Nov. 1, 1955 V. H. HASSELQUIST 2,722,090

ABRADING APPARATUS FOR MOLD PLATENS

Filed Jan. 21, 1954 2 Sheets-Sheet 1

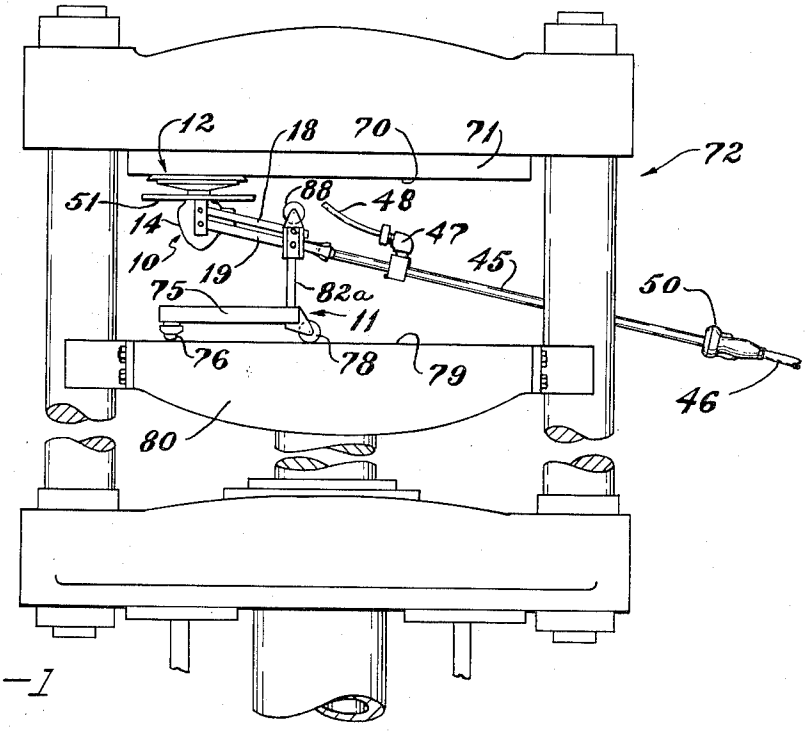


Fig -1

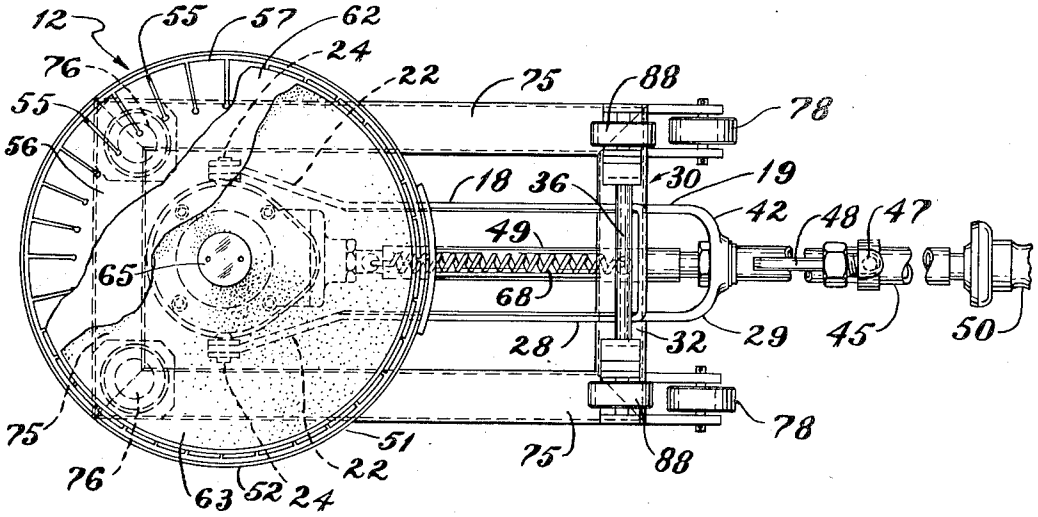


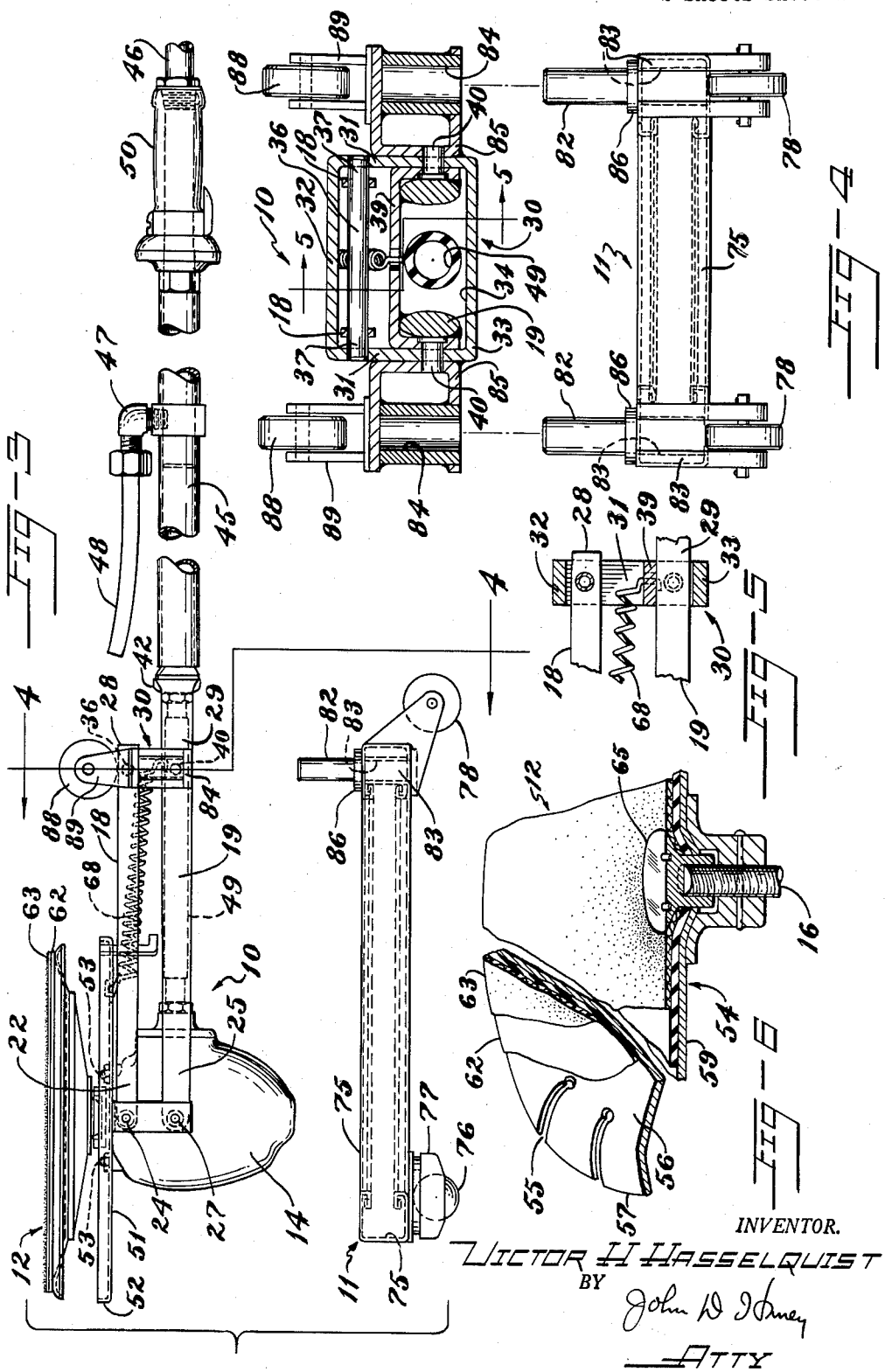
Fig -2

INVENTOR.
VICTOR H. HASSELQUIST
BY John W. Haney
ATTY

Nov. 1, 1955 V. H. HASSELQUIST 2,722,090

ABRADING APPARATUS FOR MOLD PLATENS

Filed Jan. 21, 1954 2 Sheets-Sheet 2



INVENTOR.
VICTOR H HASSELQUIST
BY
John D Shuey
ATTY

United States Patent Office

2,722,090

Patented Nov. 1, 1955

2,722,090

ABRADING APPARATUS FOR MOLD PLATENS

Victor H. Hasselquist, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N. Y., a corporation of New York

Application January 21, 1954, Serial No. 405,305

6 Claims. (Cl. 51—170)

This invention relates to an improved surface dressing machine which is particularly useful for abrading and polishing the molding faces of vulcanizing press platens while these platens are installed in a press.

The molding faces of the platens of a vulcanizing press ordinarily become corroded and pitted after periods of operation, and because of the weight of these platens it is not feasible to remove them from the presses each time the molding faces require refurbishing. The tools which have been proposed heretofore for re-surfacing platens without removing the platens from the press have been too unwieldy for a single operator to control effectively and have required considerable time and labor to accomplish the resurfacing.

