July 17, 1951 T. E. PILLOW 2,560,740

EDGING AND POLISHING MACHINE

Filed Feb. 9, 1948 3 Sheets-Sheet 1

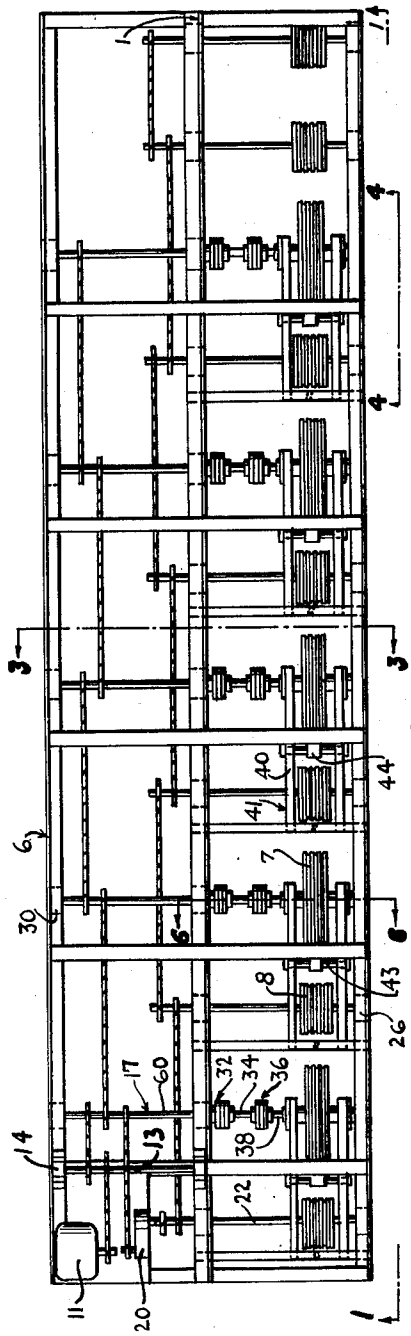


Fig. 2

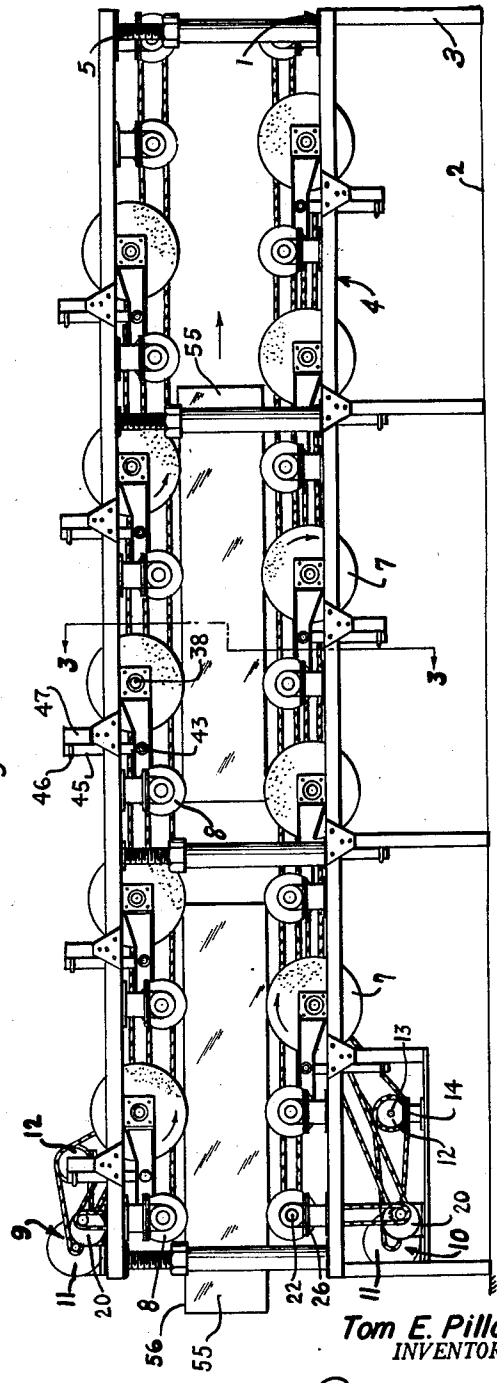


Fig. 1

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