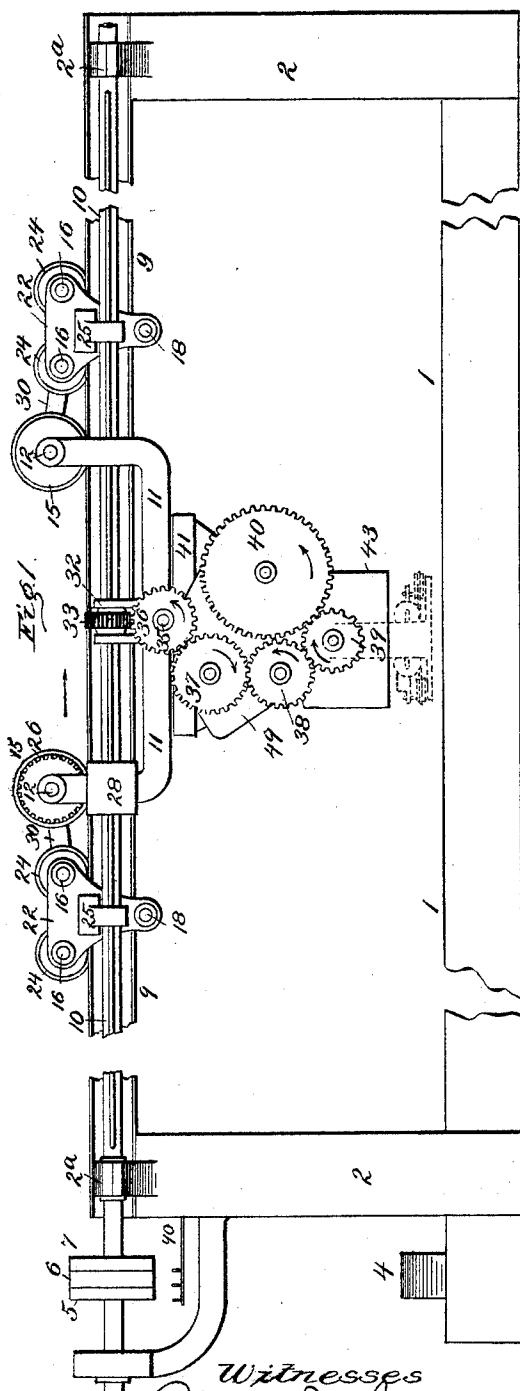


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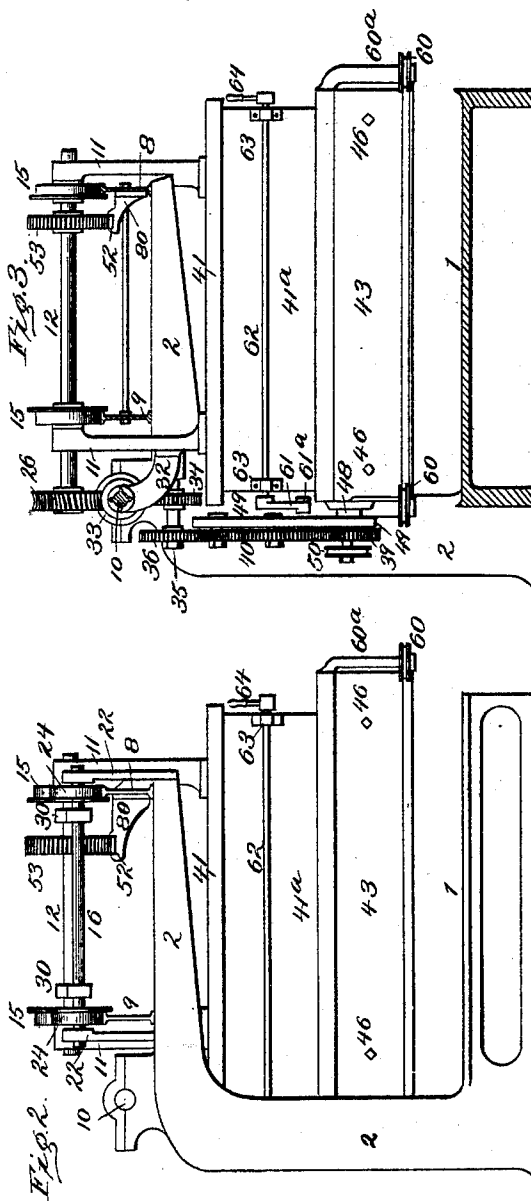
No. 519,786.

