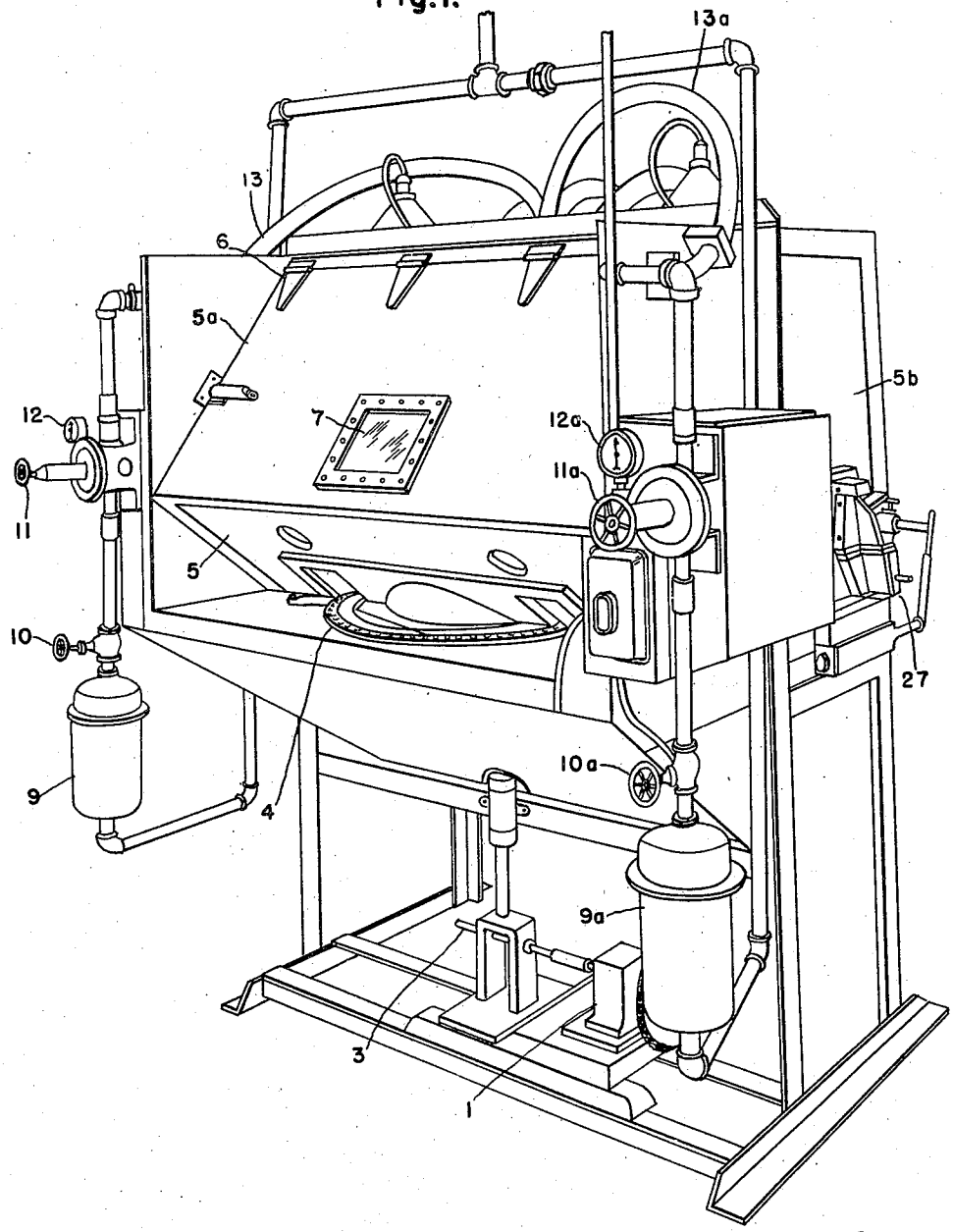
Oct. 12, 1948. A. W. TELL 2,451,049

ABRASIVE PNEUMATIC FINISHING MACHINE

Filed June 12, 1946 4 Sheets-Sheet 1

Fig. 1.



