

Nov. 24, 1931.

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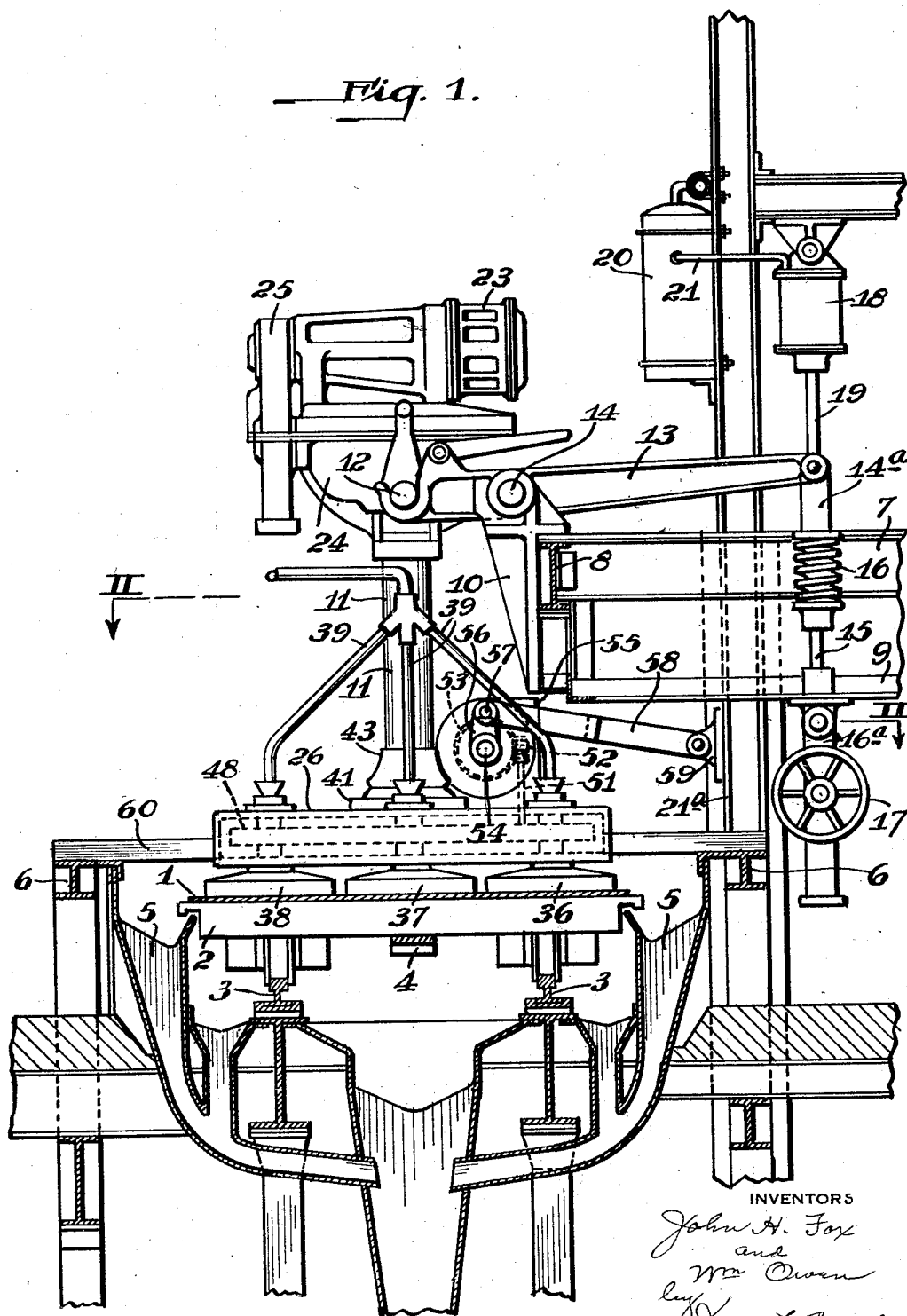
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SURFACING MACHINE

Filed Dec. 6, 1929

4 Sheets-Sheet 1

Fig. 1.



