

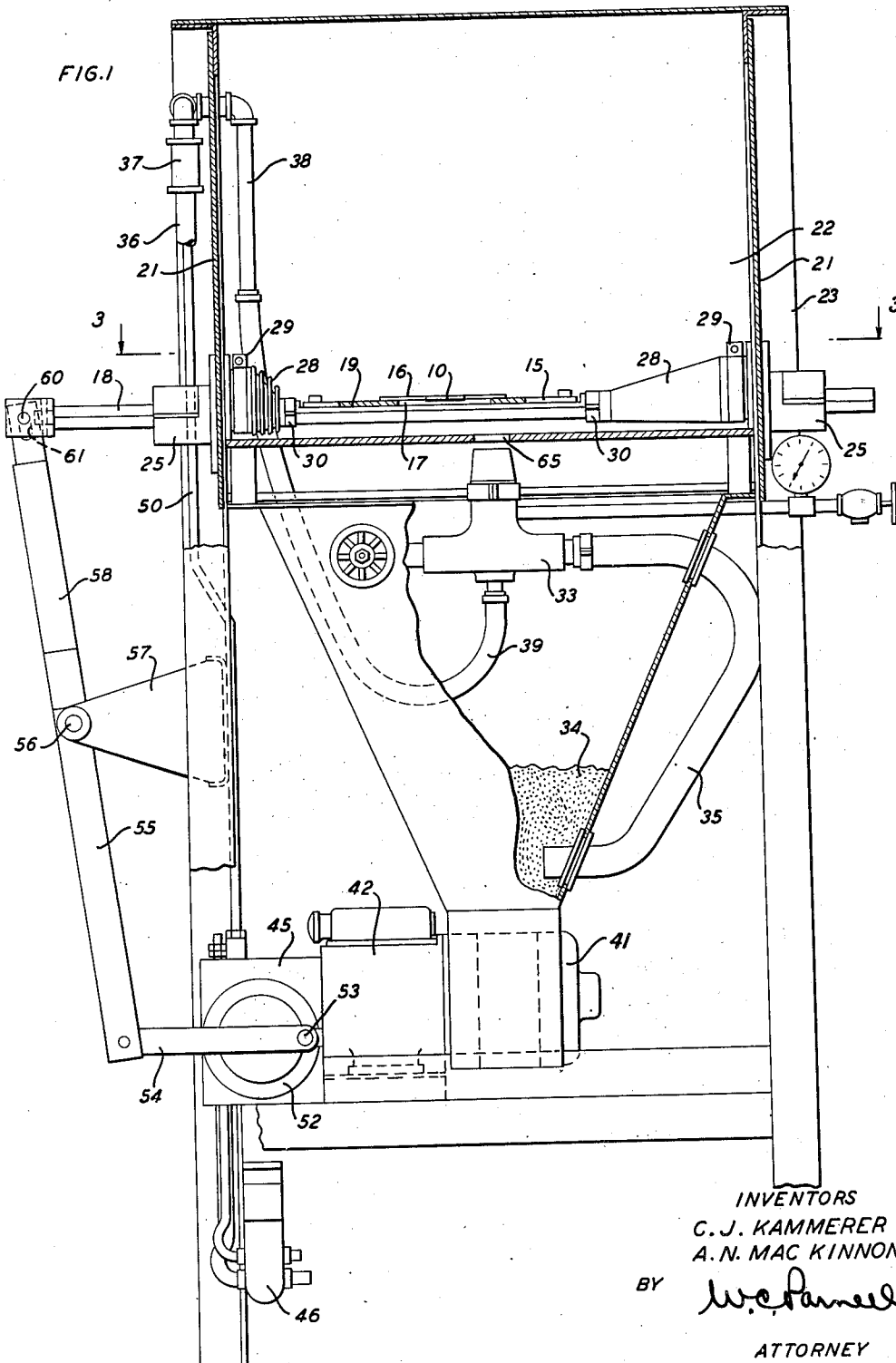
Oct. 11, 1949.