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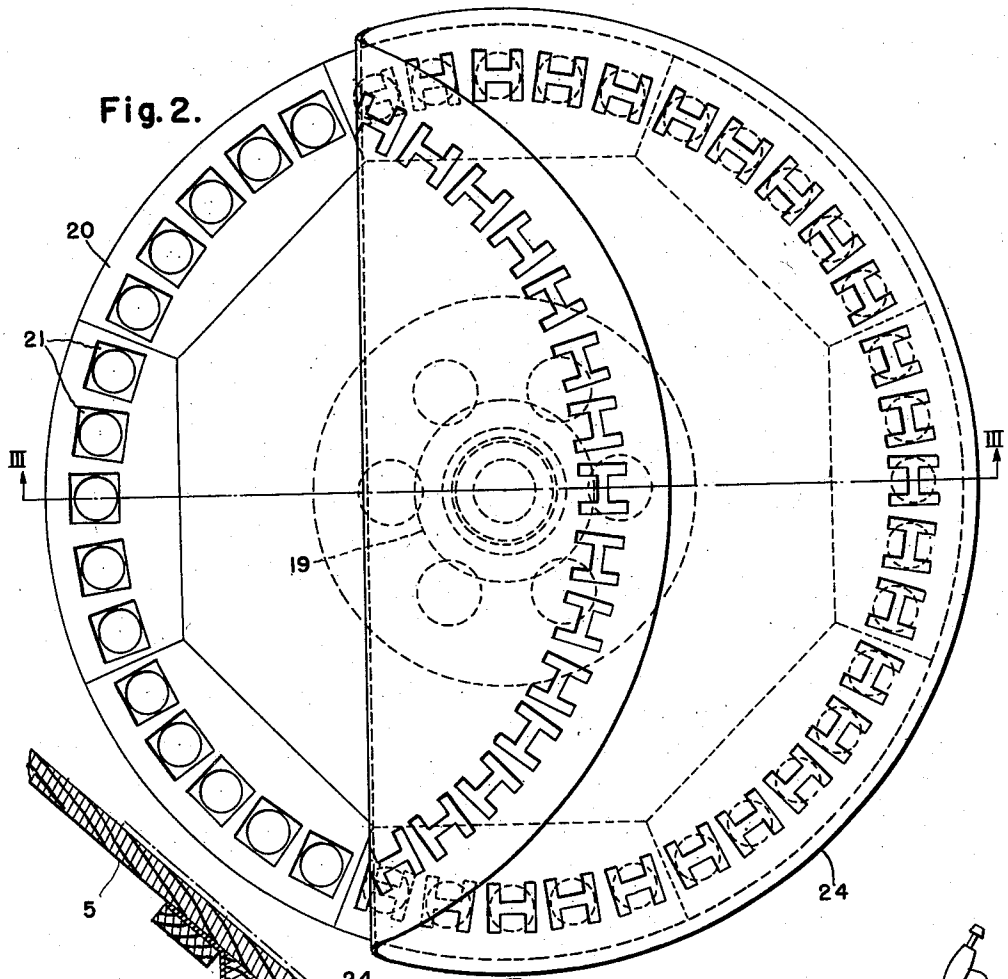
Christy, Parmelee & Strickland
ATTORNEYS

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ABRASIVE PNEUMATIC FINISHING MACHINE

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Fig. 2.



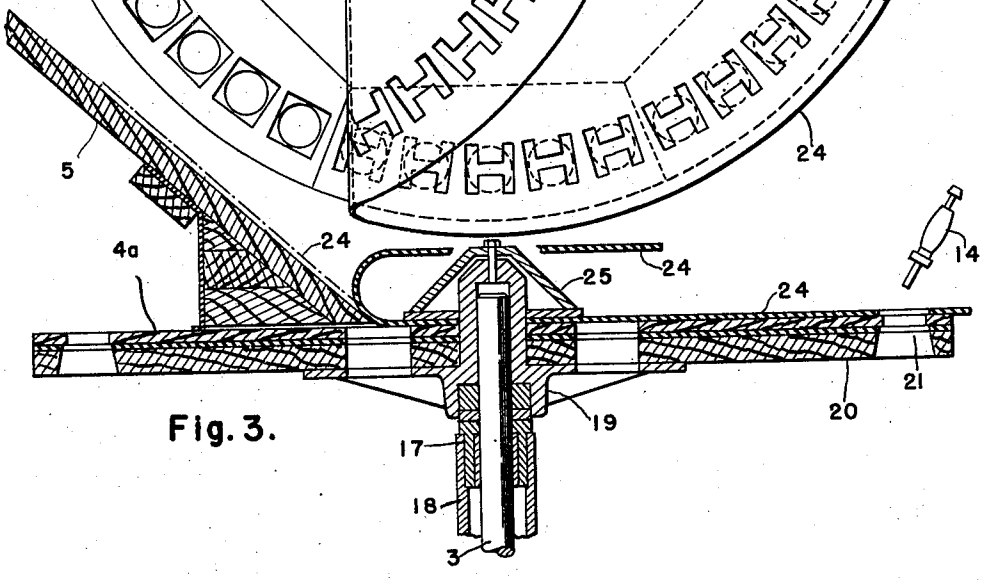


Fig. 3.

