CLEANING MACHINE FOR BOARDING PLANKS OR THE LIKE

Fig. 2
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Fig. 3
CLEANING MACHINE FOR BOARDING PLANKS OR THE LIKE

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This invention relates to a machine for reconditioning or cleaning lumber, particularly boards previously used in concrete forms. Such boards must be freed from remnants of concrete sticking to them before being used again in order that the surface of the wall or the like to be produced may be smooth. This is the more important the more so-called "visible concrete" is made, i.e. when finishing of the surface of the concrete is dispensable with. Hitherto the boards have been cleaned in general by means of manually operated scraping tools. However, some years ago I built a cleaning machine, by means of which the boards or the like, for example square lumber, could be ground off. This cleaning machine comprises a smaller vertical and a larger horizontal grinding disc, which discs are driven in operation by a motor and serve for the simultaneous grinding of two adjoining faces of the board, and comprises also a pressing device which serves for generating a regulatable grinding pressure between the horizontal grinding disc and the face of the board lying on it. The grinding pressure between the vertical grinding disc and the adjacent side face of the board was produced by hand. Although this grinding pressure is not high in as much as the face of the board or the like concerned is generally very narrow it has now been recognized that this manual work nevertheless affects the quality of the cleaning and tires the operator.

The reconditioning or cleaning machine according to the present invention is characterized by a second presser device which serves to produce a regulatable grinding pressure between the smaller vertical grinding disc and the adjacent face of the board.

In order to apply this second presser device in the simplest and most space saving manner the same is preferably provided with a threaded spindle with a hand crank thereon which spindle is mounted a nut which by turning the spindle is moved to and fro and carries a support to be moved towards and away from the vertical grinding disc, on which support one end of a resilient arm 13 is fixed, the free end of which bears on the face of the board remote from the vertical grinding disc.

An embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a side elevation of the machine;
FIG. 2 is a plan view of the same with some parts omitted for clarity of showing; and
FIG. 3 is a section on line III—III of FIG. 2.

The cleaning machine illustrated comprises a covered frame 1 which is movable on two wheels 3 journaled on an axle 2. A draw bar 4 is provided for attaching the machine to a vehicle e.g. to a motor car. Moreover, two legs 5 adjustable in height are arranged at two diagonally opposite corners of the frame 1, which in use of the machine are lowered into engagement with the ground.

On a horizontal shaft 6 a first grinding disc 7 is mounted which has two ring segments 8 which extend each through an angle of slightly less than 180°. A second larger grinding disc 9 is mounted on a vertical shaft 10 and has four segment shaped grinding bodies 11 each of which extends through an angle of slightly less than 90°. The vertical shaft 10 is the output shaft of a reduction gearing 12 the input shaft 13 of which carries a pulley 14. The shaft 6 of the first grinder disc 7 likewise carries a pulley 15, which is connected with the pulley 14 and a driving pulley 16 (see FIG. 1) by an endless belt 17. The driving pulley 16 is mounted on the shaft 18 (see FIG. 3) of an electric motor 19, which is arranged within a dust-proof casing 20. A supply cable for the current supply is not shown.

On two supports 21 arranged adjustable in height outside the casing of the frame 1 a supporting roller 22 is journaled on which the wide face of a board 23 to be cleaned is supported. The wide face of the board 23, also rests upon the upper end face of the grinder bodies 11 of the horizontal grinding disc 9. The narrow face of the board 23 however contacts the end face of the grinder bodies 8 forming the vertical grinding surface of the vertical grinding disc 7, and also contacts a guide 24 lying in the plane of said grinding surface.

In order to press the board onto the horizontal grinding disc 9 two presser rollers 25 are provided, each of which is journaled on the lower free end of an inclined rocker arm 26, which is mounted on a horizontal pivot 27. On each arm 26 a telescopically extensible connecting rod 29 is pivotally attached at 26, the other end of said connecting rod 29 being pivotally attached at 30 to a lever 31. A spring 32 mounted on the connecting rod 29 urges the arm 26 downwardly away from the lever 31. The lever 31 is mounted within the casing of the frame on a shaft 33, on which outside this casing a further lever 34 (see FIG. 1) is mounted, which is coupled with a spindle 37 through a fork-shaped member 36 pivotally connected with the lever 34 at 35. The spindle 37 is provided with a screw thread 38, which is in thread engagement with a nut (not shown) mounted in a bracket 39 fixed to the casing. A hand crank 40 mounted on the spindle 37 is provided for turning the spindle and accordingly to shift the same relative to the frame 1; thereby the levers 34 are rocked, so that the levers 31 are likewise rocked and accordingly the fork-shaped member 36 with which the springs 32 press the rollers 25 against the board 23.

The members 25 to 40, inclusive, have been omitted from FIG. 2 in order to show the components of the machine lying therebelow. Two horizontal roller 41 (see also FIG. 1) are journaled on supports 42 projecting laterally from the frame 1 for a purpose to be explained below.