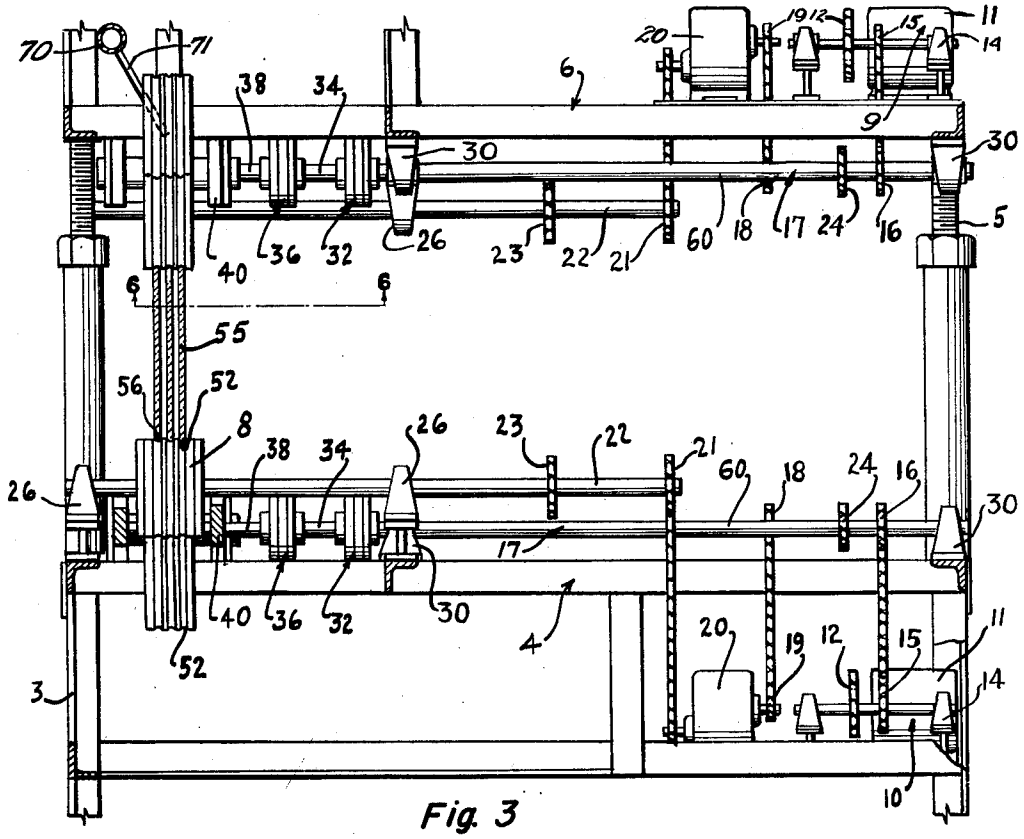


Fig. 3

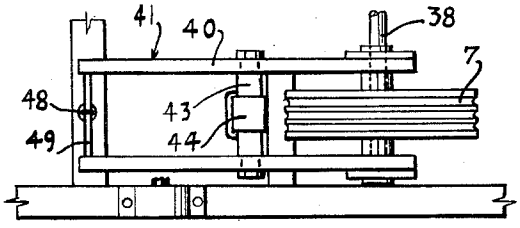


Fig. 5

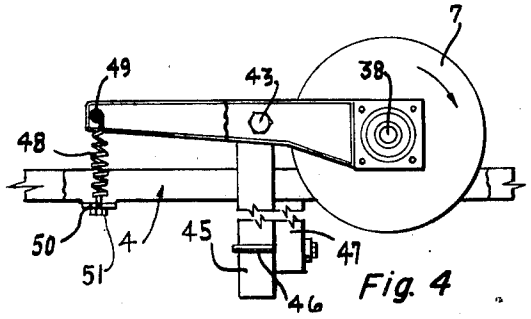


Fig. 4

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EDGING AND POLISHING MACHINE

