March 24, 1931. F. L. HITCHCOCK 1,797,342

EDGING MACHINE

Filed Dec. 23, 1924 3 Sheets-Sheet 1

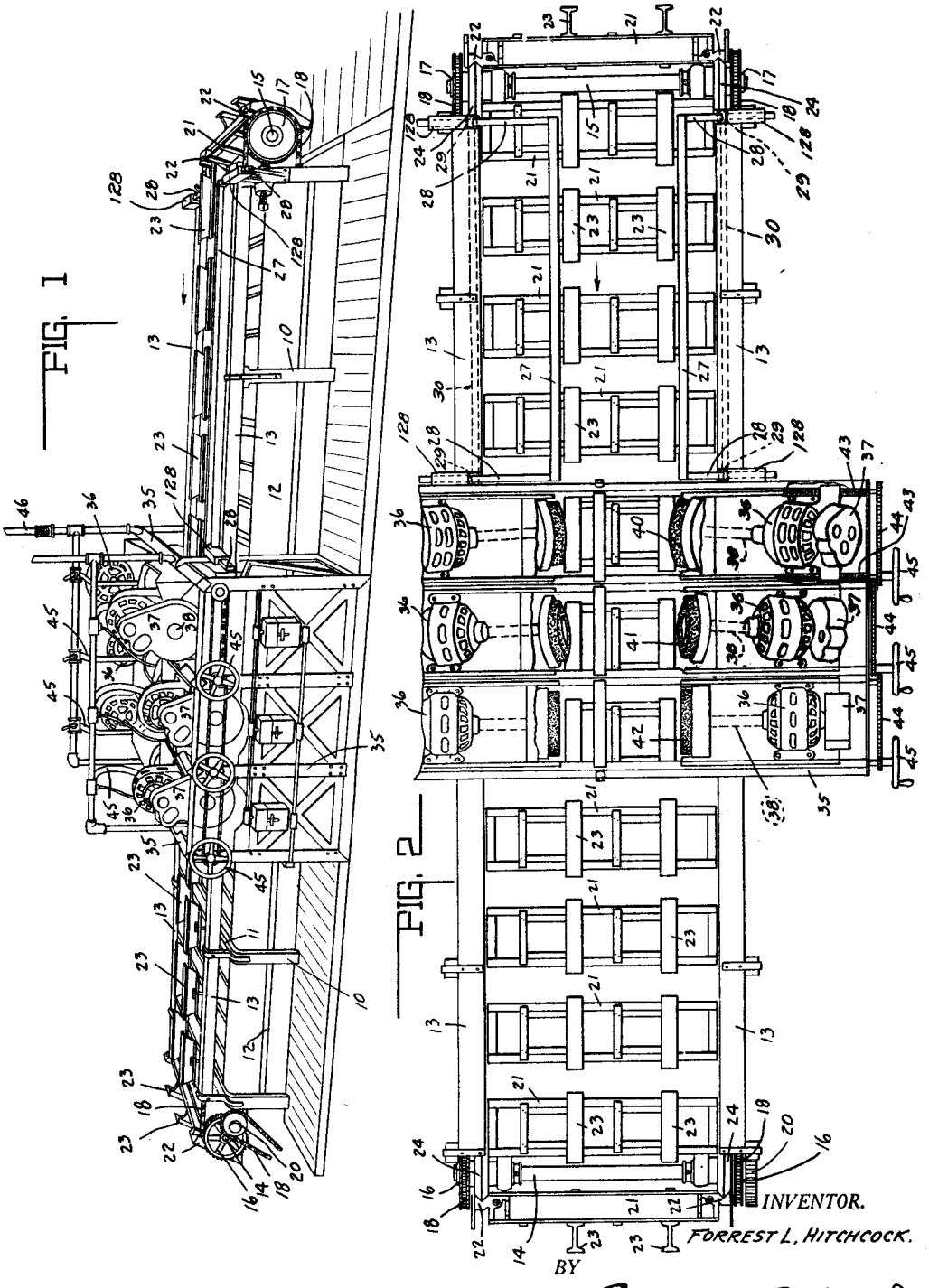


