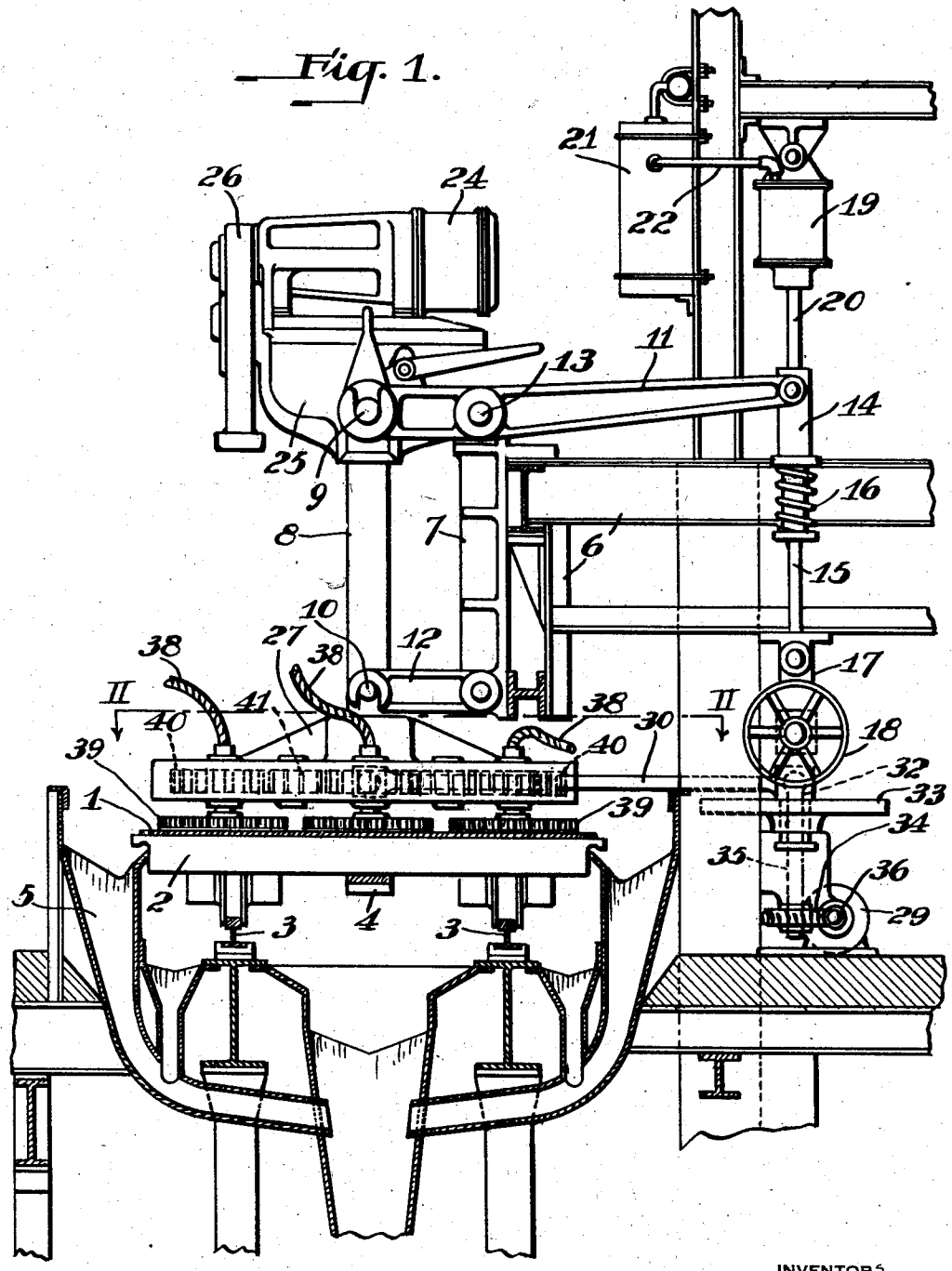
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SURFACING MACHINE

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Fig. 1.