According to this invention, a tool is provided for this purpose which is highly maneuverable within the relatively narrow opening between a pair of opposed mold platens while they are installed in a press, and which a single operator may easily control on either of the opposed molding faces of a pair of platens. The apparatus of this invention includes a carriage structure for supporting the abrading mechanism on the lower mold surface while the operator operates the mechanism to clean the upper mold surface. The abrading mechanism is designed so that it is removably engageable with the carriage and to clean a lower platen the abrading mechanism is disengaged from the carriage and inverted. The abrading mechanism further includes means to support the abrading mechanism in an inverted position for translational movement on the mold face of the lower platen to effect the cleaning.

The invention will be more fully described in connection with the accompanying drawings which illustrate a preferred apparatus constructed in accordance with and embodying the principles of this invention.

In the drawings:

Fig. 1 is an elevational view of a typical vulcanizing press with its platens opened and with the apparatus of this invention in operating position for abrading the molding face of the upper platen;

Fig. 2 is a plan view of the apparatus with portions broken away;

Fig. 3 is a side elevation of the apparatus with portions broken away and showing the carriage mechanism separated from the abrading mechanism;

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged detail view taken along the line 5—5 of Fig. 4; and

Fig. 6 is a fragmentary detail view showing the arrangement of the disc-supporting means and the abrasive disc, the view being drawn on an enlarged scale.

The illustrated embodiment of the invention includes an abrading mechanism **10** which is removably engageable with a carriage **11** as shown in Figs. 1, 3 and 4. The structure of the abrading mechanism **10** includes a circular abrasive disc **12** driven by an air motor **14**. The radial center of the disc **12** is fastened to the end of the

rotor **16** (see Fig. 6) of the air motor so that the abrasive disc is rotatable in a plane perpendicular to the rotational axis of the rotor. The motor **14** is supported for arcuate movement in a generally vertical plane by an upper link **18** and a lower link **19** which are each fork-shaped as shown in Fig. 2. The legs of the upper link **18** have a pair of laterally-spaced forward ends **22** which flare outwardly to embrace the opposite sides of the housing of the motor **14** and which are connected by a pair of pivots **24** to the housing of the motor. Similarly, the legs of the lower fork-shaped link **19** have a pair of laterally-spaced forward ends **25** (see Fig. 3) which flare outwardly to embrace the opposite sides of the housing of motor **14** and these ends **25** are connected by a pair of pivots **27** to the housing of the motor.