FIG. 1

FIG. 2

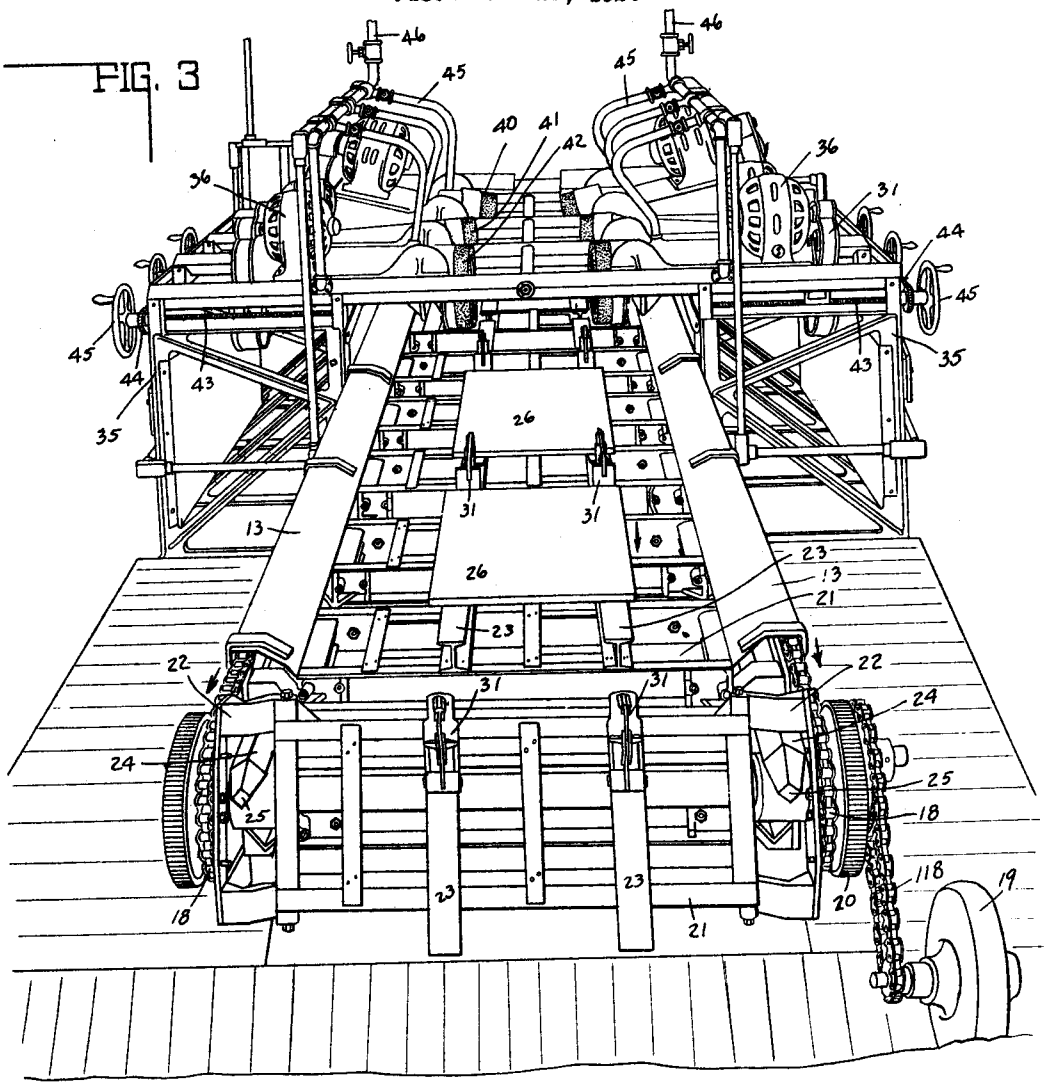
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FIG. 3