Machines such as described hereinabove have been built and successfully operated for several years. The invention relates to improvements thereof which will now be explained. Said improvements include means 43 for controlling the pressure with which the narrow face of the board 23 is urged towards the vertical smaller grinding disc 7, said pressure hitherto having been produced by hand or at best with the aid of a roughly adjustable guide abutment. The presser means 43 comprises a presser roller 44 with vertical axis which is journaled on the free end of an arm 45 consisting of a leaf spring whose other end is clamped into a slotted bolt 46 or fixed in any other suitable manner. The bolt 46 forms part of a support member 47 movable towards the vertical grinder disc 7 or away from the same by means of a horizontal threaded spindle 49 in threaded engagement with a nut 48 with-in said support member 47. The spindle 49 is provided at one end with a hand crank 50 and lies to its greater part within a U-profile rail 51 which is provided at its ends with closure lugs 52 (see FIG. 2), serving for the journaling of the spindle 49.

It will be seen that by turning the crank 50 the support member 47 can be adjusted relative to the vertical grinding disc 7 in order to adapt the position thereof to the width of the board 23 and to regulate the loading of the spring

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3. The arm 45 and accordingly the grinding pressure on the board 23.

In order to avoid the necessity of maintaining the board 23 in contact with the guide 24 by hand or by means of a coarsely adjustable counter-guide (not shown) means generally indicated by reference numeral 53 are provided which enables the exertion of a regulatable pressure between the board 23 and the guide 24. Said means 54 are generally similar to the means 43 and likewise comprise a horizontal threaded screw spindle 54 which lies to the greater part within a U-profile rail 55 which at its ends is provided with bearing lugs 55. The spindle 54 is in engagement with a nut which forms part of a support member 58 having an upwardly extending bolt 59. On the bolt 59 an arm 60 consisting of a leaf spring is fixed whose free end is slightly bent, as at 61, and bears directly—in other without the interposition of a roller such as 44—on the narrow face of the board; at the guide 24 a pressure surface which is considerably less than the grinding pressure against the vertical grinder disc 7.

On one end of the spindle 54 a sprocket wheel 62 is rotatably mounted which is connected by an endless chain 63 with a sprocket wheel 64 secured to the spindle 49, said chain 63 being guided over two deflector rollers 65. In order to keep it out of the way of a cover 66 over the belt pulleys 14—16 and the belt 17. The sprocket wheel 62 is wider than the chain 63 and has on its part protruding beyond this chain 63 an axially directed hole 66 (see Fig. 2) into which engages a pin 67 which extends through a hole 67 in the arm of a hand crank 68 and which is held in the engagement position by a lever 70 subordinated to the bias of a spring 69. The hand crank 68 is fixedly mounted on the spindle 54 and by turning the crank 50 or the crank 68 both spindles 49 and 54 are turned in unison when the pin 67 is in engagement position, and thereby the position of the support members 57 and 58 can be adjusted simultaneously to accommodate to a variation in the width of the boards to be cleaned.

It is however also possible to turn the spindle 54 separately in order to adjust the pressure applied by the spring arm 60 to the board 23 independently of the adjustment of the grinding pressure applied by adjustment of the spring arm 45. For this purpose it suffices to turn the lever 70, e.g. by means of the thumb, in opposition to the bias of the spring 69, and thereby to pull the pin 67 out of the hole 66; then, when turning the crank 68, only the support member 58 is adjusted.

The machine also includes a brush roller 71 which for the sake of simplicity has been omitted from Fig. 1. This brush roller 71 is composed of a plurality of brush rings 72 of which in Fig. 2 only some are shown. The brush rings 72 are fixedly mounted on a shaft 73, the ends of which are journalled in bearings 74 and 75. The bearing 74 is mounted on a short rocker arm 77 pivotally mounted on a support 76 fixed to the frame, which arm projects outwardly from the covering of the frame, while the bearing 75 is mounted on the outer arm 78 of a two-armed levers 78 which is pivotally mounted on a support 79 fixed to the frame (see Fig. 2).

On the inner arm 78* of the lever 78 a large counter-weight 80 is adjustably mounted which is however accessible with difficulty and is therefore adjusted once and for all in such a manner that the brush roller 71 is urged with a considerable force against the lower face of the board 23. A smaller regulating weight 81 adjustably mounted on the outer arm 78* of the lever 78 is readily accessible and enables regulation of the pressing force of the brush roller 71.