Patented May 15, 1894.



Witnesses

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(No Model.)

3 Sheets—Sheet 2.

B. BAUGH.
MACHINE FOR POWDERING PLATES, &c.

No. 519,786.

Patented May 15, 1894.

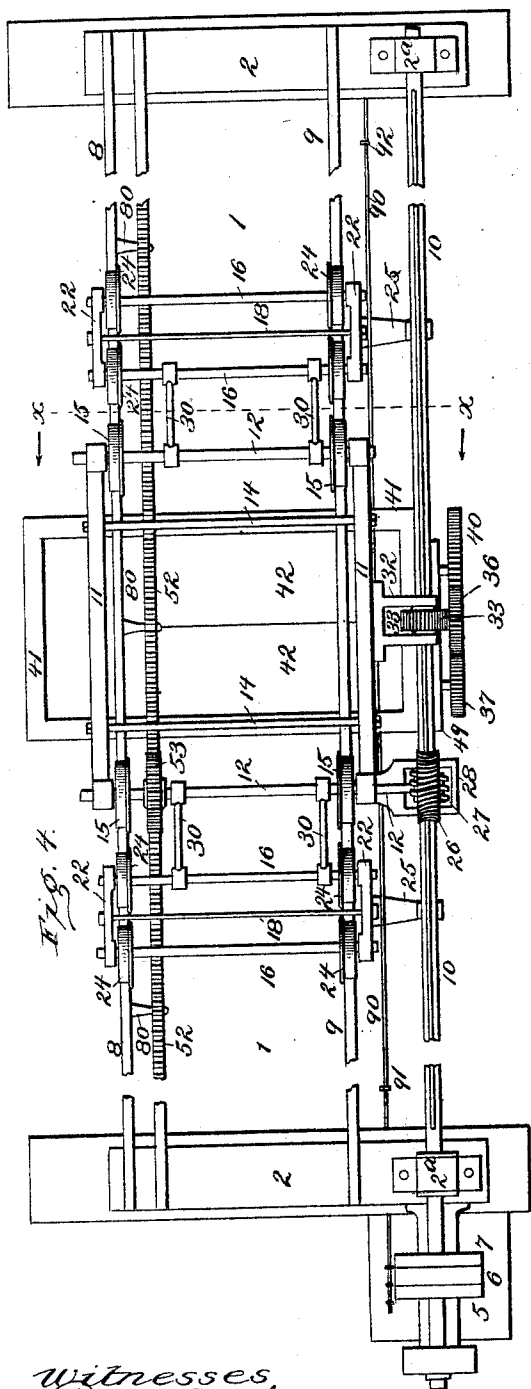


Fig. 8.

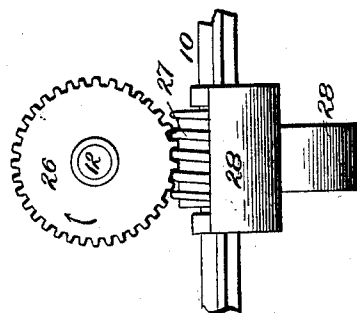


Fig. 7.

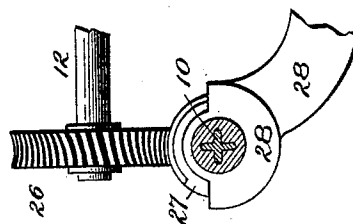


Fig. 6.

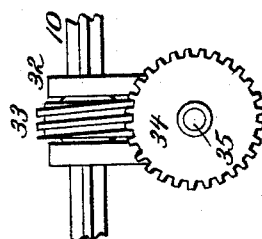
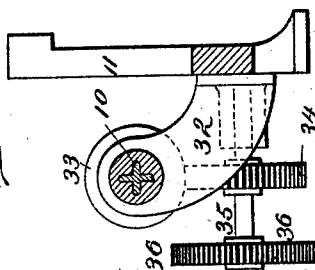


Fig. 5.



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3 Sheets—Sheet 3.