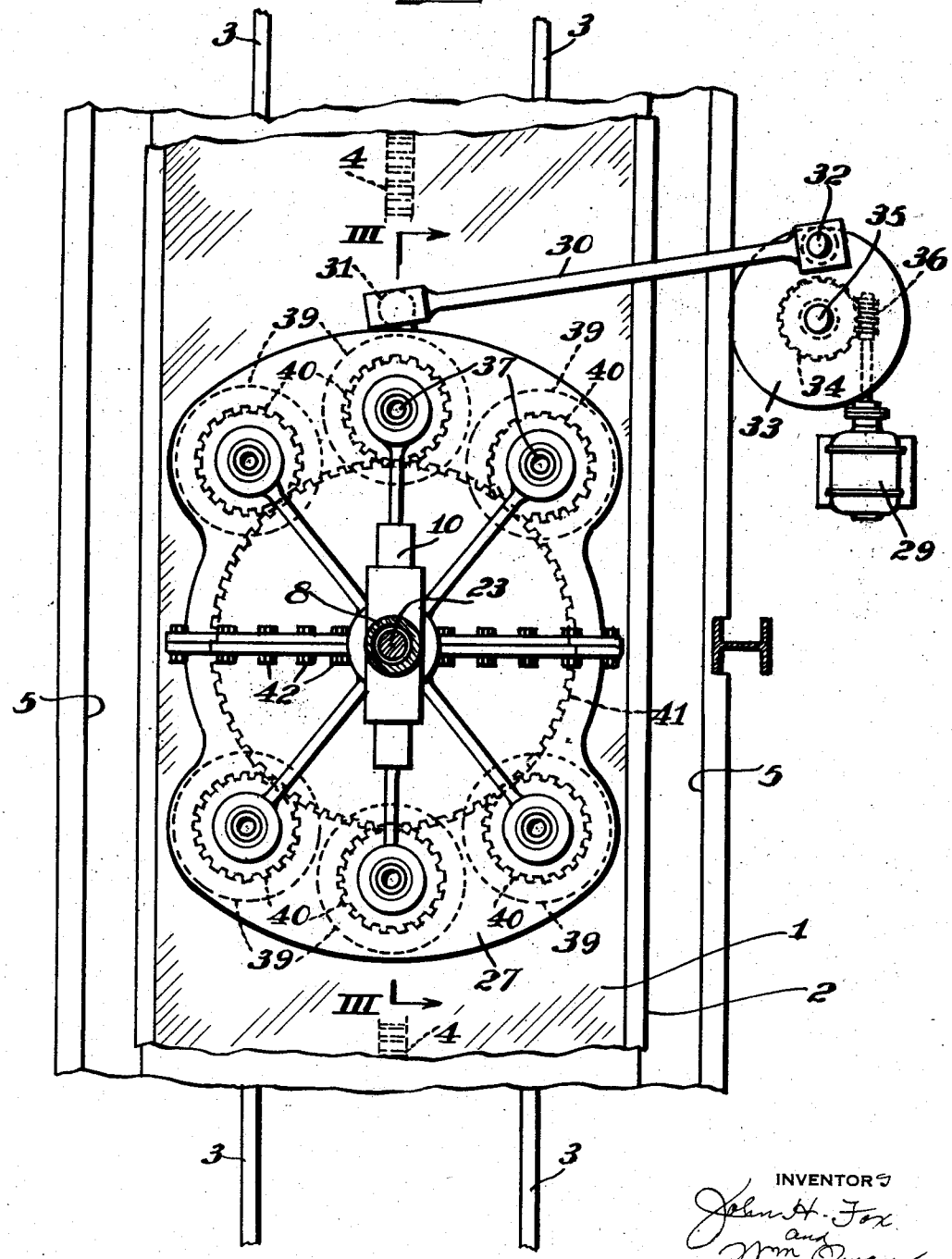
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Fig. 2.



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SURFACING MACHINE

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Fig. 3.

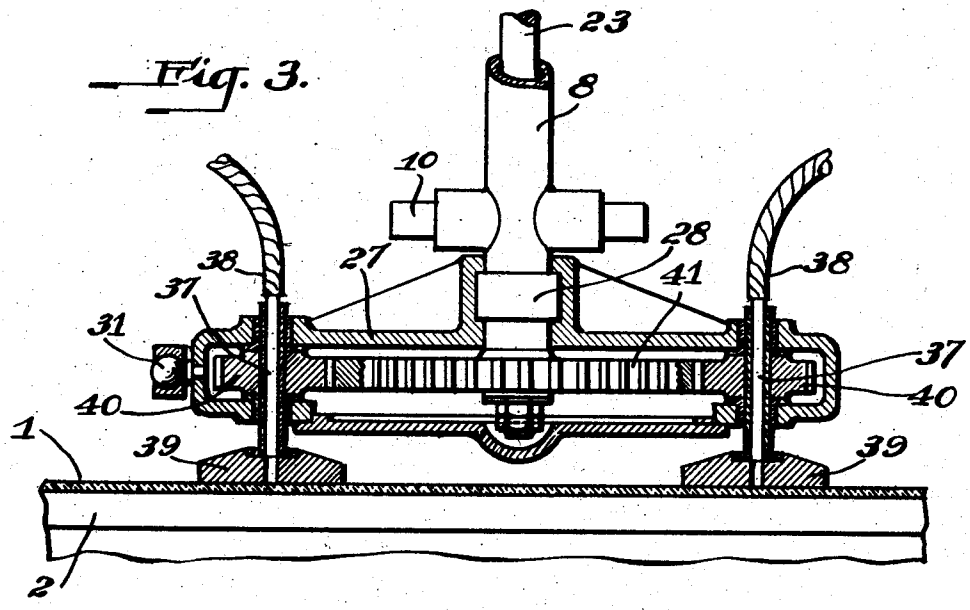


Fig. 6.