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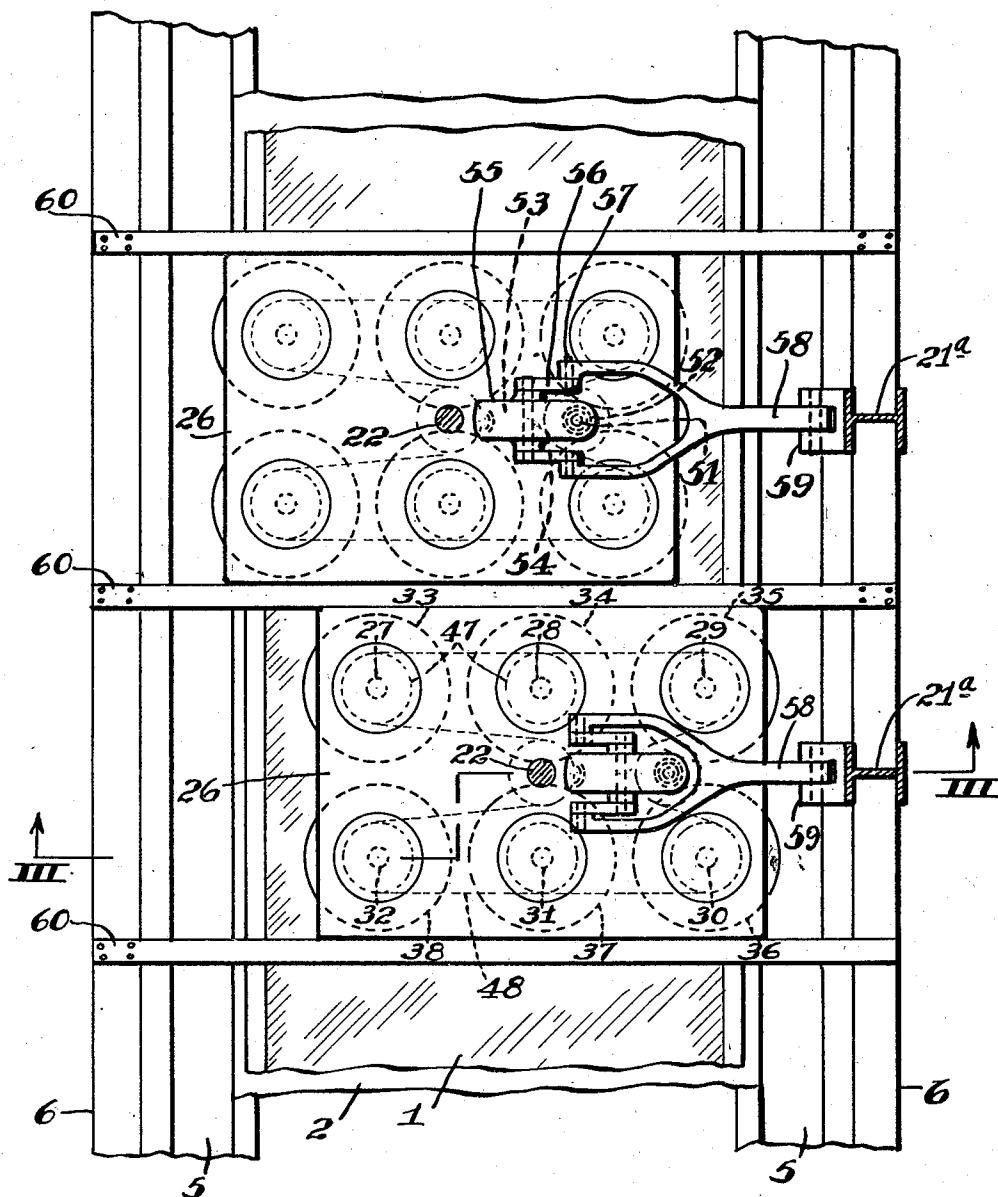
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Fig. 2.