B. BAUGH.
MACHINE FOR POWDERING PLATES,
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Fig. 9.

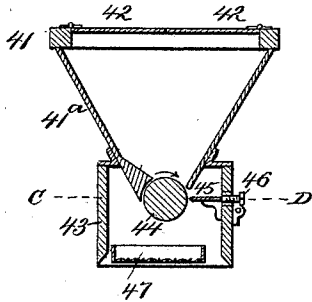


Fig. 10.

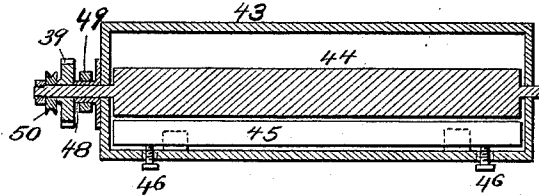


Fig. 11.

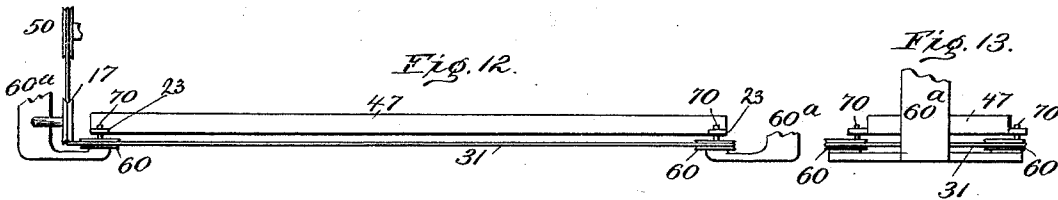
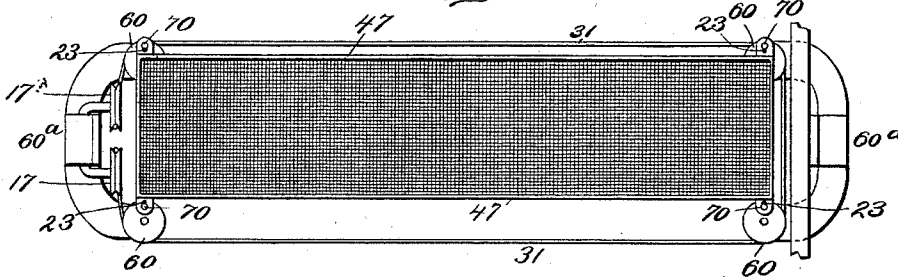


Fig. 14.

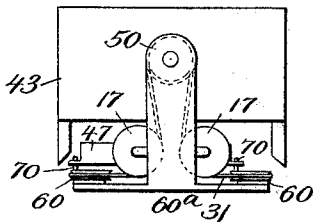
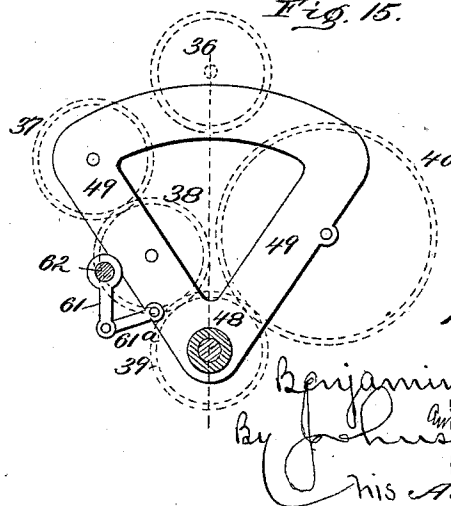


Fig. 15.



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UNITED STATES PATENT OFFICE.

BENJAMIN BAUGH, OF BIRMINGHAM, ENGLAND.

MACHINE FOR POWDERING PLATES, &c.

SPECIFICATION forming part of Letters Patent No. 519,786, dated May 15, 1894.

Application filed March 8, 1893. Serial No. 465,092. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN BAUGH, a subject of the Queen of Great Britain, and a resident of Birmingham, England, temporarily residing at Ellwood City, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Powdering Plates and other Surfaces, of which the following is a specification.

My invention relates to machines for powdering with frit the prepared surfaces of plates which are afterward subjected to a firing within a furnace whereby the frit is fused into a superficial coating of enamel in the manufacturing of articles such as signs and designs with enameled surfaces.