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ABRASIVE PNEUMATIC FINISHING MACHINE

Filed June 12, 1946 4 Sheets-Sheet 3

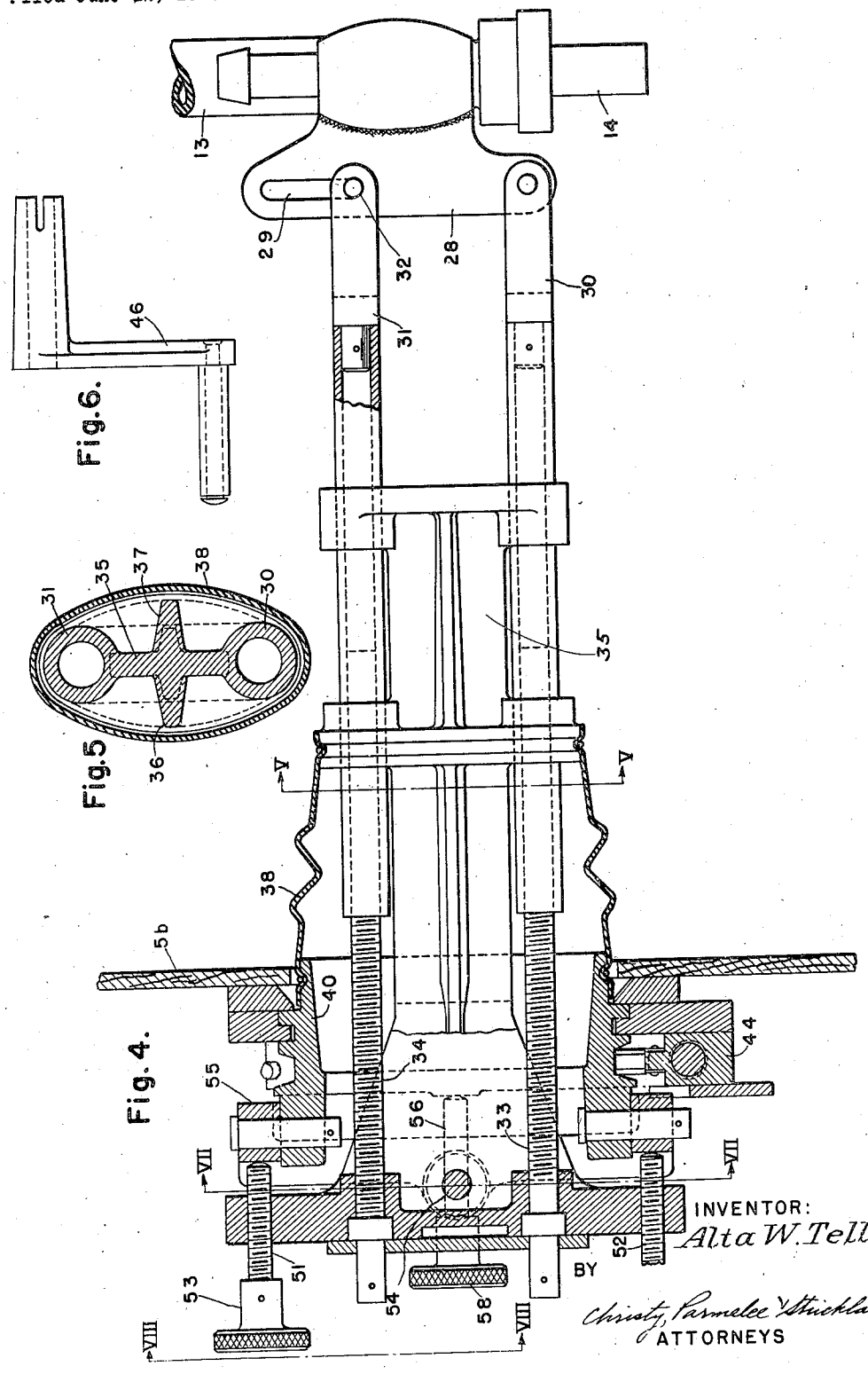


Fig. 6.

Fig. 5

Fig. 4.

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ABRASIVE PNEUMATIC FINISHING MACHINE

Filed June 12, 1946 4 Sheets-Sheet 4

Fig.7.