C. J. KAMMERER ET AL
SAND BLASTING MACHINE

2,484,625

Filed June 9, 1947

3 Sheets-Sheet 1



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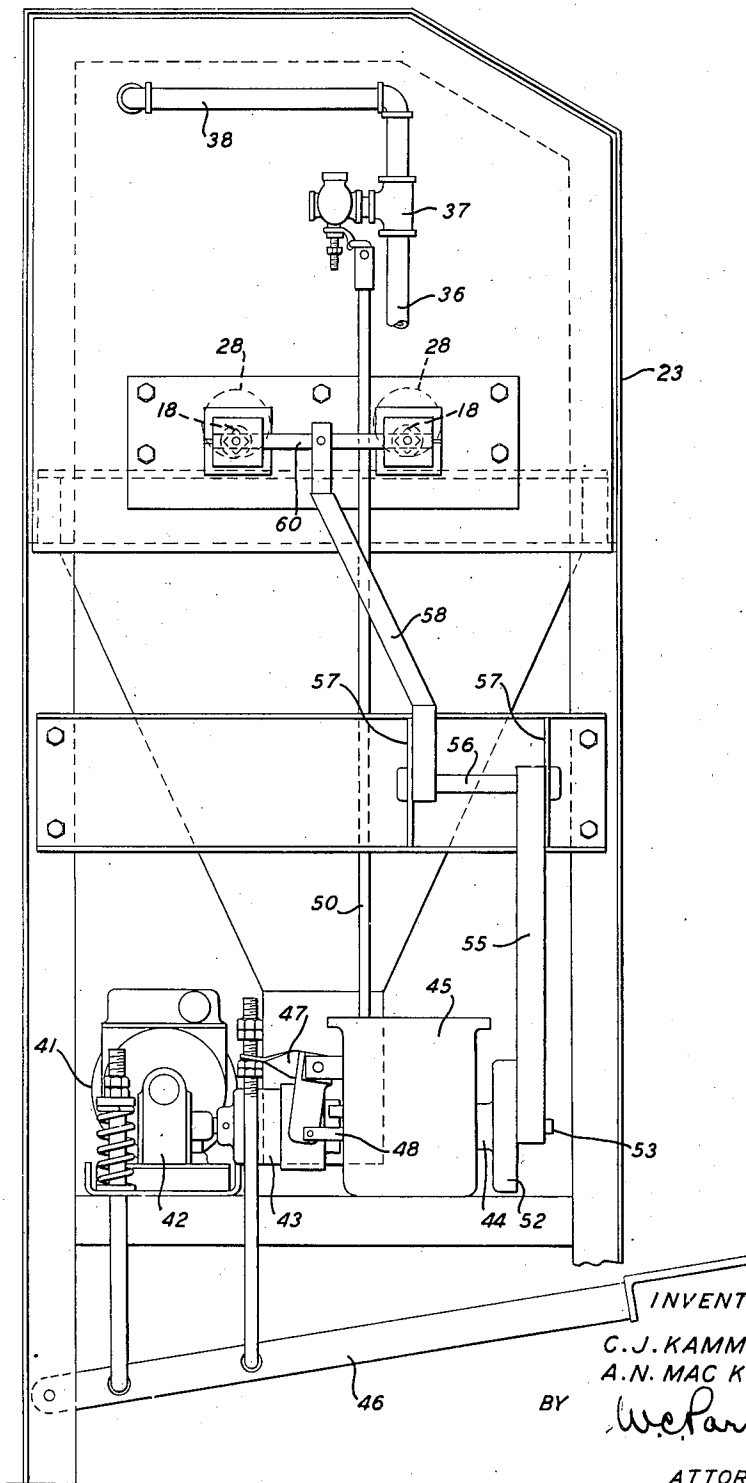
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FIG. 2



