed therebetween, and a pair of downwardly converging walls extending from one of said first mentioned walls toward the other, said converging walls being spaced apart at their lower ends to permit the discharge of the nails from the magnetic field defined by said walls.

7. A machine for arranging nails in parallelism including two opposed magnetic poles, substantially parallel vertical walls spaced apart and disposed therebetween, a pair of downwardly converging walls extending from one of said first mentioned walls toward the other, said converging walls being spaced apart at their lower ends to permit the discharge of the nails from the magnetic field defined by said walls, and means within said field for packing the nails against said converging walls.

8. A machine for arranging nails in parallelism, including two opposed magnetic poles, substantially parallel vertical walls spaced apart and disposed therebetween, a pair of downwardly converging walls extending from one of said first mentioned walls toward the other, said converging walls being spaced apart at their lower ends to permit the discharge of the nails from the magnetic field defined by said walls, and a member movable back and forth between said parallel walls for packing the nails against said converging walls.

9. A machine for arranging nails in parallelism, including two opposed magnetic poles, substantially parallel vertical walls spaced apart and disposed therebetween, a pair of downwardly converging walls extending from one of said first mentioned walls toward the other, said converging walls being spaced apart at their lower ends to permit the discharge of the nails from the magnetic field defined by said walls, and a member within said magnetic field and pivoted at its lower end to swing back and forth and transfer the nails from the center portion of the field toward said converging walls.

10. A machine for arranging nails in parallelism, including a pair of spaced magnetic poles, a pair of parallel spaced walls disposed therebetween and extending substantially vertically, a downwardly inclined wall extending between said first mentioned walls, and a member pivoted to swing back and forth between said parallel walls and toward and from said downwardly inclined wall.

11. A machine for arranging nails in parallelism, including a pair of spaced magnetic poles, a pair of parallel spaced walls disposed therebetween and extending substantially vertically, a downwardly inclined wall extending between said first mentioned walls, and a member pivoted at its lower end to swing back and forth between said parallel walls and toward and from said downwardly inclined wall.

12. A machine for arranging nails in parallelism, including an electro-magnet having a pair of magnetic poles, a pair of substantially vertical, spaced plates therebetween, and defining the magnetic field open at the top, means for delivering nails into said field at the upper end, and means for breaking the circuit of said magnet upon the accumulation of a predetermined quantity of nails in said field.

13. A machine for arranging nails in parallelism, including an electro-magnet having a pair of magnetic poles, a pair of substantially vertical, spaced plates therebetween and defining the magnetic field open at the top, means for delivering nails into said field at the upper end, and means for stopping the delivery of nails to said field and breaking the circuit of said electro-magnet upon the accumulation of a predetermined quantity of nails in said field.

14. A machine for arranging nails in parallelism, including an electro-magnet having spaced opposed poles, substantially parallel walls carried thereby, means for delivering nails to the magnetic field between said walls, means for packing the nails into a predetermined portion of the field, and means for stopping the delivery of nails to the field upon the accumulation of a predetermined quantity of nails in said last mentioned portion of said field.

15. A machine for arranging nails in parallelism, including an electro-magnet having spaced opposed poles, substantially parallel walls carried thereby, means for delivering nails to the magnetic field between said walls, means for packing the nails into a predetermined portion of the field, and means for breaking the circuit of said elec-

tro-magnet upon the accumulation of a predetermined quantity of nails in said last mentioned portion of the field.

16. A machine for arranging nails in parallelism, including an electro-magnet having spaced opposed poles, substantially parallel walls carried thereby, means for delivering nails to the magnetic field between said walls, means for packing the nails into a predetermined portion of the field, and means for breaking the circuit of the electro-magnet and stopping the delivery of nails to said field upon the accumulation of a predetermined quantity of nails in said last mentioned portion of the field.

17. A machine for arranging nails in parallelism, including an electro-magnet having spaced, substantially parallel poles forming a magnetic-field therebetween, a source of power, means operated from said source of power for delivering nails to said field, and means also operated from said source of power for mechanically transferring the nails to a predetermined portion of the field after they have been drawn into parallelism with the lines of force.

18. A machine for arranging nails in parallelism, including an electro-magnet having spaced, substantially parallel poles forming a magnetic-field therebetween, a source of power, means operated from said source of power for delivering nails to said field, and a movable member within said field and also operated from said source of power for mechanically transferring the nails to a predetermined portion of the field after they have been drawn into parallelism with the lines of force.

19. A machine for arranging nails in parallelism, including an electro-magnet having spaced, substantially parallel poles forming a magnetic field therebetween, substantially vertical, parallel, spaced plates between said poles, and a member for moving the nails laterally from the center portion toward one side of said field, said walls having their surfaces so formed as to prevent return movement of the nails to the center portion of the field.