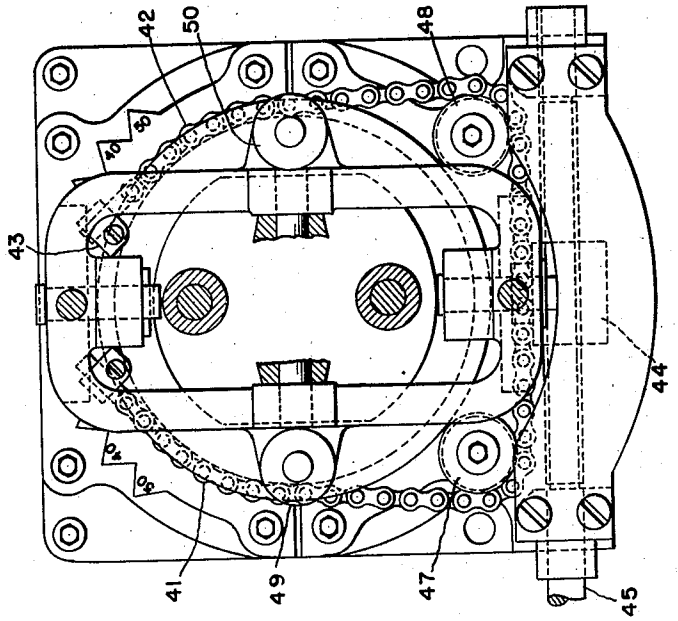
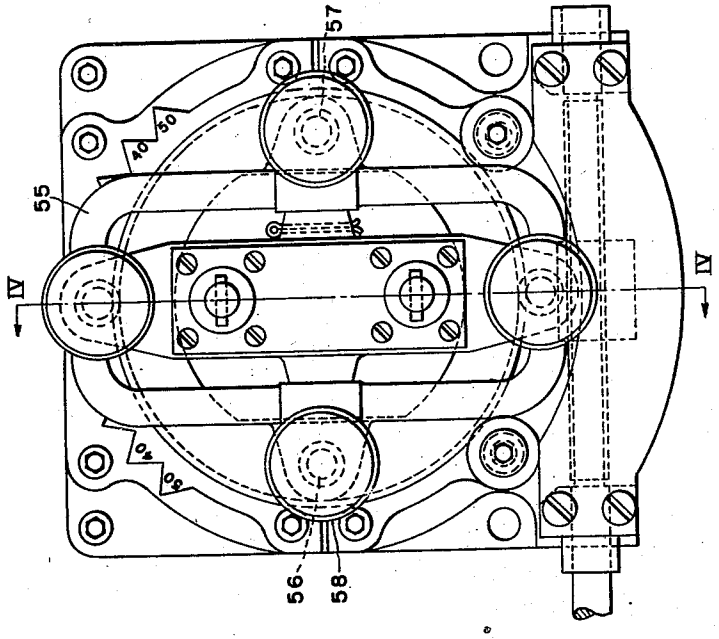


Fig.8.



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Patented Oct. 12, 1948

2,451,049

UNITED STATES PATENT OFFICE

2,451,049

ABRASIVE PNEUMATIC FINISHING MACHINE

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Application June 12, 1946, Serial No. 676,247

10 Claims. (Cl. 51—15)

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This invention relates to an abrasive pneumatic finishing machine such as, for example, a sandblasting machine or a machine for providing a blast of any other fluid or liquid for the purpose of removing flashings and other imperfections from a molded article or the like in the finishing process thereof.

Abrasive pneumatic finishing machines such as sandblasting machines are common in the art; however, most of these have the disadvantage of not being continuous in operation and of not affording a sufficient degree of flexibility in operation for pneumatically finishing articles of different size and construction.

An object of this invention is to provide an abrasive pneumatic finishing machine, such as a sandblasting machine, that is devoid of the above-mentioned disadvantages of similar machines known in the art.

A more specific object of this invention is to provide an abrasive pneumatic finishing machine comprising one or more fluid-ejecting guns for providing, for example, a blast of sand and compressed air against certain surfaces of articles to be finished, such as against surfaces of ceramic articles having flashings which should be removed.

A more specific object of this invention is to provide an abrasive pneumatic finishing machine including a turntable having a plurality of pockets adjacent the periphery thereof for seating a plurality of articles, such as ceramic articles, whose surfaces are to be pneumatically blasted, such as by sand issuing from a gun and arranged in a manner that the turntable may be continuously rotated and certain of the articles may be continuously accessible to the operator for removal after finishing and replacement with unfinished articles requiring sandblasting treatment.