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FIG. 4

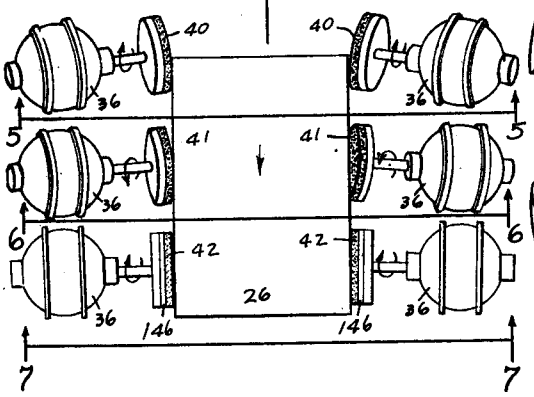


FIG. 5

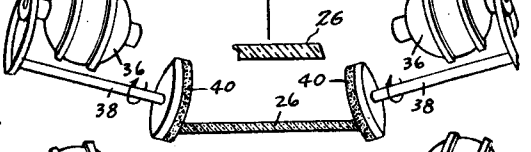


FIG. 6

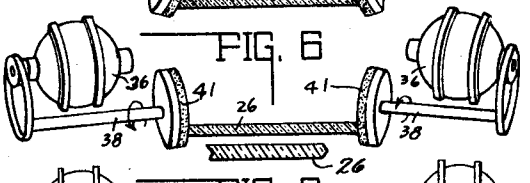


FIG. 7

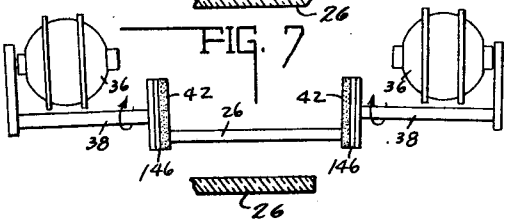


FIG. 8

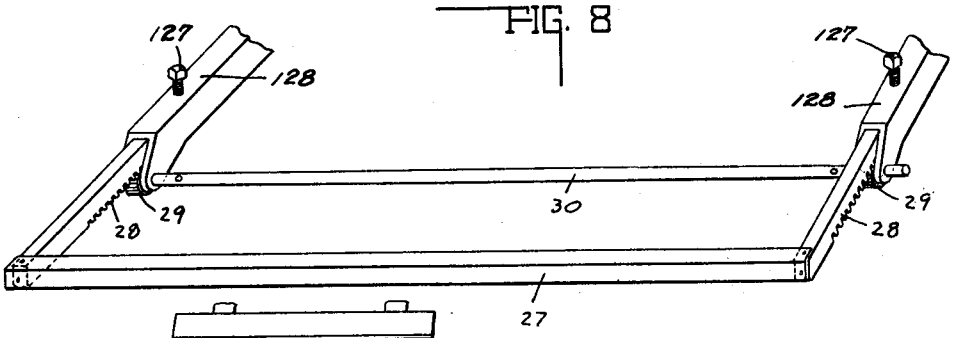
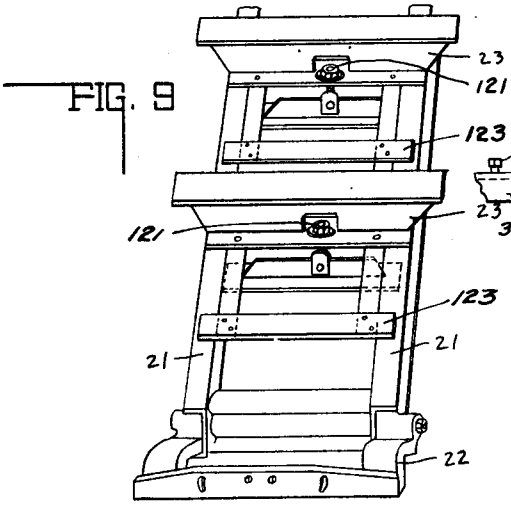


FIG. 9



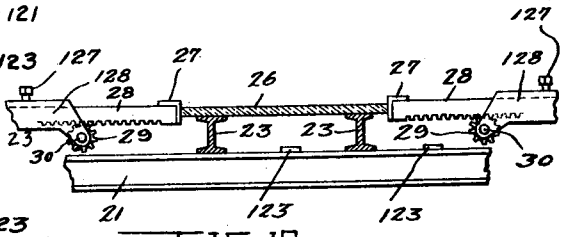


FIG. 10.

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UNITED STATES PATENT OFFICE

FORREST L. HITCHCOCK, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO MARIETTA MANUFACTURING CO., OF INDIANAPOLIS, INDIANA, A CORPORATION

EDGING MACHINE

Application filed December 23, 1924. Serial No. 757,639.

This invention relates to a combined edging, grinding and smoothing machine for glass plates or the like.