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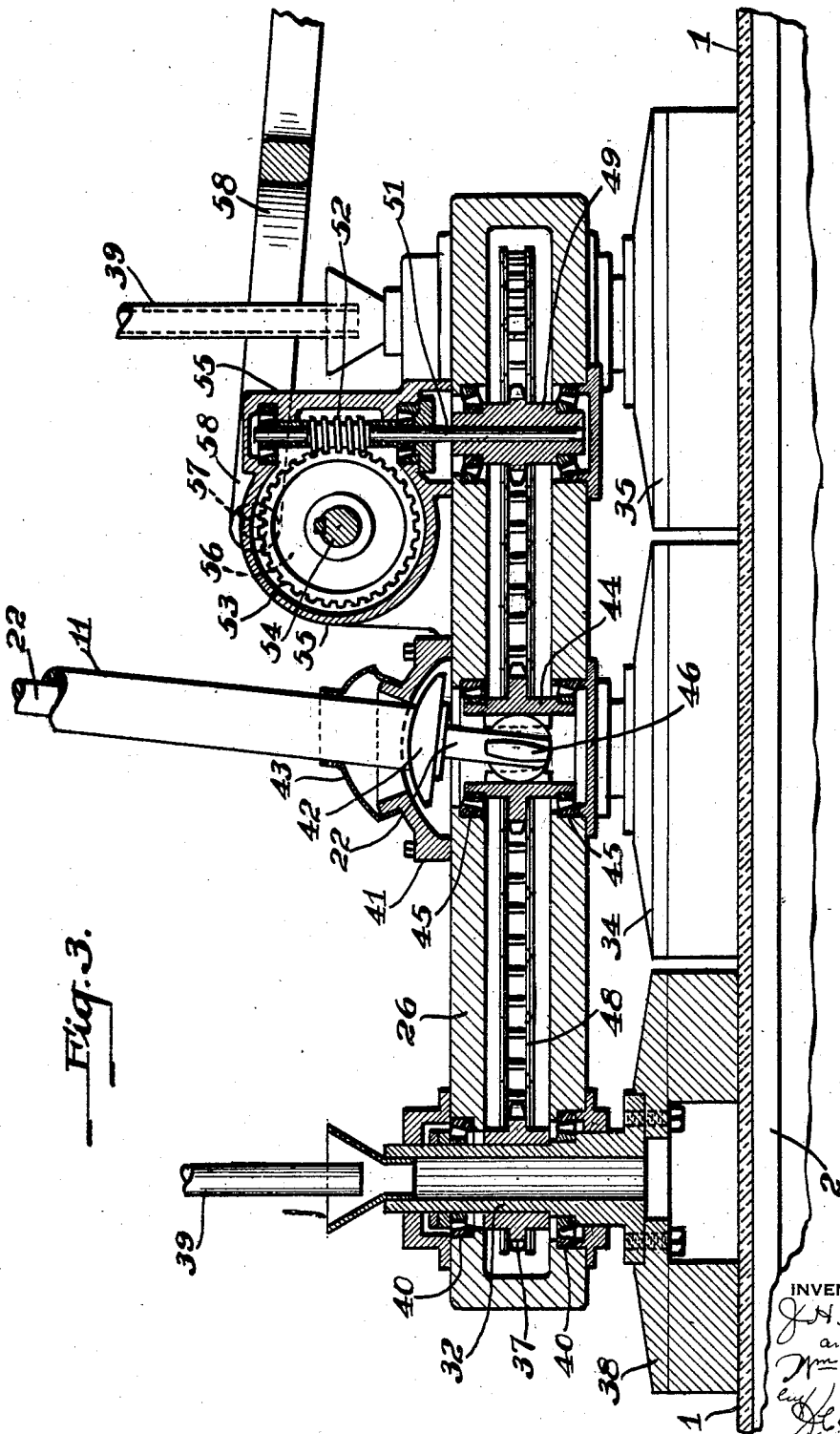
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Fig. 4.