20. A machine for arranging nails in parallelism, including an electro-magnet having spaced, substantially parallel poles forming a magnetic field therebetween, substantially vertical, parallel, spaced plates between said poles, and a member for moving the nails laterally from the center portion toward one side of said field, each of said walls having a shallow groove receiving the ends of said nails and serving to prevent their return movement upon the return movement of said member.

21. A machine for arranging nails in parallelism, including two spaced magnetic poles, substantially parallel, vertical plates therebetween, a downwardly extending plate between said first mentioned plates and in a plane substantially at right angles to the latter, said first mentioned plates having shallow grooves in their inner surfaces adjacent to said downwardly extending plate, means for delivering nails into the magnetic field between said parallel plates, and means for moving said nails laterally within said field until their end portions enter said grooves.

22. A machine for arranging nails in parallelism, including two spaced magnetic poles, substantially parallel, vertical plates therebetween, a downwardly extending plate between said first mentioned plates and in a plane substantially at right angles to the latter, said first mentioned plates having shallow grooves in their inner surfaces adjacent to said downwardly extending plate, means for delivering nails into the magnetic field between said parallel plates, and means for moving said nails laterally within said field until their end portions enter said grooves, said downwardly extending plate and said grooves serving to guide the nails from said field as they leave the latter under the action of gravity upon the breaking of the circuit of the electro-magnet energizing said poles.

23. A machine for arranging nails in parallelism, including an electric-magnet having two spaced magnetic poles forming a magnetic field therebetween, means for delivering nails to said field whereby the latter are brought into parallelism with the lines of force, a member within said field for transferring the nails to a predetermined portion of the field after they are arranged in parallelism, and a circuit closer for controlling the flow of current through said magnet, said circuit closer being automatically operated to deënergize the poles upon the accumulation of a predetermined quantity of nails in said field and automatically operated to reënergize the poles upon the discharge of the nails from the field under the action of gravity.

24. A machine for arranging nails in parallelism including an electro-magnet having two spaced poles forming a magnetic field therebetween, means for delivering the nails to said field whereby they may be drawn into parallelism with the lines of force, and means for destroying the residual magnetism in said poles upon the breaking of the circuit of the magnet.

25. A machine for arranging nails in parallelism including an electro-magnet having two spaced poles forming a magnetic field therebetween, means for delivering the nails to said field whereby they may be drawn into parallelism with the lines of force, and means for causing the flow of lines of force in the reverse direction in said field to destroy the residual magnetism in said poles

upon the breaking of the circuit of said electro-magnet.

26. A machine for arranging nails in parallelism, including an electro-magnet having two spaced poles forming a magnetic field therebetween, means for delivering the nails to said field whereby they may be drawn into parallelism with the lines of force, and means for causing the flow of the current in the reverse direction in the coil of said magnet for a brief instant after the breaking of the circuit of the magnet to destroy the residual magnetism in said poles.

27. A machine for arranging nails in parallelism, including two spaced magnetic poles forming a magnetic field therebetween, open at the top and bottom, means for delivering nails into said field at the upper end, a receptacle beneath said field and receiving the nails upon the breaking of the lines of force in said field, and means for rotating said receptacle.

28. A machine for arranging nails in parallelism including two spaced magnetic poles forming a magnetic field therebetween open at the top, means for delivering nails into said field at the upper end, and a member movable through the magnetic field in a direction at right angles to the lines of force, said member operating continuously during the delivery of the nails.

29. A machine for arranging nails in parallelism including two spaced magnetic poles forming a magnetic field therebetween open at the top, means for delivering nails into said field at the upper end, a member movable through the magnetic field in a direction at right angles to the lines of force, and means for operating said member continuously during the delivery of the nails.

30. A machine for arranging nails in parallelism including two spaced magnetic poles forming a magnetic field therebetween, parallel face plates between said poles and with which the nails may engage, and a packing member between said plates, said plates being adjustable toward and from each other and said member being of adjustable width.

31. A machine for arranging nails in parallelism including two spaced magnetic poles forming a magnetic field therebetween, parallel face plates between said poles and with which the nails may engage, a packing member between said plates, said plates being adjustable toward and from each other, and means for automatically varying the width of said member in accordance with the distance between said plates.

32. A machine for arranging nails in parallelism including two spaced, substantially parallel plates between which the nails are delivered, means for creating magnetic lines of force passing across the space between said plates, and a member movable back and forth between said plates to sweep the nails from the center portion of said plates toward the sides after said nails have been drawn into parallelism with the lines of force.

33. A machine for arranging nails in parallelism, including two spaced poles forming between themselves a magnetic field, means for delivering magnetic objects into the said field and means movable through said field and adapted to bring the said magnetic objects in compact form and simultaneously remove the same from the field.

Signed at New York, in the county of New York and State of New York, this 7th day of September, A. D. 1915.

OTTO GAMPER.

Witness:
FLORENCE LEVIEN.