A more specific object of this invention is to provide an abrasive pneumatic finishing machine including one or more pneumatic guns for blasting abrasive fluid under pressure against surfaces of articles to be finished so as to remove flashings and the like therefrom together with means for adjusting said gun so that it will blast the abrasive fluid at any desired angle with respect to the surfaces of the articles and at any desired elevation from the articles,—in other words, for providing universal adjustment of the guns.

A still more specific object of this invention is to provide an abrasive pneumatic finishing machine comprising a rotatable turntable having a plurality of pockets adjacent the periphery thereof for seating articles that have certain surfaces

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to be finished and having a flexible mask with a plurality of holes adapted to register with such surfaces, which machine is arranged so that as the turntable is continuously rotated, part of the periphery thereof will be enclosed within a housing wherein the sandblasting operation is performed, the other part of the periphery being exposed to the outside of the housing so as to be accessible to the operator to enable removing of finished articles and replacing thereof by unfinished articles, thereby providing a continuous finishing operation.

Other objects and advantages of this invention will become apparent from a study of the following specification taken with the accompanying drawings wherein:

Figure 1 is a perspective view of a complete abrasive pneumatic finishing machine involving the principles of this invention;

Figure 2 is an enlarged top view of the turntable of Figure 1 for supporting the articles to be finished adjacent the periphery thereof and including a flexible mask thereon having suitable apertures for registry with portions of the surfaces of the articles requiring sandblasting;

Figure 3 is a cross-sectional view taken along line III—III of Figure 2;

Figure 4 is an enlarged cross-sectional view of the control arm and adjusting mechanism for adjusting the position of the sandblasting gun;

Figure 5 is a cross-sectional view taken along line V—V of Figure 4;

Figure 6 is a side view of a crank used for adjustment purposes;

Figure 7 is a cross-sectional view taken along line VII—VII of Figure 4, and

Figure 8 is a side view taken substantially along line VIII—VIII of Figure 4.

Referring more particularly to Figure 1 which shows a complete abrasive finishing machine assembly, numeral 1 denotes a motor which drives, through a suitable drive assembly including a gear reducer and drive shaft 3, a turntable 4 only a portion of which appears in the figure. The remaining portion of the turntable is enclosed in a housing 5 having a lid 5a pivotally mounted by hinges such as 6 in order to afford access to the interior of the housing. Lid 5a has a window 7 to enable the operator to view the interior of the housing at all times.

Auxiliary apparatus arranged in pairs, such as expansion tanks 9 and 9a, shut-off valves 10 and 10a, air control valves 11 and 11a and air gauges 12 and 12a are provided on opposite sides of the supporting framework for providing a pair of con-

trolled streams of abrasive material under pressure through hose connections 13 and 13a to a pair of guns such as 14 (see Figure 4), which pair of guns is contained in the interior of housing 5. The guns are adjustably mounted so that their nozzles are above the peripheral portion of turntable 4 immediately above the articles to be finished.

Figures 2 and 3 are enlarged views of the turntable construction and assembly. Drive shaft 3 has rigidly secured thereto a sleeve 17 journaled in a bearing 18, which bearing 18 serves as a housing for the shaft. A turntable flange 19 is rigidly secured to shaft 3 and has mounted thereon a turntable 20 of wood or other suitable material.

The turntable has a plurality of pockets such as 21 having shapes corresponding to shapes of articles whose surfaces are to be finished by blasting with an abrasive fluid such as, for example, ceramic articles such as ceramic insulators which are in a semi-finished condition, that is, which have flashings or small projections or imperfections on their surfaces that must be removed by blasting with an abrasive fluid to give a finished appearance to the articles. For example, if the articles are somewhat square shaped, as indicated, there may be only certain surfaces which require finishing and other surfaces which are to be masked from the pneumatic abrasive blast because the latter do not require finishing. For instance, let it be assumed that only a substantially H-shaped portion of the surfaces of the articles are to be exposed to the abrasive blast. If this is the case, a flexible mask 24 of rubber or other suitable flexible material may be supported on and rigidly secured to the top of turntable 20 by means of a hub 25 rigidly secured to the end of turntable flange 19, thereby making the mask readily removable and replaceable by a different mask having a different aperture design for the purpose of finishing other types and designs of articles. A portion of mask 24 is shown bent back upon itself in Figures 2 and 3 merely for purposes of illustration. Actually, however, the bent-over portion rests on an inclinator or angularly extending portion of housing 5 as indicated by dot and dash lines. Consequently, the rubber mask 24 in its entirety remains enclosed at all times by housing 5 whereas a portion 4a of the turntable surface will project exteriorly of the housing so as to provide access to the pockets thereof by the operator to enable the operator to remove finished articles and replace them by unfinished ones and thereby not requiring stoppage of the machine for re-loading purposes thus giving continuous operation suitable for mass production finishing of the articles.