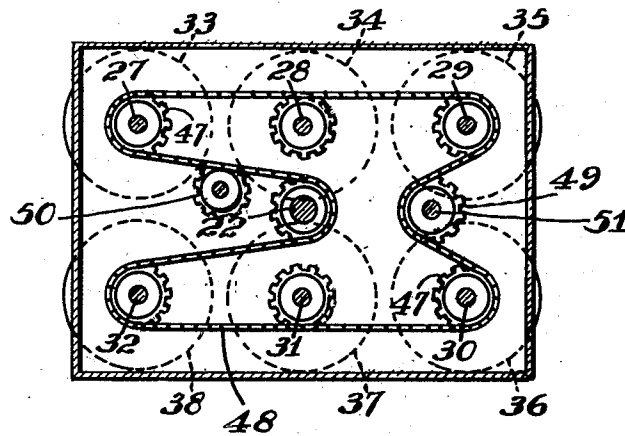


Fig. 5.

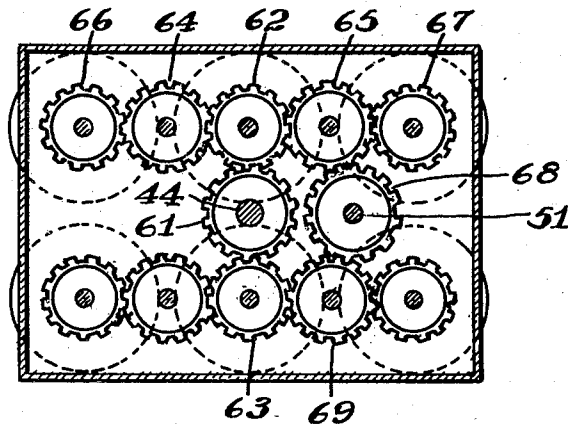
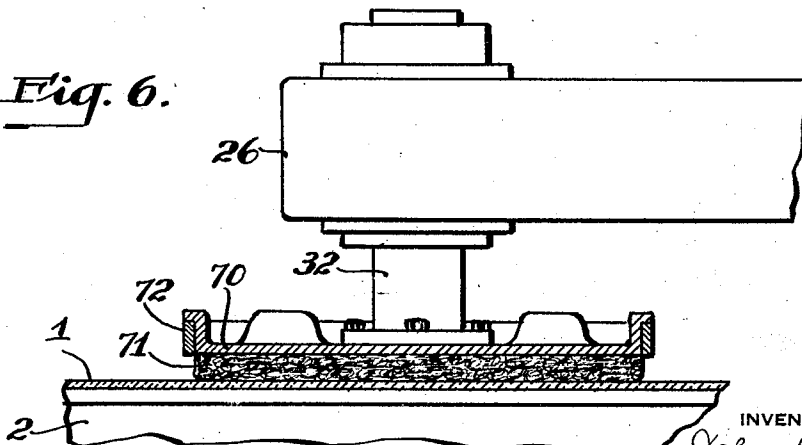


Fig. 6.



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UNITED STATES PATENT OFFICE

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SURFACING MACHINE

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The invention relates to surfacing machines for use in straight away grinding and polishing, being particularly designed for use in surfacing plate glass, but not limited to use in such connection. It has for its objects the provision of a machine, which will give a uniform surfacing action over the faces of the glass sheets carried beneath it by the tables, which has its surfacing unit so constructed and arranged that it may be expeditiously removed and replaced with a minimum loss of time, and which will operate satisfactorily to surface sheets of glass of as great a dimension in width as it is practicable to handle in a straight away grinding and polishing operation. Certain embodiments of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevation. Fig. 2 is a section on the line II—II of Fig. 1. Fig. 3 is a section on the line III—III of Fig. 2 on an enlarged scale. Fig. 4 is a diagrammatic plan view showing the means for driving the work spindles. Fig. 5 is a view similar to that of Fig. 4, but showing a modification. And Fig. 6 is a detail side elevation view partially in section showing the use of a polishing block on one of the work spindles instead of the grinding discs shown in Fig. 3.