Heretofore in the manufacture of glass plates for such use as table and counter tops, wall panels and the like, it has been the practice for the operator to take a single glass plate, and grind off one edge at a time the rough edges. It then goes to another operator who on another machine handles them individually, holding them against a smoothing wheel for smoothing the edges. The plate then passes to another operator who, upon another machine manually supports the plate against a finishing and polishing wheel.

It is the object of this invention to produce a machine through which the glass plates are carried on an endless conveyor, said machine being provided with means for supporting and clamping the plates upon the conveyor in proper alignment, said supporting means being adjustable to the desired width of the plates, and also with gauging means so as to cause the proper amount of stock to be removed and the plates finished to a given size, and thereafter causing the plates to pass between a plurality of adjustable grinding wheels so constructed and positioned as to first grind off the rough edges, smooth the same and thereafter finish them. By means of this machine the operator merely passes the plates one after another upon the conveyor and when they reach the other end of the machine and are moved from the conveyor by another operator, the opposite edges thereof have been trimmed and ground and finished.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a perspective view showing a side elevation of the machine. Fig. 2 is a plan view looking down thereon. Fig. 3 is a perspective view taken from one end thereof. Fig. 4 is a diagrammatical view looking down on the grinding wheels and plate. Fig. 5 is a section taken on a line 5—5 of Fig. 4. Fig. 6 is a section taken on a line 6—6 of Fig. 4. Fig. 7 is a section taken on a line 7—7 of Fig. 4. In Figs. 5, 6 and 7 a portion of the work is shown enlarged and in section immediately adjacent thereto to illustrate the finished edge produced by the cutter shown in the respective figure. Fig. 8 is a perspective view of the plate side or lateral aligning mechanism. Fig. 9 is a perspective view of the endless conveying plate carrier frame or supporting unit. Fig. 10 is a vertical cross sectional view of the work and an elevational view of the support therefor.

In the drawings there is shown a machine having a framework consisting of the legs 10 and cross pieces 11 connected by the side bars 12 and the chain guards 13. The framework carries an endless conveyor which consists of the shaft 14 mounted at the discharge and driving end of the carrier, and the shaft 15 mounted at the feed end of the carrier. Each of said shafts carries the sprockets 16 and 17 on which carrier chains 18 are mounted. The sprockets and chains are driven from the discharge end of the carrier from a suitable source of power, not shown herein, such as a motor, through the speed reduction drive 19, the chain 18 and further speed reduction gearing 20, whereby a comparatively slow movement of the carrier is acquired.

Pivotally mounted on the inner edges of the chains 18 there are carrier frames 21 provided on their ends with the grooved sliding shoes 22 and the upwardly extending carrier plates 23. The frames 21 are so connected with the chain as to permit them to be freely carried about the sprocket wheels at each end of the main frame, and upon being carried to the top of the frame the sliding shoes 22 pass on to the supporting ways 24 over the reduced end thereof at 25, said ways extending the full length of travel on each side of the main frame for slidably supporting and guiding the shoes 22 in their travel throughout the length thereof. The frames 21 are carried by said shoes so that intermediate the ends of the machine, the carrier is rigid and prevented from giving or sagging, or in any way varying its position. The frames 21 are so constructed as to permit the lateral positioning of the supporting plates 23 to be adjusted

laterally of the carier for receiving the glass plates 26 of varying widths, see plate anchorage 123 and clamping means 121 in Fig. 9.

Supported upon the legs 10 and frames 35, so as to extend over the carrier adjacent the forward end thereof, there are aligning bars 27, see Figs. 2 and 8, supported upon the inwardly extending rack bars 28 which mesh with the pinions 29 mounted on each end of the shaft 30, whereby upon the rotation of said shaft both ends of the gauge bar 27 will be moved inwardly or outwardly simultaneously to vary the position at which it is desired to align the edge of the plate to be edged. The adjustment of said gauge bars varies with the desired width of the plate and the position of the grinding wheels. Before starting the operation of the machine, it is necessary that the gauge bars be properly adjusted as well as the grinding wheels.