It is highly desirable to provide at least one, preferably a pair, of pnuematic guns such as 14 for blowing a blast of abrasive material under pressure, such as sand under pneumatic pressure, against the exposed or unmasked surfaces of the articles to be finished. It is also highly desirable to adjust the angle of incidence of the gun with respect to the turntable surface so that the blast may be made from any angular direction or at right angles to the surfaces of the articles on the turntable, also so that the height of the nozzle of the gun from the articles to be finished may be adjusted. In other words, universal adjustment of the gun is highly desirable. Such universal adjustment is provided by gun adjusting mechanism designated generally by numeral 27 in Figure 1 located at the side of the housing.

The details of the gun adjusting mechanism 27 are shown in Figures 4 to 8 inclusive which show the adjusting mechanism for one of the guns 14.

Referring more particularly to these figures, it will be seen that gun 14 has affixed thereto a bracket 28 having a slot 29. A pair of control arms 30 and 31 support the gun bracket, the bracket being pivoted to arm 30 and there being a pin 32 at the end of arm 31 which is adapted to move in slot 29 when the gun bracket is adjustably tilted. Such adjustable tilting may be effected by turning screw threaded rods or shafts 33 and 34 by any suitable means for coupling the ends of such rods projecting from the left, as viewed in Figure 4, such as, for example, a socket wrench or perhaps a crank similar to that shown in Figure 6. It will be apparent that as rod 34 is rotated so as to provide longitudinal movement of control arm 31, the bracket 28 and gun 14 will be tilted, during which tilting movement the pin 32 will be guided by slot 29. It will also be apparent that by screwing both rods 33 and 34, the gun 15 may be moved laterally. A rigid supporting structure is provided for control arms 30 and 31 comprising a frame 35 having ribs 36 and 37 shown more clearly in Figure 5. In order to seal and protect the screw threaded parts as well as the adjusting mechanism to be described hereinafter against the abrasive effects of the sandblast, a flexible hood such as a rubber hood 38 is provided which enshrouds a portion of frame 35 and control arms 30 and 31 and projects through an opening provided in the end wall 5b of the housing. A projecting end of hood 38 is secured along a peripheral portion of a chain drum 40, about which drum is entrained a pair of chains such as roller chains 41 and 42.

One of the ends of chains 41 and 42 is secured to a somewhat T-shaped chain anchor 43 while the other ends of the chain are rigidly secured to a carriage member 44 which is adapted to be propelled by screw threads of a shaft 45. Thus by turning shaft 45 in one direction or an opposite direction, such as by means of a crank 46 as shown in Figure 6, the carriage 44 is propelled in one direction or an opposite direction, respectively, so as to selectively move chains 41 and 42 in either direction along a track defined by chain rollers 47 and 48. Lugs 49 and 50 are provided on yoke 55, which lugs contain threads for screw shafts 56 and 57. Since the control arms 30 and 31 are rigidly mounted with respect to chain drum 40, it will be apparent that as the chains are moved about the chain rollers, the gun 14 will be tilted about an axis at right angles to the gun axis so as to enable adjustment of the angle of tilt of the gun with respect to the articles to be finished.

In order to provide tilting movement of the gun in the plane of Figure 4 of the drawings, a pair of screw threaded shafts 51 and 52 is provided having regulating knobs, such as 53, secured at the ends thereof. The other end of shafts 51 and 52 bear against the outer surface of a yoke 55, hence it will be apparent that by screwing one or both of the shafts 51 and 52 in opposite directions, the frame 35, together with the attached assembly, will pivotally move about the axis of a shaft 54, thereby enabling angular adjustment of the gun within the plane of Figure 4.

Similarly, the gun may be adjustably moved substantially at right angles into and out of the plane of Figure 4 by similar screw threaded shafts 56 and 57 having regulating knobs, such as 58, secured at the ends thereof. The other ends of shafts 56 and 57 bear against the outer surface

of the drum 40, hence by screwing shafts 56 and 57 in opposite directions, the gun may be adjustably moved into or out of the plane of Figure 4.

Thus it will be seen that gun 14 is adjustable in all directions or, in other words, is universally adjustable, so that it may assume any angle with respect to the surfaces of the articles to be pneumatically blasted thereby and may assume any height from such articles so as to give a very flexible degree of operation to suit various conditions, such as for different pressures or different abrasive materials for sandblasting or for different articles requiring different degrees of abrasive blasting for finishing thereof.