The links **18** and **19** each extend rearwardly from the motor **14** in spaced generally parallel relation to each other and their rearward ends **28** and **29**, respectively, are supported by a generally rectangular frame **30** (see Fig. 4). The frame **30** has a pair of upright side members **31** connected together by a transverse upper member **32** and a lower member **33** to define an opening **34** through the frame. The side members **31** are spaced apart slightly wider than the legs of the links **18** and **19** so that the rearward ends of these links extend through the opening **34** of the frame close to the upright side members **31**. The rearward end **28** of link **18** is connected to the frame **30** by a rod **36** which extends through and is fastened to each leg of the link and which has a pair of projecting ends **37** pivotally supported in the upright side members **31** near the upper member **32** of the frame. The portions of link **19** embraced by the upright side members **31** of the frame are connected together by a transverse brace **39** having a pair of axially aligned trunnions **40** at its opposite ends which are pivotally supported by the upright side members **31** near the lower member **33** of the frame. The upper link **18** is slightly shorter than the lower link **19** so that when the links are swung upwardly the peripheral edge portion of the abrasive disc **12** farthest from the frame **30** will strike the mold face first and the abrading pressure will always be a maximum at this portion of the disc.

The rearward end **29** of the lower link **19** extends through the frame **30** beyond the trunnions **40** and terminates in a cross member **42** (see Fig. 2) which bridges between the two legs of link **19** and to which is connected one end of a relatively long tubular handle **45**. To drive the motor **14**, an air-inlet hose **46** (see Fig. 1) is connected at the outer end of the handle from a source of compressed air. The air introduced into the handle through the connection **46** is conducted to the motor **14** through a conduit **49** which extends from the cross member **42** in communication with the tubular handle **45** to the housing of the motor **14**. The handle is also provided with a fitting **47** having a nozzle **48** directed toward the abrasive disc and adapted to blow abraded particles away from the operator when the apparatus is in operation. The outer end of the handle is provided with a suitable valve **50** to regulate the flow of air into the handle.

Between the abrasive disc **12** and the pivots **24** which connect the upper link **18** to the housing of motor **14**, there is an annular tray **51** which has an outside diameter slightly larger than the diameter of the disc **12**. The tray **51** is a flat metal plate with an upturned flange **52** around its periphery and it is rigidly secured to the housing of the motor by the bolts **53** (Fig. 3) so that it concentrically surrounds the rotor **16**. This tray collects abrasive particles from the disc **12** as the disc is worn and also serves as a bumper to prevent the edges of the disc from being moved against the polished vertical guides of

a platen press on which the platens are slidably supported.

The details of the structure of the abrasive disc **12** are best shown in Fig. 6. The disc includes a thin circular backing plate **54** of highly flexible spring steel having a plurality of radial slots **55** extending through the marginal area **56** from the peripheral edge **57** of the backing plate. This plate has a generally flat center area **59** disposed coaxially about the rotor **16** of the motor, and the surrounding marginal area **56** is curved generally convexly relative to a mold face. That is to say the marginal area **56** is curved gradually upwardly from the flat area **59** and then reversely curved downwardly to the peripheral edge **57** in substantially an elongated ogee curve to provide the contour in a radial direction shown in Fig. 6. The side of the backing plate which is directed away from the motor **14** is covered with a rubber pad **62** and over this pad there is disposed a flexible circular sheet **63** of abrasive material. The sheet **63**, the pad **62**, and the backing plate **54** are collectively secured at their centers to the end of the rotor **16** by a nut **65** the head of which is recessed slightly below the surface of the abrasive sheet **63** on the flat area **59** of the backing plate so that the nut can not engage the work surface.

The slots **55** and the contour of the marginal area **56** of the backing plate permit the portion of the abrasive disc in contact with the mold face to flatten against a mold face when the disc is urged into contact with it. The resilience of the backing plate **54** eliminates the shattering and excessive lateral vibration which would otherwise occur if the disc were rigid. Also because of the flexibility of the backing plate, the abrasive disc is adapted to conform to concavely curved surfaces and the like in the molding faces if any such surfaces are present.