The glass sheets 1 which are to be surfaced are mounted upon a series of tables 2 which constitute an endless train and move beneath a series of grinding and polishing machines similar to that shown in Figs. 1 to 4. The tables are mounted upon the tracks 3 and are moved slowly therealong by any suitable power means, such as spur gears driven from motors and engaging racks 4 carried by the bottoms of the tables. The tables are carried upon a suitable foundation made up of commercial sections and provided with drainage troughs 5 for receiving the mixture of waste water and abrasive which flows from the tables. Extending alongside the track 3 is a framework made up of commercial sections 6, 7, 8, 9 and the casting 10 which takes the weight of the surfacing unit, as later described.

The surfacing unit includes a vertical sleeve 11 provided at its upper end with a pair

of trunnions 12 engaged by the end of the lever 13. The lever 13 takes the weight of the unit and is pivotally supported at 14 upon the casting 10. The lever 13 is provided at its end with a connecting rod made up of the parts 14^a and 15 with a spring 16 under compression therebetween so that the surfacing unit carried by the lever is yieldingly supported and counterbalanced. The rod 15 constituting the lower part of the connecting rod is screw-threaded and extends through a bracket 16^a carried by the beam 9, the end of such rod being threaded and engaged by a nut swivelled in the bracket. This nut is rotated from the hand-wheel 17 to regulate the vertical position of the surfacing unit and in this way adjust the pressure exerted by the surfacing runners upon the glass. This construction for counterbalancing a surfacing unit is well-known in the art being shown and described in the patent to A. L. Harrington, No. 1,671,718, so that a detailed showing of this structure is unnecessary, and it will be understood that any suitable counterbalancing means may be employed for the lever 13, so that such arm may be regulated in position and resiliently held. When it is desired to lift the unit quickly from the table, the air-lift cylinder 18 is employed, such cylinder being provided with a piston whose plunger 19 is also pivotally connected to the end of the lever 13. The piston is operated from the air reservoir 20 connected to the cylinder 18 by means of the pipe 21. This is also a construction well-known in the art for which no claim is made in this application.

The sleeve 11 carries the drive shaft 22 which is journalled in the sleeve and driven from the electric motor 23. This motor is seated upon a casing 24 which is in turn supported upon the upper end of the sleeve 11. The motor drives the shaft 22 through the intermediary of suitable reduction gearing in the casings 24 and 25. At the lower end of the sleeve 11 is the gear casing 26 in which are mounted a series of six work spindles 27, 28, 29, 30, 31 and 32 carrying at their lower ends the grinding discs 33, 34, 35, 36, 37 and 38. These spindles are preferably hollow as are also the grinding

discs and abrasive is supplied therethrough from the feed pipes 39 connected to a suitable source of supply by means of flexible pipes. The spindles are all journaled in the gear casing and held against longitudinal movement therein by means of the roller bearings 40, 40 (Fig. 3) so that the weight of the gear casing is applied to the grinding disc to increase their abrading effect.