While sand has been described as the abrasive material for blasting by a stream of compressed air under pressure in the gun against the surface to be finished, it will be apparent that other abrasive materials may be substituted therefor, perhaps more powdery abrasives, or even liquids under pressure may be used instead of air for certain purposes, or perhaps air alone may be used for other purposes.

Thus it will be seen that I have provided an efficient pneumatic finishing machine whereby a plurality of articles may be simultaneously finished, and whereby the finishing operation is a continuous one and thus adapted for mass production finishing of the articles—furthermore, I have provided a novel adjusting mechanism for universally adjusting one or more guns so that the guns may assume any desired angle in relation to the surfaces of the articles to be finished and any desired height with respect thereto, which adjustment may be readily made exteriorly of the housing and even during operation of the machine.

While I have illustrated and described certain specific embodiments of my invention, it will be understood that this is by way of illustration only and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. An abrasive finishing machine comprising a housing, a turntable mounted in said housing in a manner so as to have a portion thereof projecting exteriorly of the housing through an aperture thereof, a plurality of pockets on said turntable for seating articles whose surfaces are to be blasted and thereby finished by an abrasive fluid, gun means mounted in said housing above said pockets to direct a blast of said abrasive fluid on said pocketed articles and a flexible mask mounted on said turntable and having a plurality of cutaway portions registering with said pockets, and means overhanging said turntable for lifting only a portion of said flexible mask during rotation of the turntable in order to uncover said portion of the turntable projecting exteriorly of the housing.

2. An abrasive finishing machine comprising a housing, a turntable mounted in said housing in a manner so as to have a portion thereof projecting exteriorly of the housing through an aperture thereof, a plurality of pockets on said turntable for seating articles whose surfaces are to be blasted and thereby finished by an abrasive fluid, gun means mounted in said housing above said pockets to direct a blast of said abrasive fluid on said pocketed articles, adjusting means mounted on said housing and adjustable exteriorly of said housing for varying the angle of incidence of said gun with respect to the surfaces of the articles and a flexible mask having a plurality of cutaway portions which are in registry with portions of said pockets, and a housing portion overhanging a segment of said turntable so that the mask will ride thereon and uncover said turntable portion projecting exteriorly of the housing and cover only the portion that remains within the housing during rotation of the turntable.

3. An abrasive finishing machine comprising a housing, a turntable mounted in said housing in a manner so as to have a portion thereof projecting exteriorly of the housing through an aperture thereof, a plurality of pockets on said turntable adjacent the periphery thereof for seating articles whose surfaces are to be blasted and thereby finished by an abrasive fluid, gun means mounted in said housing above said pockets to direct a blast of said abrasive fluid on said pocketed articles, and a flexible mask having cut-away portions adjacent the periphery thereof for matching corresponding surfaces of said articles and for masking other surfaces of said articles for enabling pneumatic blasting of only selected portions of the surfaces of said articles, a portion of the wall of said housing projecting inwardly immediately above said turntable in a manner so that said flexible mask portion that otherwise would project outside the housing will, instead, remain in the housing and ride on the interior surface of said housing portion so as to uncover said turntable portion extending exteriorly of said housing.

4. A pneumatic finishing machine comprising a housing having a bottom portion and an inclined side portion, a turntable rotatably mounted on said bottom portion in a manner so that a portion of the turntable is enclosed by the housing and another portion thereof projects exteriorly thereof through an aperture in said inclined portion, means exteriorly of the housing for driving said turntable at relatively slow speed, said turntable having on its upper surface adjacent the periphery thereof a plurality of pockets for receiving articles whose surfaces are to be pneumatically blasted with abrasive material, a gun mounted in said housing above the path of said articles, a circular mask of flexible material mounted on said turntable and having a plurality of apertures cut adjacent the periphery thereof for registering with portions of the surfaces of said articles requiring finishing, and adjusting means operable exteriorly of said housing for adjusting the position of said gun relative to the surfaces of the articles to be finished.

5. A pneumatic finishing machine comprising a housing having a bottom portion and an inclined side portion, a turntable rotatably mounted on said bottom portion in a manner so that a portion of the turntable is enclosed by the housing and another portion thereof projects exteriorly thereof through an aperture in said inclined portion, means exteriorly of the housing for driving said turntable at relatively slow speed, said turntable having on its upper surface adjacent the periphery thereof a plurality of pockets for receiving articles whose surfaces are to be pneumatically blasted with abrasive material, a gun mounted in said housing above the path of said articles, a circular mask of flexible material mounted on said turntable and having a plurality of apertures cut adjacent the periphery thereof for registering with portions of the surfaces of said articles requiring finishing, and adjusting means operable exteriorly

of said housing for adjusting the position of said gun relative to the surfaces of the articles to be finished, said adjusting means including means for adjusting the gun in any angular direction or normal with respect to said articles and means for elevating said guns.