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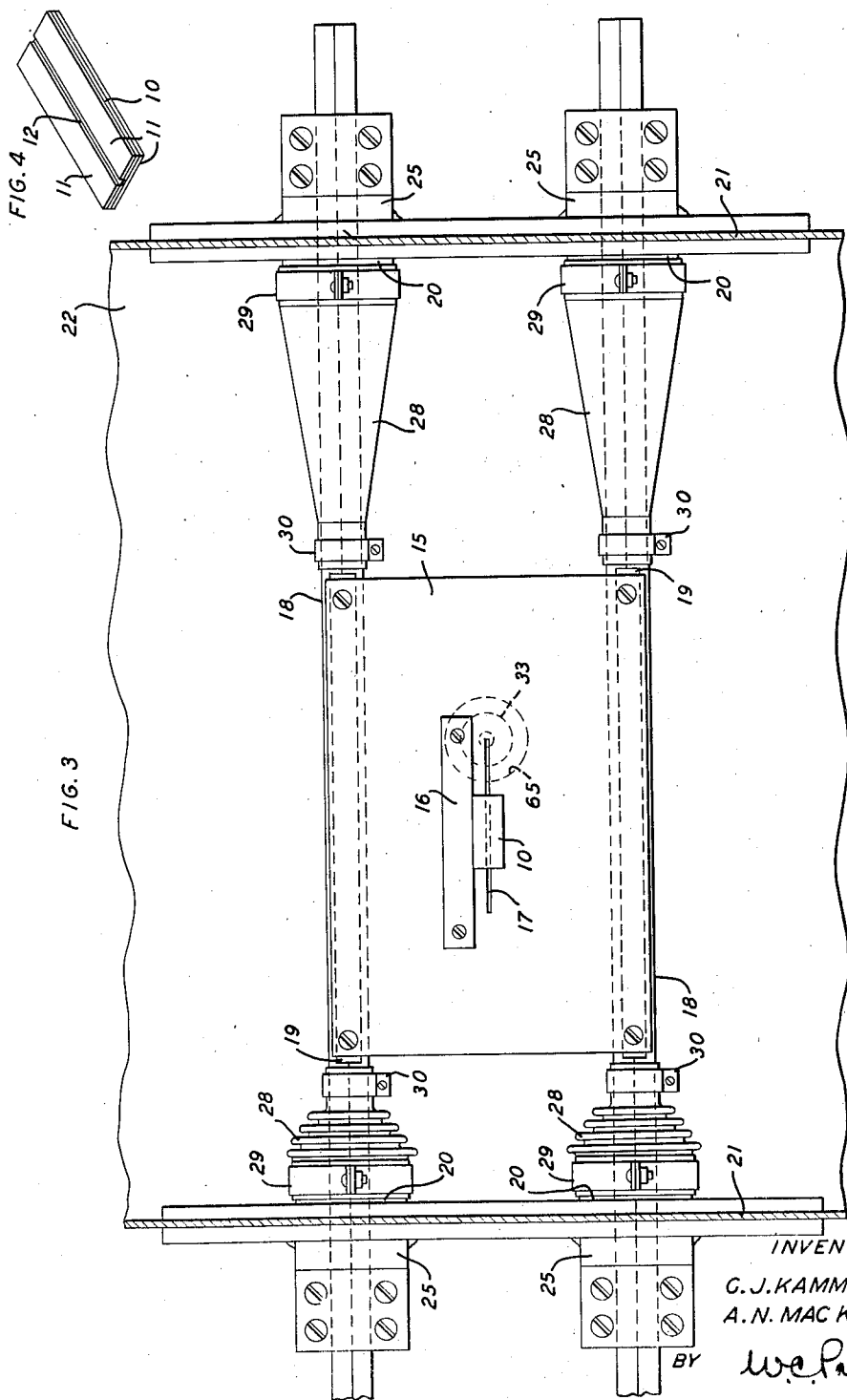
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UNITED STATES PATENT OFFICE

2,484,625

SAND BLASTING MACHINE

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Application June 9, 1947; Serial No. 753,443

1 Claim. (Cl. 51-14)

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This invention relates to sand blasting machines, and more particularly to work supports therein.