My invention embraces among other things the provision of supplemental truck-frames for the carriage which carries and sifts the powder upon the plates, whereby it is caused to have a steady and firm movement upon its track rails. This provision also constitutes intermediate sliding bearings for a long power transmitting shaft connecting said carriage, whereby said shaft is firmly supported between its journal bearings in its function of traversing the carriage. While the carriage-hopper has a back and forth traversing movement in the operation of sifting the powder, the roll-device for feeding the powder from the hopper, must have a continuous rotation in the same direction, and for effecting this operation of the feed-roll, I provide a shifting frame loosely mounted upon the journal of said feed-roll and carrying a train of gear adapted to maintain constant engagement with said roll and to be alternately engaged with carriage connecting gear and to maintain such alternate engagement by the action of gravity brought into function by the swinging movement of said gear carrying frame. It is also important that the vibratory movement of the sifter should be free from sudden jerks and for this purpose I provide a construction which admits of the use of an endless cord operated from the feed-roll, and the mounting of the sieve directly upon pulleys which are driven by said endless cord in a way to give the sieve a steady and regular movement upon pulleys, the axis pins of which have a fixed relation to the hopper of the feed-device.

The accompanying drawings illustrate my improved powdering machine, and in connection with them I shall particularly designate the subject matter of my invention in the claims concluding this specification.

Referring to the drawings: Figure 1 represents a front elevation of a powdering machine embracing my invention. Fig. 2 shows in elevation the right end of the machine. Fig. 3 is a vertical section of the same on the line *x—x* of Fig. 4. Fig. 4 is a top view of the machine. Figs. 5 and 6 show detail views of the carriage sifting operating connections. Figs. 7 and 8 show detail views of the carriage moving connections. Fig. 9 is a vertical cross section of the hopper sifting device; and Fig. 10 is a horizontal section of the same taken on the line *C—D* of Fig. 9. Figs. 11, 12 and 13 show respectively side, top and end views of the sifter and its supporting and operating devices; and Fig. 14 is an end elevation of the same; and Fig. 15 is a view of the shifting roller train device of the carriage, the shifting frame being of cog gear.

A suitable level bed frame or table 1 supports the plates or articles to be powdered with their faces or surfaces upward; and rising from this table at each end are standards 2 preferably of inverted L-shape, which overhang the table crosswise and support and carry the operating mechanism in proper reciprocating relation over said plates. This table is comparatively long and narrow for the convenient handling and placing of the plates close together. Supported upon the horizontal arms of the standards are two longitudinal I-beams 8 and 9 which are tied together by nutted rods 14 Fig. 4 and which extend the length of the table to form ways for a carriage, from which latter the distributing hopper for the powder, depends, as I shall presently state.

At the front side of the machine and outside of and parallel with the rail 9 and about on a level therewith, a shaft 10 is mounted in journal boxes 2^a and has a square or X-cross section between its journals. This shaft is provided at one end with contiguous pulleys 5, 6, and 7, of which the middle one 6 is loose thereon, and these pulleys are driven from a continuously driven pulley 4 Fig. 1 in a way to reverse the motion of the shaft for a

purpose which I will presently state. At the inner side of the rail 8 and parallel therewith, a toothed rack 52 is supported upon the standard arms and by intermediate brackets 80 on the rail 8.

The carriage which carries the powdering mechanism consists of two frames 11 one outside of each rail, extending below and rising above it, and supported upon the rails by flanged wheels 15, there being a pair of such wheels connected by an axle 12, at each end of said frames. One of these axles 12 has keyed upon its front end a worm wheel 26, see Figs. 1, 7, and 8, which engages a worm gear 27 on the shaft 10 whereby to give a positive rotation to the said carriage axle 12. This worm gear 27 is rotated by the shaft 10, and is moved longitudinally thereon, with the carriage, by a box 28 open at its top, and secured by a bracket to the front carriage side 11, the ends of the box embracing the ends of the worm, so as to slide it on the shaft either way the carriage may be moved. A gear wheel 53 also geared upon this carriage axle, engages the rack 52 and thus the carriage receives its reciprocating motion from end to end of the machine from the rotation of the shaft 10. For the purpose of giving a long wheel-base and a steady motion to the carriage, I provide a truck attachment at each side of the carriage. Each truck consists of two pairs of flanged wheels 24, the axle 16 of which, are mounted in end plates 22, tied together by nutted rods 18. Brackets 25 extend from the front truck plates and partially encircle and support the shaft 10. Hooks 30 loosely connecting the carriage axles, engage the truck axles and thereby couple the trucks to the carriage. These coupling hooks can be disengaged for any necessary manipulation of the carriage.