The central portion of the gear casing is provided with a cap 41 secured thereto by means of bolts and overlying the enlarged end 42 of the lower end of the sleeve 11. The connection at this point is a loose one so that the weight of the sleeve 11 and parts carried thereby is not imposed upon the gear casing. The connection comes into play in lifting the gear casing to cause the grinding disc to clear the glass therebeneath. A flexible cap 43, preferably of rubber, serves to close the space between the cap 41 and the lower end of the sleeve 11 and prevent the entrance of dirt or abrasive. The sleeve 44 is journaled in the central portion of the gear casing by means of the roller bearings 45, 45 and receives the lower end of the driving shaft 22. The end 46 of the shaft which lies in the sleeve has a sliding and rocking tumbler fit therewith so that a proper driving connection is provided as the gear casing moves back and forth transversely of the line of movement of the table therebeneath, as later described. Each of the work spindles 27 to 32 is provided with a sprocket 47 and around these sprockets and the sleeve 44 passes a driving chain 48, the position of such chain with respect to the sprockets being shown in diagrammatic view, Fig. 4. This chain also passes around a sprocket 49 (Figs. 3 and 4) and across one side of a take-up sprocket 50 shown only diagrammatically in Fig. 4. The take-up sprocket and its adjustment may be of any approved form well-known in the art and no detailed showing of such construction is, therefore, included in the drawings. The sprocket 49 is provided with a shaft 51 having at its upper end the worm 52. This worm engages a worm wheel 53 on the shaft 54, the parts 52, 53 and 54 all being carried by a suitable casing 55 bolted to the top of the casing 26. The shaft 54 extends out through the sides of the casing 55 and is provided with a pair of cranks 56 having crank pins 57 (Fig. 2). These crank pins are engaged by the forked end of a connecting rod 58 whose other end is pivoted to a bracket 59 carried by the vertical frame member 21^a. This provides a means for moving the casing 26 back and forth across the line of movement of the table, as such table moves along beneath the surfacing machine. The tumbler connection between the lower end of the shaft 21 and the sleeve 44 permits this back and forth movement and provides a drive for the gear-

ing carried by the casing 26 and for the cranks 56 by means of which the transverse movement of the grinding unit with respect to the table is secured. The gear casing 26 is guided in its back and forth movement by means of a pair of guide bars 60, 60 (Fig. 2) extending transversely of the framework of the machine. The unit may be removed bodily from its position over the table by means of an overhead crane which lifts the trunnions 12 from the end of the lever 13, the crank pins 57 being at this time removed in order to release the connection of the unit with the connecting rod 58. With this arrangement little time is lost in making replacements and repairs, as the unit may be removed bodily and a spare unit placed upon the lever 13 while repairs or replacements are being made upon the unit which is removed.

Fig. 5 illustrates a modification in which spur gears are substituted for the chain and sprocket drive of the work spindles. Here the sleeve 44 carries a spur gear 61 which meshes with spur gears 62, 63 on the spindles 28 and 31. The spindles 27 and 29 are driven from the idler pinions 64 and 65 which mesh with the gear 62 and the gears 66 and 67 carried by the spindles 27 and 29. The spindles 30 and 32 are driven through similar trains of gearing. The shaft 51 which operates the cranks 56 is driven from the gear 68 which meshes with the pinions 65 and 69. Various other means might be employed for driving the work spindles which may be rotated either in the same direction or part in one direction and part in another, depending upon conditions and requirements.

Fig. 6 illustrates the application of a polishing block to one of the work spindles, such as the spindle 32, in place of the grinding disc shown in Fig. 3. This polishing block may be of any desired design, but as shown comprises a plate 70 to whose lower face is secured a sheet of felt 71 held in place by means of the ring 72 which extends over the corners of the felt, the section of Fig. 6 being taken in a plane between such corners. The spindle is mounted in the casing 26 and driven as heretofore described in connection with Figs. 1 to 4.

What we claim is:

1. In combination in a surfacing machine, a work table mounted for right line movement, a framework alongside the table, a surfacing unit comprising a vertical sleeve mounted on the framework for swinging movement back and forth across the line of movement of the table and counterbalanced, a vertical shaft journaled in the sleeve, a motor and driving connections for the shaft mounted upon the upper end of the sleeve, a gear casing having a rocking connection with the lower end of the sleeve, a plurality