In the manufacture of quartz crystal structures for use in the communication arts, certain of the crystal wafers have silver coatings on opposing surfaces thereof which in some instances are divided in two or more parts to form a multiple crystal unit. To divide the silver coatings in two or more parts, these parts must be completely separated from each other, although the line of separation may be relatively narrow. It has been found advantageous to form the separating line or lines in the silver coatings by abrasive particles forced by air under pressure to the restricted areas for the separating lines. To accomplish this result satisfactorily, that is, to produce dividing lines in the silver coatings by uniform action on the article or coated crystal throughout the lengths of the dividing lines, it is important that the crystal be moved in a straight line relative to the unit forcing the abrasive particles toward the crystal.

An object of the invention is to provide a carriage suitable for supporting and reciprocating work in a given plane in a sand blasting machine.

The salient feature of this invention includes a carriage for an article, in an abrasive machine such as a sand blasting machine, wherein the carriage is supported for movement in a given plane relative to the abrasive unit. An element supporting the carriage is mounted for movement in a bearing while a flexible covering surrounds the bearing and the portion of the element movable in the bearing during reciprocation of the carriage.

More specifically, the carriage is in the form of a table or mask having a slot therein comparable in width and contour to the dividing line to be formed in the coating on the article. In the present embodiment of the invention, the carriage is supported by parallel rods movable longitudinally in spaced pairs of bearings surrounded by hoods of flexible material secured to their bearings and to given portions of the rods whereby the rods may be moved longitudinally to move the carriage between given limits. During movement of the rods with the carriage, the hoods completely enclose not only the bearings, but those portions of the rods which will move in the bearings preventing the abrasive material from entering the bearings and causing damage thereto.

Other objects and advantages will be apparent

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from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a front elevational view of an abrasive machine embodying the invention, portions of the machine being shown in section;

Fig. 2 is a side elevational view of the machine;

Fig. 3 is an enlarged fragmentary sectional view taken along the line 3-3 of Fig. 1; and

Fig. 4 is a perspective view of one of the articles.

Referring now to the drawings, attention is first directed to Fig. 4 which illustrates a quartz crystal wafer 10 having coatings 11 of material such as silver on opposing sides thereof. The thicknesses of the coatings, as well as the thickness of the crystal, are exaggerated for the purpose of illustration. In the present embodiment of the invention, the coatings 11 are to be divided into two equal parts along a straight line 12. These coatings could be divided into more than two parts and the line of division could be other than a straight line if so desired.

Attention is now directed to Fig. 3 which illustrates a carriage 15 in the form of a table or mask having a locating member 16 mounted on its upper surface to locate the article or crystal 10 with respect to an elongate opening 17. The table 15 is mounted on parallel rods 18 which may be defined as elongate elements. The rods 18 in the present embodiment of the invention are square in cross-section, portions thereof being provided with additional flat surfaces 19 for the mounting of the table 15 thereon. The rods 18 extend through bearings 20 which are supported in side walls 21 of a compartment 22 (Fig. 1) of the main frame 23 of the machine. Outer bearing portions 25 for the rods 18 are secured to the outer surfaces of the walls 21 externally of the compartment 22. The walls of the compartment 22 surround the carriage 15 together with the bearings 20 on all sides excepting the front which is open whereby the operator may gain access to the carriage for the positioning of the crystals thereon. The bearings 20, as well as the bearing members 25, have square openings therein conforming to the cross-sectional contours of the rods 18 permitting longitudinal movement of the rods in the bearings.

Flexible coverings or hoods 28 completely surround portions of the rods 18, as well as their bearings 20 to protect them against the abrasive material. The coverings 28 are substantially conical when extended their full lengths as illus-

trated at the right of Fig. 3 but may be collapsed as illustrated at the right (Fig. 3), during movement of the carriage and rods between their given limits. Securing bands 29 extend about the large ends of the coverings 28 and their adjacent bearings 20 to secure them in place on the bearings. Similar, but smaller bands 30 conforming substantially to the rods 18 extend about the adjacent ends of their coverings and their rods to seal the smaller ends of the coverings to the rods.