6. A pneumatic finishing machine comprising a housing having a bottom portion and an inclined side portion, a turntable rotatably mounted on said bottom portion in a manner so that a portion of the turntable is enclosed by the housing and another portion thereof projects exteriorly thereof of the housing for driving said turntable at relatively slow speed, said turntable having on its upper surface adjacent the periphery thereof a plurality of pockets for receiving articles whose surfaces are to be pneumatically blasted with abrasive material, a gun mounted in said housing above the path of said articles, a circular mask of flexible material mounted on said turntable and having a plurality of apertures cut adjacent the periphery thereof for registering with portions of the surfaces of said articles requiring finishing, adjusting means operable exteriorly of said housing for adjusting the position of said gun relative to the surfaces of the articles to be finished, means including a chain drum having a chain entrained thereabout together with means secured to the ends of said chain for propelling the chain in a peripheral direction for tilting said gun, and screw threaded means for tilting said drum in a different direction.

7. An abrasive finishing machine comprising a housing, a turntable rotatably mounted in said housing and containing a plurality of pockets adjacent the periphery thereof into which articles to be finished may be seated, a gun mounted in said housing for directing a blast of abrasive material under pressure on the surfaces of said articles requiring finishing, and means exteriorly of the housing for universally adjusting the tilt of said gun, and a mask of rubber-like material supported on said turntable and having cutaway portions which coincide with said pockets, said housing having a wall portion projecting radially inwardly above a segment of said turntable and upon the inner surface of which said mask is adapted to ride so as to uncover a segment of said turntable, said uncovered turntable segment projecting exteriorly of said housing allowing access for removing the blasted articles and replacing them with new articles requiring blasting while the turntable is rotating.

8. An abrasive finishing machine comprising a housing, a turntable rotatably mounted in said housing and containing a plurality of pockets adjacent the periphery thereof into which articles to be finished may be seated, a gun mounted in said housing for directing a blast of abrasive material under pressure on the surfaces of said articles requiring finishing, and means exteriorly of the housing for universally adjusting the tilt of said gun, said last-named adjusting means comprising a chain drum having a pair of roller chains entrained thereabout, a carriage secured to corresponding ends of said chains, a chain anchor secured to the other ends of said chains, screw threaded means for propelling said carriage so as to cause peripheral movement of said chain and drum for tilting the chain and gun, said gun being adjustably

secured to said drum thereby being angularly rotatable therewith, and screw threaded means for adjusting the gun in a different direction from that afforded by rotation of said drum.

9. An abrasive finishing machine comprising a housing, a turntable rotatably mounted in said housing and containing a plurality of pockets adjacent the periphery thereof into which articles to be finished may be seated, a gun mounted in said housing for directing a blast of abrasive material under pressure on the surfaces of said articles requiring finishing, and means exteriorly of the housing for universally adjusting the tilt of said gun, said last-mentioned screw threaded means comprising a pair of screw threaded shafts and a pair of control arms that are respectively propelled by said shafts and a bracket tiltably mounted at the end of said control arms, said bracket being rigidly secured to said gun, hence causing tilting movement of the gun in response to unscrewing one of said screw threaded means or to unscrewing of both of said screw threaded means in opposite directions.

10. An abrasive finishing machine comprising a housing, a turntable rotatably mounted in said housing and containing a plurality of pockets adjacent the periphery thereof into which articles to be finished may be seated, a gun mounted in said housing for directing a blast of abrasive material under pressure on the surfaces of said articles requiring finishing, and means exteriorly of the housing for universally adjusting the tilt of said gun, said last-mentioned means comprising a chain drum and a pair of control arms rigidly secured with respect to said chain drum, said gun including a supporting bracket which is tiltable in response to longitudinal movement of said control arms, means exteriorly of the housing for longitudinally moving one or both of said control arms for selectively tilting the gun, a pair of screw threaded means having regulating knobs connected at the ends thereof for applying pressure on diametrically opposite face portions of said drum for tilting the gun in a different direction, and a second pair of screw threaded means for applying pressure against the end surface of said drum at diametrically opposite portions which are at right angles to the above-mentioned diametrically opposite adjusting surfaces, for tilting the gun in a still different direction, thereby providing universal adjustment of the position of said gun relative to the surfaces of the articles to be finished.

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