The glass plates 26 to be edged are placed by the operator upon the supporting plates 23 as they are brought to horizontal position. Plate 26 is then aligned and adjusted with respect to the gauge bars 27 by permitting the glass edge to overlap the bars on both sides sufficiently to show that all irregularities will be taken off, after which they are clamped on the carrier frame 21 by any suitable clamping means 31. The movement of the carrier is comparatively slow, giving the operator sufficient time to properly set his plate and clamp it in position during the slow continuous movement thereof. The gauge bars and the supporting plates are adjusted before running through a batch of glass plates to be edged, so as to take care of any desired width within the capacity of the machine.

The edging elements comprise the frame 35 in which are mounted a plurality of cutting and grinding wheels with individual motors for driving the same, and mounted on each side of the machine so as to simultaneously cut or grind opposite edges of the glass plates passing therethrough. Adjustably supported in the frame 35 and upon opposite sides thereof are a plurality of driving motors 36 having associated therewith the gear housings 37 in which are mounted variable reduction gears or chains which in turn are connected to the shafts 38 upon which are mounted the grinding wheels 40, 41 and 42. Each wheel is capable of being slidably adjusted to and from the work by means of the screw shafts 43 horizontally supported on the frame 35 on each side of the respective motors and grinding wheels so that by rotating the same the motor and grinding wheel will be caused to move to or from the work, thereby permitting adjustment to work of varying widths. Each pair of screw shafts 43 are simultaneously operated through the chain and sprockets 44 by the hand wheel 45. This enables a minute adjustment to be had without causing the grinding wheel to be tilted laterally or out of the proper angular relation to the edge to be ground. The hand wheels 45 may be suitably notched and numbered so that each set of three on both sides of the machine may be properly controlled in their adjustment with respect to each other. This also permits the individual wheels to be adjusted to take up for wear as the machine is operated.

As will be noted in the drawings, and with particular reference to Figs. 4 to 7, the grinding wheels are arranged in groups at opposite sides of the frame 35 and are oppositely directed. The wheels of each group are set at various angles to the side of the plate to be ground. The grinding wheel 40 of each group which is of a coarser grit, is the first to engage with the work, and its rotational axis is set at an angle to the horizontal of about 15 degrees. This wheel operates to cut off the ragged edge of excess stock of the plate and in order that it will not cause the lower edge thereof to be chipped, it grinds away from the lower edge or toward the upper edge, as shown in Fig. 5. It is also set with its radial face at an angle of about 6 degrees to the side edge or direction of travel of the work, as shown in Fig. 4, in order that the forward portion thereof will not engage the plate, but only the rear portion will perform the cutting operation, whereby there will be less danger of chipping or breaking into the plate as it is forced past the wheel by the movement of the carrier. The second grinding wheel 41 is a little more closely set and its radial face has an angle to the vertical of about 5 degrees, its inclination being opposite to that of wheel 40, as shown in Fig. 6, so as to smooth off the edge left by the rough cutting of the wheel 40. Wheel 41 cuts towards the top and from the lower edge and therefore the foregoing cutting approximates cutting both upper and lower edges towards the center. This wheel is also set with its radial face at an angle of about 4 degrees to the edge of the plate 26, as shown in Fig. 4, for the same reason as above explained with respect to the wheel 40.

The finishing wheel 42 is provided with a rubber cushion 146 and is set with its radial face substantially vertical, although preferably at an angle of about 1 degree thereto. This smooths the edge down to the square and exerts a resilient pressure against the edge of the glass so as to permit of the use of a wheel having a finer grit, and provide sufficient pressure for giving the same a smoothing effect, but at the same time not being sufficiently positive to cause chipping or breaking. Furthermore, the cushioning effect permits a substantially constant pressure to be exerted for smoothing and finishing purposes regardless of the wearing away of the wheel within certain limits. This also permits of slight excess of stock to be compensated for.

After the plate 26 has passed from between

the wheels 40, 41 and 42, the edge has been cut down and trued to the proper width and the irregularities removed by the wheels 40, a finer grinding effect, and truing to the plane is substantially obtained by the wheels 41, and the finishing thereof accomplished by the cushion wheels 42. The plates are then passed to the position shown in Fig. 3 where they may be readily removed by the operator at the end of the machine.

It will be noted that there is provided a battery of pipes 45, one for each grinding wheel which are connected on each side of the pipes 46 for causing a fluid to be constantly fed to the grinding wheels. There may be provided a pan underneath the machine to catch the drip of such fluid, whereby it may be pumped back through the pipes 46 and refed to the machine.