The sifting device is attached to and depends from the lower side of the carriage frames, and the provision for evenly distributing the powdered frit upon the plates as the carriage is moved back and forth, I will now describe.

Fixed to and depending from the carriage frames 11 transversely beneath the rails, is a horizontal rectangular frame 41 having top doors 42 which may be hinged to open upward between the carriage frames, for the introduction of the powdered enamel into the hopper, as seen in Fig. 9. An oblong hopper 41^a depends from this frame and opens into an oblong box 43, the bottom of which is open and is fitted with a movable sifter; while the bottom opening of the hopper is fitted with a roll 44, preferably of metal, the rotation of which causes the powder to descend between it and the edge of a plate 45 fitted horizontally within the box which contains the sifter. This plate is made adjustable with respect to the roll by two screws 46, Figs. 4 and 9, which pass through the side of the box and engage the plate, so as to regulate the quantity of powder fed from the hopper by the roll.

Projecting from the front carriage plate is a divided bracket 32 constructed to form a keeper for a worm gear 33 upon the shaft 10, and rotated by and sliding upon it with the carriage, as seen in Figs. 5 and 6. Below the shaft 10 and at right angles to it, a stud 35 projects preferably from a bearing in the front carriage bracket 32 and has a worm wheel 34, which engages with the worm gear 33; while a spur gear 36 on the end of this stud engages the sifter operating train of gear, which I will now describe in connection with the sifter for depositing the powdered frit upon the plates.

The hopper box 43 extends down to near the plates to be powdered and within its open bottom I mount the sifter frame 47 so as to have a limited shaking movement within said box. Extending from each end of the box is an inverted T-shaped bracket 60^a the ends of the arms curving under the box and at each end carrying a small pulley 60 which has a pin 70 set eccentrically on its upper face which engages a slot 23 on each corner of the sifter frame as seen in Figs. 11, 12 and 13, and above the T-arms the bracket has two guide pulleys 17 at the front end of the box. A hollow stud 48, Figs. 3, 10 and 15 is fastened to the front end of the box, through which the journal of the roll 44 passes and has a pinion 39 and a pulley 50, so that an endless cord 31 passing over the pulley 50 down under the guide pulleys 17 and around the four sifter pulleys will, by the rotation of the roll 44, cause a continuous gentle horizontal rotary motion of the sifter to deliver the powdered frit evenly on the plates. Mounted pivotally upon this hollow stud 48 is a plate 49 Figs. 3, 4 and 15 of triangular form which stands upward and has a slight lateral swinging movement for a purpose which I will presently state. From the outer face of this plate 49 studs project upon which are fitted the pinions 37, 38, 39, and 40. The pinion 37 engages the pinion 38 which engages the pinion 39 upon the hopper roll 44, and this roll pinion engages the larger pinion 40, when the frame 49 swings to the right as in Fig. 1.

Referring to Fig. 1 it will be seen that the spur gear 36, which is driven from the shaft 10, is engaged with the pinion 37 and causes the train of gear to rotate in the direction of the arrows and the roll 44 to rotate so as to feed the powder down to the regulating plate as seen in Fig. 9, as the carriage is moving in one direction.