For driving the brush roller 71 an electric motor 82 is provided whose casing is pivotally mounted at 83 (see Fig. 3) and whose shaft 84 carries a belt pulley 85. An endless belt 86 is trained over the belt pulley 85 and a belt pulley 87 mounted on the brush roller shaft 73, the belt 86 being kept tensioned owing to the pivotal mounting of the motor casing at 83. The direction of rotation of the motor 82 is so chosen that the rotary movement of the brush roller 71 at its line of contact with the board 23 is opposite to the movement of the board, as indicated in Fig. 3 by arrows. The machine described operates as follows:

An operator at the left-hand side of the machine, as seen in FIGS. 1—3, pulls the board to be cleaned upon the supporting roller 22, then pushes the board in the direction of the arrow whereby it is cleaned on its lower broad face by the horizontal grinder disc 9 and on its rear narrow face in Fig. 3 by the vertical grinder disc 7. A second operator standing at the other side of the machine pulls the board 23 out of the same. Said two faces of the board are thus faultlessly cleaned from any adhering remnants of concrete or other material, inasmuch as the lateral grinder pressure and the lateral guidance of the board 23 no longer depend on the skill of the operator and the brush roller 71 cleans the lower face of the board from the grinding dust. A further advantage is that the operators are less likely to become tired since the lateral guidance of the board and the pressing on the vertical grinder disc are effected automatically.

When the board 23 has passed through the machine, the seats 80 and 81 of the supports 77 are engaged on the rollers 41 arranged outside the casing of the frame back towards the first operator. After reversing the board 23 the two other faces thereof are cleaned in the same manner.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a machine for reconditioning or cleaning lumber, particularly boards previously used in concrete forms, a frame, a first grinding disc, means supporting said first grinding disc in said frame for rotation on a vertical axis, a second grinding disc, means supporting said second grinding disc in said frame for rotation on an horizontal axis in such relationship with said first grinding disc that a board moving with a horizontal side surface thereof in engagement with the upper end surface of said first grinding disc is simultaneously engageable by a vertical end surface of said second grinding disc on a vertical side surface of the board, first adjustable presser means mounted in said frame for engagement with the board to urge the board towards said first grinding disc, and said presser means mounted in said frame for engagement with the board, said second presser means including a threaded spindle, means rotatably and nontranslatably on said spindle in said frame in an horizontal position, manually operable means secured to one end of said spindle for rotating the same, means threadedly engageing said spindle, means supporting said spindle engaging means for guiding the latter longitudinally of the spindle, and a resilient arm having one end secured to said spindle engaging means and the free end in a position to be moved toward and away from the board by rotation of said spindle, whereby said second presser means is operable to resiliently urge the board towards said second grinding disc.

2. The machine as set forth in claim 1, including a brush roller, means supporting said brush roller on said frame for rotation on an horizontal axis at a level below the pathway for the board, and means for rotating said brush roller, said means supporting said brush roller including two levers projecting from said frame and pivotally connected therewith.

3. The machine as set forth in claim 2, wherein one of said levers is a two-arm lever, first counterweight means mounted on one of said levers, a second lightweight counterweight means mounted on the other of said arms, and one end of said brush roller being supported on said last mentioned arm.

4. The machine as set forth in claim 1, including a
rotatably mounted on said free end of the resilient arm for rolling engagement with the board.

5. In a machine for reconditioning or cleaning lumber, particularly boards previously used in concrete forms, a frame, a first grinding disc, means supporting said first grinding disc in said frame for rotation on a vertical axis, a second grinding disc, means supporting said second grinding disc in said frame for rotation on an horizontal axis in such relationship with said first grinding disc that a board moving with an horizontal side surface thereof in engagement with the upper end surface of said first grinding disc is simultaneously engageable by a vertical end surface of said second grinding disc on a vertical side surface of the board, first adjustable presser means mounted in said frame for engagement with the board to urge the board towards said first grinding disc, second presser means mounted in said frame for engagement with the board, said second presser means including a threaded spindle, means rotatably and non-displaceably supporting said spindle in said frame in an horizontal position, manually operable means secured to one end of said spindle for rotating the same, means threadedly engaging said spindle, means supporting said spindle engaging means for guiding the latter longitudinally of the spindle, and a resilient arm having one end secured to said spindle engaging means and the free end in a position to be moved toward and away from the board by rotation of said spindle, whereby said second presser means is operable to resiliently urge the board towards said second grinding disc, guide means secured to said frame and having a vertical end surface for the board in the plane of said vertical end surface of the second grinding disc, and a third presser means mounted in said frame for resiliently urging the board toward engagement with said vertical guide surface.

6. The machine as set forth in claim 5, wherein said third presser means includes a threaded spindle, means rotatably and non-displaceably supporting said spindle in said frame in an horizontal position, manually operable means secured to one end of said spindle for rotating the same, means threadedly engaging said spindle, means supporting said spindle engaging means for guiding the latter longitudinally of the spindle, and a resilient arm having one end secured to said spindle engaging means and the free end in a position to be moved toward and away from the board by rotation of said spindle, whereby said third presser means is operable to resiliently urge the board towards said guide means.

7. The machine as set forth in claim 6, including transmission means interconnecting said threaded spindles for operation of the same in unison, and release means for selectively rendering said interconnecting transmission means inoperative.

8. The machine as set forth in claim 6, including transmission means interconnecting said threaded spindles for operation of the same in unison, said transmission means including a sprocket wheel mounted on each of said spindles, means securing one of said sprocket wheels to one of said spindles, means mounting the other sprocket wheel for rotation on the other spindle, and coupling means for releasably connecting said last mentioned sprocket wheel with said last mentioned spindle.

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