From the foregoing it will be observed that after the machine is once adjusted for one size of plate they may be constantly and comparatively rapidly passed therethrough accomplishing in one operation what had heretofore required four operations.

The invention claimed is:

1. In a plate edging machine, the combination of an endless conveyor including a plurality of plate supporting skeleton units, a plurality of the units each having plate supporting means laterally adjustably mounted thereon for accommodating different widths of plates, a plate positioning register means extending longitudinally of the conveyor movement and adjacent the same, a plurality of spaced means adjustably supporting said positioning register means and simultaneously operable to the same degree for maintaining said positioning register means in adjustable aligned relation with respect to the plane of movement of the conveyor, a cutting wheel, means for adjustably supporting said cutting wheel in substantial alignment with the register means, whereby said wheel is movable towards and away from the work for adjusting the position of the cutting wheel to the plate supporting means and the positioning register means and a back stop for each unit for insuring plate movement with and by the conveyor.

2. An edging device including in combination, a conveyor of the character defined by claim 1, and an additional register means and an additional cutting wheel aligned therewith, said additional register means and wheel being positioned oppositely with respect to said conveyor and the same parts defined by claim 1, said additional register means and said cutting wheels being of the same character as defined by claim 1 and each being adjustably mounted as defined thereby.

3. In an edging machine for vitreous plate and the like, the combination of work supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, power means therefor, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts and being progressively less from the first pair to the last.

4. In an edging machine for vitreous plate and the like, the combination of work supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, power means therefor, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to the line of travel, said departure being different for each pair of shafts and the vertical projections of the shafts of each pair being oppositely inclined to the horizontal, said inclination being different in each pair of shafts.

5. In an edging machine for vitreous plate and the like, the combination of work supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, power means therefor, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts, and the vertical projections of the shafts of each pair being oppositely inclined to the horizontal, said inclination being progressively less from the first to the last pair.

6. In an edging machine for vitreous plate and the like, the combination of work supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite

edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, power means therefor, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being progressively less from the first pair of shafts to the last and the vertical projections of the shafts of each pair being oppositely inclined to the vertical, said inclination increasing progressively from the first to the last pair.

7. In an edging machine for vitreous plate and the like, the combination of work supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, power means therefor, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts, and the vertical projections of the shafts of each pair being oppositely inclined to the horizontal, the inclination of the shafts of the first pair being opposite to those of the corresponding shafts in another pair.

8. In an edging machine for vitreous plate and the like, the combination of a work-supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, a motor for operating each shaft, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts and being progressively less from the first pair to the last.

9. In an edging machine for vitreous plate and the like, the combination of a work-supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, a motor for operating each shaft, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to the line of travel, said departure being different for each pair of shafts and the vertical projections of the shafts of each pair being oppositely inclined to the horizontal, said inclination being different in each pair of shafts.

10. In an edging machine for vitreous plate and the like, the combination of a work-supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, a motor for operating each shaft, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts, and the vertical projection of the shafts of each pair being oppositely inclined to the horizontal, said inclination being progressively less from the first to the last pair.

11. In an edging machine for vitreous plate and the like, the combination of a work-supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, a motor for operating each shaft, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being progressively less from the first pair of shafts to the last and the vertical projections of the shafts of each pair being oppositely inclined to the vertical, said inclination increasing progressively from the first to the last pair.

12. In an edging machine for vitreous plate and the like, the combination of a work-supporting means arranged to support a flat sheet in substantially horizontal relation and permit its movement along a predetermined

line of travel for operation upon opposite edges parallel to the movement in one pass of the sheet, a plurality of pairs of cutting disc wheels, the operating surfaces of which are adapted to simultaneously engage the opposite edges of the sheet, a shaft for each wheel, a motor for operating each shaft, and means supporting each shaft approximately transverse to the line of travel of the sheet, the horizontal projection of each shaft departing slightly from the perpendicular to said line of travel, said departure being different for each pair of shafts, and the vertical projections of the shafts of each pair being oppositely inclined to the horizontal, the inclination of the shafts of the first pair being opposite to those of the corresponding shafts in another pair.

In witness whereof, I have hereunto affixed my signature.

FORREST L. HITCHCOCK.