The swinging movement to the left of the plate 49 upon its hollow stud 48 will disengage the pinion 37 from pinion 36 and engage the larger pinion 40 with said pinion 36, but this is only done when the movement of the carriage is reversed in order that the latter pinion will continue to rotate the roll 44 in the same direction. Thus when the carriage moves in one direction motion is transmitted through the train of gear 36, 37, 38, and 39 revolving the roll in the direction indicated by the arrow in Fig. 9. When the carriage

moves in the other direction motion is transmitted to the roll through the gear 36, 40 and 39, and the roll still revolves in the same direction. This is important as the even distribution of the powdered frit depends upon the continuous flow between the roll and the plate 45. The provision for shifting the plate 49 consists of a rod 62 fastened in bearings 63 on the side of the hopper 41 having a crank 61 which is jointed by a link 61^a to the plate 49 near its supporting stud 48, as seen in Figs. 3 and 15, the other end of said rod having a handle 64, Figs. 2 and 3, by which the attendant operates it preferably at the rear side of the machine, so as to vibrate its crank 61 and push the triangular plate 49 over to engage its pinion 37 with the carriage pinion 36 as seen in Fig. 1; or pull the said plate 49 over to engage its pinion 40 with the carriage pinion.

It is important to notice that the pinions 37 and 40 are so arranged on the opposite edges of the plate 49 that when either is engaged with the carriage pinion, the upper end of this plate will stand to one side of the vertical line of gravity and thereby automatically hold itself in engagement with either of its pinions 37 or 40. For this purpose the axis of the plate bearing and the axis of carriage pinion are vertically coincident, as seen in Fig. 15.

The band pulley 4 is driven by any suitable motor, and the shaft pulleys 5 and 7 are driven by means of a straight belt upon one and a crossed belt upon the other. When the one belt is running the shaft 10 in one direction the other is running upon the loose pulley, and when at either end of the track the carriage shifts the belts by striking stops 91, 92, on a shifter rod 90, the direction of revolution in the shaft is reversed and the movement of the machine reversed. For this purpose the shifter rod 90 has fingers seen in Fig. 1 to engage the belts and the rod is arranged the length of the machine so that its stops will, by contact with the carriage brackets 25 be shifted as stated.

Assuming the carriage to be at the limit of its movement in one direction, the hopper supplied with a quantity of frit and the table 1 covered with the prepared plates, the machine is started. The rotation of the shaft 10 rotates the worm gear 27, which turns the worm wheel 26, the shaft of which, by its spur gear 53, engages the rack 52 and moves the carriage upon its rails. At the same time the worm gear 33 on the shaft 10 transmits motion to its worm wheel 34 Figs. 3 and 6 and through the pinion 36 and the train of gear, motion is given to the roll 44 and the powder is caused to descend into the sifter. The hopper pulley 50 is rotated by the roll 44, and with it rotates the sifter pulleys 60, causing the sifter to have a rotary shaking movement in a horizontal plane to sift and deliver the powder evenly upon the surface of the articles upon the table. When the carriage has

reached the end of the rails, the bracket 25 strikes the stop on the shifting rod 90 and the belts are reversed and the carriage started in the other direction. At this moment the attendant shifts the plate 49 by its crank operating device and changes the engagement of its train of gear with the carriage pinion 36, and the rotation of the feeding roll is continued in the same direction during the return movement of the carriage. In effecting this change in the direction of the movement of the carriage, any suitable forms of reversing gear may be substituted for the crossed belts and pulleys.

The provision of the supplemental trucks and their sliding connection with the power transmitting shaft is important in forming a sliding support for the long shaft to prevent its sagging and vibration under the sliding movement of the carriage, the hopper feed-device whereof is operated by a sliding connection with said shaft. These trucks for this purpose form intermediate bearings for the shaft to keep it steady; and they also serve to steady the movement of the carriage and thereby render the feed from its hopper uniform. In furtherance of this object I also provide for operating the sifter by an endless cord and pulley connections with the feed-roll, whereby the sieve is caused to have a steady movement as distinguished from the jerking movement of a crank action, which tends to produce an unequal deposit of powder upon the plate; whereas a perfectly smooth and equal distribution of the powder upon the surface is an important requirement in the work. It is for this purpose that I provide a steady movement of the carriage, its feed-device and its sifter. In such provision the sifter is supported directly upon the pulleys which are operated by an endless cord from the feed roll.

Having described a powdering-machine embodying in preferred form the several features of my present invention in combination, what I separately claim, and desire to secure by Letters Patent, is—

1. In a machine for powdering surfaces, the independent truck-frames 22, 22, each having a bearer-arm 25 projecting from one end, combined with the track-rails, the carriage having the hopper and the power transmitting shaft, the said truck bearing-arms supporting and moving along said shaft to support it on each side of and independent of the carriage for the purpose stated.