An abrasive unit 33 in the form of a sand blast nozzle is mounted at a fixed position beneath the compartment 22 and the elongate aperture 17 in the carriage 15. Abrasive material 34 is supplied to the unit 33 through a tube 35 in the conventional manner by the forcing of air from a supply line 36 (Fig. 2) through a valve 37 and air lines 38 (Figs. 1 and 2) and 39 to the unit 33.

The carriage is moved through an operating cycle from a starting position to a given position away from the starting position and back to the starting position by a driving mechanism which is the subject matter of the copending application of Harry H. Merwin, Serial No. 753,535, filed June 9, 1947, now Patent No. 2,463,895, dated March 8, 1949. This driving mechanism is shown in general in Figs. 1 and 2 and includes a drive motor 41, a speed reducing unit 42 driven by the motor and a clutch 43 on the output shaft of the unit 42 to drive a shaft 44 one revolution during each cycle of operation. The clutch is actuated by a mechanism, disposed in a unit 45, through the actuation of a treadle 46 to move a bell crank lever 47, moving a rod 48 to release the clutch for one revolution. A cam (not shown) is mounted on the shaft 44 to pull a rod 50 downwardly to open the valve 37 at the start of the movement of the carriage and to hold the valve operated until the carriage again returns to its starting position.

A flywheel 52 mounted on the shaft 44 carries a stub shaft 53 eccentrically as shown in Fig. 1 with respect to the axis of the shaft 44 to actuate a link 54 and a lever 55. The lever 55 has its upper end fixed to a shaft 56 journaled in a bearing bracket 57, the shaft 56 causing actuation of a lever 58 which extends upwardly between the adjacent ends of the rods 18. The adjacent ends of the rods 18 are connected to each other by a lateral member 60, the member 60 extending through an elongate opening 61 in the upper end of the lever 58.

During operation of the abrasive machine by the actuation of the treadle 46 to bring about one cycle of operation of the driving mechanism, the carriage 15 is moved from the position shown in Figs. 1 and 3 to a similar position near the right wall of the compartment 22 and back to the starting position shown in these figures. During this movement of the carriage, the valve 37 is open allowing air under pressure to pass through the unit 33 creating a vacuum therein to draw abrasive material 34 through the tube 35 and force this material through an opening 65 at the bottom of

the compartment toward and through the elongate aperture 17 in the carriage 15. In this manner, the coating 11 on the underside of the article 10 is removed along a line control by the aperture 17. By applying the abrasive material vertically to the article through the aperture 17 the material, after striking the article and accomplishing its purpose, may drop freely from the article. The particles of the abrasive material which enter the compartment 22 may fall upon the carriage 15 or the hood-like coverings 28, but none of these particles will rest upon the portions of the rods 18 which, during their movements, will enter or pass through the bearings 20. Furthermore, the bearings 20 are sealed against the abrasive particles and in this manner, long useful life of the work supporting structure is assured.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claim.

What is claimed is:

In a sand blasting machine having a compartment with an opening in the bottom thereof through which abrasive material such as sand may be forced in a given path upwardly from a sand blasting unit positioned externally of the compartment, spaced parallel rods traversing the compartment and extending through pairs of aligned apertures in walls of the compartment, bearings to support the rods for reciprocable movement mounted in the said apertures, a work supporting carriage with an elongate aperture therein mounted on the rods for reciprocation therewith whereby the elongate aperture may be moved over the opening and traverse the path of the abrasive material, means operable to reciprocate the bars in unison to move the carriage between given limits, flexible hoods completely surrounding the bearings within the compartment and the portions of the rods movable in their bearings during reciprocation of the rods and carriage to seal the bearings and the rod portions against the abrasive material, and clamps to secure and form sealtight connections of the ends of the hoods to their bearings and rod portions.

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