To aid an operator in controlling the abrading action of the apparatus, a coil spring **68** (see Fig. 3) is stretched between the tray **51** and the transverse brace **39** which extends between the rearward ends **29** of lower link **19**. The spring tension normally tends to maintain the links **18** and **19** in a horizontal position and when the links are pivoted upwardly to raise the motor **14**, the spring is elongated to resist this movement. If the operator releases the pressure on the grip at the end of the handle while the motor **14** is raised, this spring **68** immediately retracts the abrasive disc from the face of the mold. Since the tension in the spring resists the movement of the handle to raise the motor, the possibility that an operator may inadvertently bring the abrasive disc into contact with the mold face while he adjusts the apparatus in certain positions relative to the mold face is greatly reduced.

When the abrading mechanism **10** is utilized as in Fig. 1 for abrading and polishing a molding face **70** of an upper platen **71** of a typical vulcanizing press **72**, the abrading mechanism **10** is supported for maneuvering relative to the platen on the portable carriage **11**. The carriage is formed with structural frame members **75** arranged in a rectangular form and is provided at its front corners with ball casters **76** rotatably mounted in sockets **77**, and with small wheels **78** at its rear corners for supporting the frame members on a plane surface. As indicated in Fig. 1, the carriage **11** is adapted to rest on the mold face **79** of the lower platen **80** when the upper platen is to be refurbished and the casters **76** and the wheels **78** allow the carriage to be moved translationally over this face and maneuvered easily in any direction.

The abrading mechanism **10** is connected to the carriage by a pair of vertical posts **82** of equal length. These posts fit slidably into sockets **83** at the rear corners of the carriage near the wheels **78** and their upper ends project above the carriage and are engageable with a pair of spaced sockets **84** (see Fig. 4) which are supported by brackets **85** fastened to the side members **31** of the frame **30**. Each of the posts has a central collar **86** surrounding it against which the bottom of the sockets **84** abut when the abrading mechanism is engaged with the carriage. When the apparatus is not in use, the bottom of the air motor **14** normally fits through the opening defined by the frame members **75** at the front of the carriage and rests on the surface engaged by the casters **76**.

Since the distances to which the platens may be separated in different types of presses may vary considerably, the apparatus is designed so that the abrading mechanism may be supported at various elevations above the carriage by substituting other pairs of posts for the posts **82**. Thus in Fig. 1, the abrading mechanism is shown supported an appreciable distance above the carriage by posts **82*a*** which are longer than the posts **82** and which are engageable with the sockets **83** and **84** as explained in the foregoing. The sockets **83** on the carriage which receive the lower ends of the posts are located forwardly of the rearward supporting wheels **78** to minimize the tendency for the front end of the carriage to tilt upward from the lower platen when the motor is raised by the handle to urge the abrasive disc against the mold face of the upper platen **71**.

To abrade a mold face of a lower platen such as the mold face **79** of the lower platen **80** in the press of Fig. 1, the abrading mechanism **10** is disengaged from the posts **82*a*** and then inverted so that the abrasive disc **12** is directed against the molding face **79**. In this position of the abrading mechanism, the frame **30** is supported on the mold face for translational movement by a pair of rollers **88** mounted on the brackets **89** opposite the sockets **84**. The action of the abrading mechanism when cleaning an upwardly-directed molding face is substantially the same as explained in the foregoing.

Variations of the structure disclosed may be made within the scope of the appended claims.

I claim:

1. Apparatus for abrading a mold face comprising a carriage, a frame removably supported on the carriage at one end of the carriage, a rotatable abrasive disc supported above the carriage at the end of the carriage opposite the frame and having an abrasive surface directed upwardly away from the carriage, means extending between said frame and the disc for supporting the disc for movement in a vertical plane toward and away from the carriage, and means on the opposite side of said frame from the carriage for supporting the frame in an inverted position for translational movement when the frame is disengaged from the carriage.