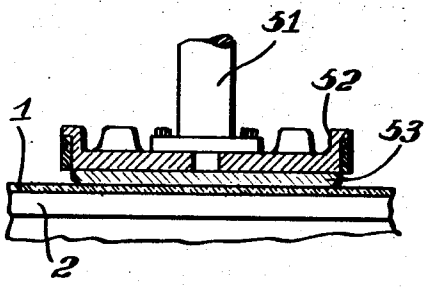
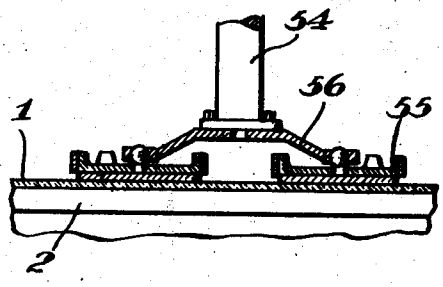


Fig. 7.



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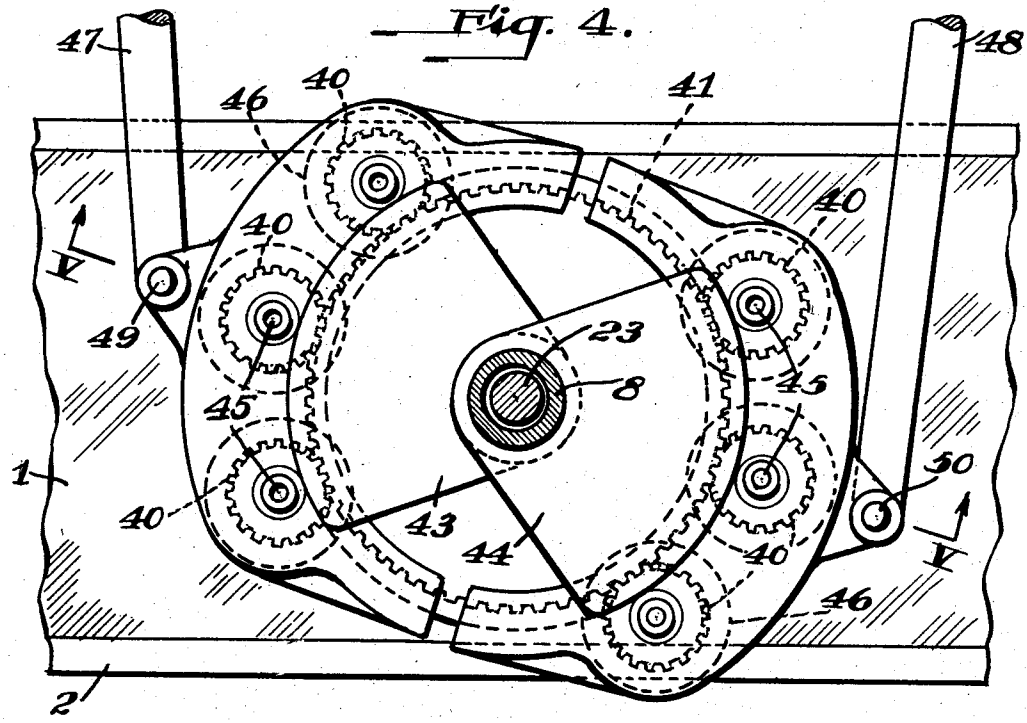
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SURFACING MACHINE

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Fig. 4.