2. In a machine for powdering surfaces, the combination of a horizontal power transmitting shaft, track-rails, and a reciprocating carriage thereon, and a hopper having a feed-roll and sifting devices, of a plate or frame loosely mounted on the journal of said feed-roll having a train of gear arranged for constant engagement with a pinion on said feed-roll and suitable gear connecting the shaft and carriage arranged relatively with the train gear for alternate engagement there-

with by the swinging movement of said plate, substantially as described.

3. The combination, with a reciprocating carriage having a hopper, a shaft parallel
5 with the movement of said carriage, suitable gearing connecting said shaft and carriage, and a feed-roll having a pinion, of a swing-frame loosely on the journal of said feed-roll having a train of gear arranged in such rela-
10 tion to said carriage and roll-gear, that two of the train pinions will be in constant engagement with said roll-gear and two of said train pinions will be in alternate engagement with the carriage connecting gear according
15 as said frame is swung upon its journal at the end of the reciprocating movement of the carriage, for the purpose stated.

4. In a machine for powdering surfaces, the combination of the reciprocating carriage
20 having a hopper and a feeding-roll, a power transmitting shaft parallel with the movement of said carriage, suitable gear for engaging said carriage and shaft, and a pinion on said feed-roll, with a plate or frame 49
25 loosely mounted on the shaft of said feed-roll and having a train of gear arranged in constant engagement with said feed-roll pinion, the said plate arranged to be swung to alter-
30 nately engage its train of gear with the said carriage gear and to maintain such engagement by gravity due to the position of the plate, substantially as described.

5. The combination in a machine for powdering surfaces, of a table for supporting the
35 article to be powdered, with a horizontal traversing carriage supported above said table, a hopper depending from said carriage, a feed-roll 44 therein having the pinion 39 and pulley 50, a sifter 47 supported by the hopper,
40 and means for operating said roll and sifter, consisting of a rotating shaft 10, a worm gear 33 adapted to have a sliding movement thereon with said carriage, a worm wheel 34 on the latter engaging said shaft worm, a pinion 36
45 operated by said worm pulley 34, a shifting plate 49 having the pinions 37, 38, 39 and 40, pulleys 60 on said hopper eccentrically connected to said sifter, and an endless cord connecting said sifter and roll pulleys, substan-
50 tially as described.

6. In a machine for powdering surfaces, the

combination of a horizontally reciprocating carriage, a hopper depending therefrom having a feed-roll and pulleys supported in fixed
55 relation to said hopper, with an endless cord arranged to connect said pulleys with the feed-roll, a sifter mounted directly upon and operated by said pulleys and mechanism for operating said feed-roll, substantially as described.

7. In a machine for powdering surfaces, the combination of a horizontally reciprocating carriage, a hopper depending therefrom having eyed brackets 23 at each corner, inverted
60 T-shaped brackets 60^a at each end, and a feed-roll for said hopper, with a sifter and means for supporting and operating the same consisting of the horizontal pulleys 60 mounted
65 in the brackets 60^a and having eccentric pins 70 engaging the brackets 23, the vertical pulleys 17, 17, mounted in the bracket 60^a, the pulley 50 on the feed-roll, an endless cord connecting said pulleys, and suitable means for connecting said feed-roll and carriage for operating the endless cord, substantially as
75 described.

8. In a machine for powdering plates, the combination with the power transmitting shaft 10, a reciprocating carriage, having a
80 hopper and a feed-device, and means for operating said carriage from said shaft, of a device for operating the feed-roll in the same direction during the reciprocating movement of said carriage, consisting of the worm-gear 33, sliding on said shaft, the pinion 36, on the
85 carriage engaging said shaft worm, the pinion 39 on the feed-roll, and the plate 49 loosely mounted on the journal of said feed-roll and having the gear wheels 37, 38, and 40, the said
90 gear wheels 38 and 40 being in constant engagement with the roll pinion and the said gear wheels 37 and 40, being arranged for alternate engagement with said carriage pinion by the shifting action of said plate, substantially as described.

In testimony whereof I have hereunto signed this specification in the presence of witnesses.

BENJAMIN BAUGH.

Witnesses:

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