2. Apparatus for abrading a mold face comprising a carriage, a rotatable abrasive disc above the carriage having an abrasive surface directed upwardly away from the carriage, means for rotating said disc, a frame removably engaged with the carriage, a pair of links each having one end pivotally connected to the frame and having its opposite end pivotally connected to said means to support said disc, the links being movable arcuately about the frame to move the abrasive disc in a vertical plane relative to the frame, a handle for moving said links arcuately relative to the frame to bring said abrasive surface of the disc against a mold face, a spring for opposing said movement of the links and means on a side of the frame opposite the carriage for supporting the frame in an inverted position for translational movement against a mold face when the frame is disconnected from the carriage.

3. Apparatus for abrading a molding face comprising a carriage, a frame removably engageable with the carriage, a motor having a rotor disposed generally perpendicular to the carriage and to the surface of the mold face to be abraded, a pair of links each pivotally connected at one end to the motor and at the opposite end to the frame for arcuate movement relative to the frame

to move the motor in a vertical plane relative to the carriage, a flexible resilient disc secured to said rotor and directed upwardly from the carriage, the disc having an abrasive surface disposed in a plane substantially parallel to the work surface and in face-to-face relation to the work surface, means for moving said links pivotally relative to said frame to move said abrasive surface of the disc away from the carriage and toward said work surface, a spring for opposing said arcuate movement of said links, and rollers on a side of the frame directed away from the carriage for supporting the frame in an inverted position for translational movement when the frame is disengaged from the carriage.

4. Apparatus for abrading opposed molding faces in a platen press comprising a carriage having a forward end and a rearward end, a first set of rollers mounted at the rearward end of the carriage, a pair of castors mounted at the forward end of the carriage, a frame above said carriage having a side removably engaged with the carriage at a point on the carriage intermediate said rollers and the casters but adjacent the rearward end, a pair of links pivotally secured to the frame and extending forwardly from the frame toward the forward end of the carriage, an abrasive disc supported by said links above the forward end of the carriage and adapted for arcuate movement in a vertical plane relative to said frame and for rotation about an axis substantially perpendicular to the carriage, an abrasive surface on the disc directed away from the carriage, and on the frame a second pair of rollers on a side thereof opposite said side engaged with the carriage for supporting the frame in inverted position for translational movement when the frame is disconnected from the carriage.

5. Apparatus for abrading a molding face comprising a carriage, a frame removably engageable with the carriage, a fluid-operated motor having a rotor disposed generally perpendicularly to the carriage and to the surface of the mold face to be abraded, a pair of links each pivotally connected at one end to the motor and at the opposite end to the frame, one of the links being disposed above the other in spaced parallel relation and the links being movable about their respective pivots arcuately relative to the frame to move the motor in a generally vertical plane relative to the carriage, a flexible resilient disc secured to said rotor on the end of the rotor and directed upwardly from the carriage, the disc having an abrasive surface disposed in a plane substantially parallel to the work surface and in face-to-face relation to the work surface, a handle for moving said links pivotally relative to said frame to move the disc away from said carriage, the handle being tubular and extending from said motor through said removable frame and being secured to the lower of said links and through which handle fluid is supplied to said motor for driving the disc, a spring for opposing said arcuate movement of said links, and rollers on a side of the frame directed away from the carriage for supporting the frame in an inverted position for translational movement when the frame is disengaged from the carriage.

6. Apparatus in accordance with claim 5 which further includes a nozzle mounted in said handle and directed toward said disc for blowing abrasive particles from the disc when the disc is engaged with a mold face.

References Cited in the file of this patent

UNITED STATES PATENTS

409,051	Maloy	Aug. 13, 1889
1,134,925	Soderlund	Apr. 6, 1915
1,936,449	De Marchi	Nov. 21, 1933
2,114,966	Myers	Apr. 19, 1938
2,124,705	Locklin	July 26, 1938
2,394,858	Jeffreys	Feb. 12, 1946
2,484,906	Pond et al.	Oct. 18, 1949
2,670,577	McDonough	Mar. 2, 1954