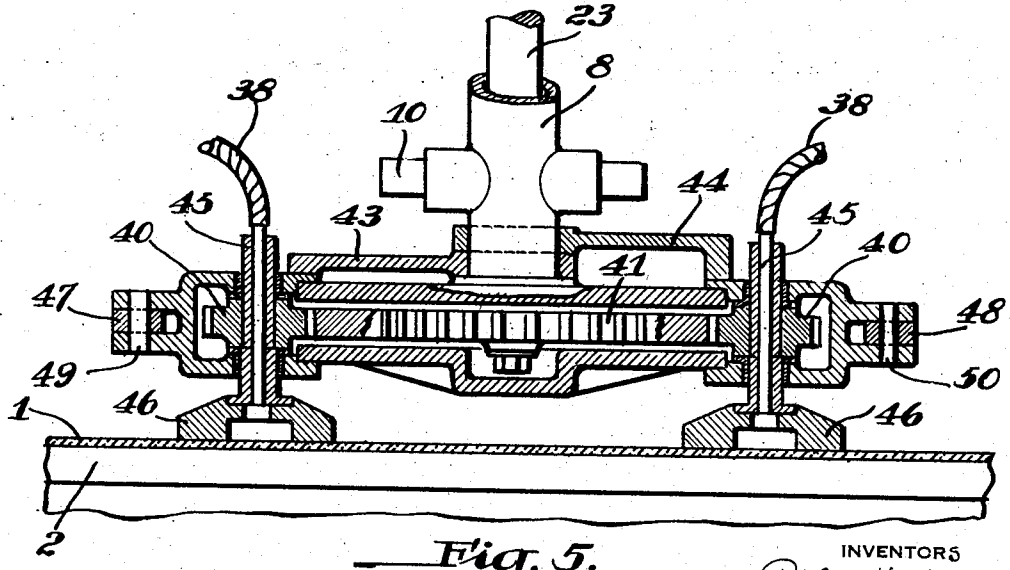


Fig. 5.

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UNITED STATES PATENT OFFICE

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SURFACING MACHINE

Application filed October 24, 1929. Serial No. 402,084.

The invention relates to surfacing machines for use in straight away grinding and polishing, being particularly designed for use in surfacing plate glass, but is 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 modifications 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. Fig. 4 is a section similar to that of Fig. 2 showing a modification. Fig. 5 is a section on the line V—V of Fig. 4. And Figs. 6 and 7 are sectional detail views showing the form of runners employed for the polishing operation as opposed to the grinding operation shown in Figs. 1, 2 and 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, 2 and 3. The tables are mounted upon the tracks 3 and moved slowly therealong by means of any suitable power means, such as spur gears driven from motors and engaging the racks 4 carried by the bottoms of the tables. The tables are carried upon a suitable foundation made of the usual commercial sections and provided with drainage troughs 5 for receiving the mixture of waste water and abrasive which flows from the tables. Extending alongside of the tables is a framework made up of the commercial sections 6 and the casting 7 which takes the weight of the unit as later described.

The surfacing unit includes a vertical sleeve 8 provided at its upper and lower ends with a pair of trunnions 9 and 10 engaged respectively by the lever 11 and the arm 12. The arm 11 takes the entire weight of the unit, while the arm 12 guides the lower end of the sleeve in its up and down movements. The lever 11 is pivoted at 13 upon the casting 7 and provided at its end with a connecting rod made up of two parts 14, 15 with a spring 16 under compression therebetween. The part 15 is a screw threaded at its lower end and is moved up and down by a nut carried by the bracket 17 and rotated by the hand wheel 18 so that the connecting rod may be moved up and down to regulate the vertical position of the surfacing unit carried by the other end of the lever 11. At such time the spring 16 is under compression and serves to counterbalance in part the weight of the surfacing unit. This construction for counterbalancing a surfacing unit is well-known in the art, being shown and described in the patent to 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 arm 11 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 19 is employed, such cylinder being provided with a piston whose plunger 20 is also pivotally connected to the end of the lever 11. This piston is operated from the air reservoir 21 connected to the cylinder 19 by means of the pipe 22. This is also a construction well known in the art for which no claim is made in this application.

The sleeve 8 carries the drive shaft 23 which is journalled in the sleeve and driven from the electric motor 24. This motor is seated upon a casing 25 which is in turn supported upon the upper end of the sleeve 8. The motor drives the shaft 23 through the intermediary of suitable reduction gearing in the casings 26 and 25. Swivelled upon the lower end of the sleeve 8 is a gear casing 27, the swivel connection being shown most clearly at 28 in Fig. 3. This casing 27 carries the various work spindles and the driving mechanism for such spindles and is adapted to be oscillated back and forth to carry the grinding and polishing discs across the line

of movement of the table. This oscillation is accomplished by means of the motor 29 mounted on the floor at the side of the unit and operating the connecting rod 30 which is connected at its outer end with the casing 27 by means of the ball joint 31. The other end of the connecting rod 30 is mounted on the pin 32 carried by the crank disc 33. This crank disc is rotated from the motor 29 by means of a worm wheel 34 mounted upon the shaft 35, such worm wheel being engaged by a worm 36 carried by the motor shaft.

The casing 27 has extending through it the six vertical work spindles 37 preferably hollow and supplied with suitable abrasive through the flexible pipes 38. Secured to the lower ends of the work spindles are the grinding discs 39 preferably of cast iron and having openings through their centers through which the abrasive from the work spindles is supplied to the surface of the glass. Keyed to each of the work spindles is a pinion 40 and these work spindles are all driven from a large spur gear 41 which is keyed to the lower end of the drive shaft 23 which extends through the sleeve 8. The work spindles and the grinding discs carried thereby are thus driven from the shaft 23 and, at the same time, the casing 27 and the grinding discs carried thereby are oscillated back and forth across the line of movement of the table, thus distributing the grinding action uniformly over the glass sheets on the tops of the tables moving beneath the surfacing unit. As indicated in Fig. 2, the gear casing 27 is made in two sections suitably ribbed and secured together by means of the bolts 42 to facilitate the assembling of the parts carried by the casing and including the gearing.

Figs. 4 and 5 illustrate a modification in which the construction follows that of Figs. 1, 2 and 3 with the exception that the gear casing 27 of Figs. 1, 2 and 3 is made in two parts 43 and 44, each of which carries three of the work spindles 45 and three of the grinding discs 46. The gear sections 43 and 44 are each swivelled to the sleeve 8 as in the other form of construction and the work spindles are driven in the same manner from the drive shaft 23, namely, by a large spur gear 41 carried by the shaft 23 which engages the pinions 40 carried by the work spindles. The gear casing sections 43 and 44 are operated by a pair of connecting rods 47 and 48 pivoted to the gear casings at 49 and 50 and operated by any suitable power means, such as that shown in connection with Figs. 1, 2 and 3.

Figs. 6 and 7 merely illustrate the changes which may be made in order to change the grinding unit into a polishing unit. In Fig. 6 the spindle 51 carries the usual polishing block 52 faced with a felt sheet 53, rouge and water being employed instead of the abrasive used with the grinding units of Figs. 1, 2 and 3.

Fig. 7 illustrates a further modification in which each work spindle 54 is provided with a plurality of polishing blocks 55 pivotally mounted upon a spider 56 carried by the lower end of the spindle 54.

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 drive shaft above the table, a vertical sleeve in which the shaft is journalled, means carried by the framework for supporting the sleeve for vertical movement and counterbalancing it, a motor and driving connections therefrom to the shaft mounted upon the upper end of the sleeve, a gear casing swivelled upon the lower end of the sleeve, a plurality of work spindles extending vertically through the casing, a surfacing disc carried by each spindle, and driving means between the lower end of the drive shaft and the spindles, a motor at the side of the table, and connections between the motor and casing to carry the surfacing discs back and forth transversely of the line of movement of the table.

2. 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 drive shaft above the table, a vertical sleeve in which the shaft is journalled, means carried by the framework for supporting the sleeve for vertical movement and counterbalancing it, a motor and driving connections therefrom to the shaft mounted upon the upper end of the sleeve, a gear casing swivelled upon the lower end of the sleeve, a plurality of work spindles extending vertically through the casing, a surfacing disc carried by each spindle, and driving means between the lower end of the drive shaft and the spindles, a motor at the side of the table, and connections between the motor and the gear casing, and including a crank and connecting rod for oscillating such casing to carry the surfacing discs back and forth transversely of the line of movement of the table.

3. 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 drive shaft above the table, a vertical sleeve in which the shaft is journalled, means carried by the framework for supporting the sleeve for vertical movement and counterbalancing it, a motor and driving connections therefrom to the shaft mounted upon the upper end of the sleeve, a gear casing swivelled upon the lower end of the sleeve, a plurality of work spindles extending vertically through the casing, a surfacing disc carried by each spindle, and driving means between the lower end of

the drive shaft and the spindles, and means including a motor and crank for oscillating the casing to carry the surfacing discs back and forth transversely of the line of movement of the table.

4. 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 drive shaft above the table, a vertical sleeve in which the shaft is journalled, means carried by the framework for supporting the sleeve for vertical movement and counterbalancing it, a motor and driving connections therefrom to the shaft mounted upon the upper end of the sleeve, a gear casing swivelled upon the lower end of the sleeve, a plurality of work spindles extending vertically through the casing, a surfacing disc carried by each spindle, a driving pinion on each spindle, a gear on the lower end of the shaft engaging the pinions, and means including a motor and crank for oscillating the casing to carry the surfacing disc back and forth transversely of the line of movement of the table.

In testimony whereof, we have hereunto subscribed our names.

JOHN H. FOX.
WILLIAM OWEN.