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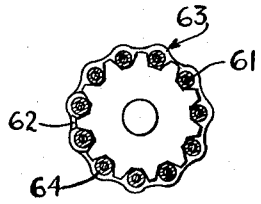


Fig. 8

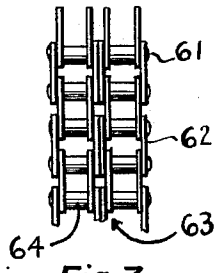


Fig. 7

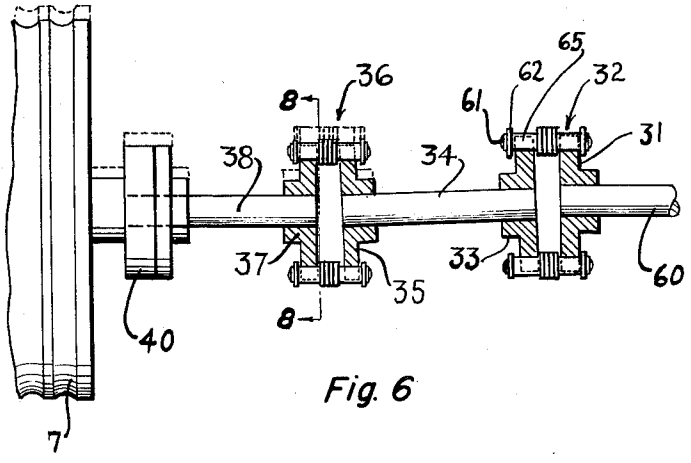


Fig. 6

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Patented July 17, 1951 2,560,740

UNITED STATES PATENT OFFICE

2,560,740

EDGING AND POLISHING MACHINE

Tom E. Pillow, Port Arthur, Tex.

Application February 9, 1948, Serial No. 7,155

2 Claims. (Cl. 51—80)

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This invention relates to a machine for polishing or edging glass sheets or the like and it is especially adapted to receive a plurality of sheets in which the transverse axes thereof are positioned in parallel and in a vertically extending direction so that the sheets are passed through the machine with the longitudinal axes thereof traveling along a horizontal path between grinding wheels or other suitable edging means.

It is an object of this invention to provide a machine adapted to edge sheets of glass which may not be exactly rectilinear in shape as when the edges of the sheets may have been distorted so that the sheet has a sinuous configuration.

It is a further object of this invention to provide a machine in which any sinuousity in the shape of the sheets or any variation from the rectilinear is compensated for by mechanism adapted to resiliently position the edging wheels of the machine in a vertical direction.

It is also an object of this invention to provide a machine of this class adapted to accommodate sheets of various widths through providing means to vertically position the upper frame unit of the machine from the lower unit.

It is still a further object of this invention to provide a machine of this class in which the grinding wheels are diven by a flexibly adjustable drive to accommodate the sinuousity of configuration of the sheets being edged.

It is also an object of this invention to provide a machine of this class equipped with means by which the grinding wheels, either the upper or lower row, may be adjusted so as to remain out of contact with the sheets as they are processed through the machine.

It is also an object of this invention to provide a machine of this class which is adapted to accommodate sheets which vary in width along the longitudinal axes thereof.

It is also an object of this invention to provide a machine of this class in which the guide feed rollers are driven at appreciably lower speeds than the grinding wheels thereof so that the feed rollers also serve a braking function while the sheets are passed through the machine.

It is yet a further object of this invention to provide a machine of this class in which a single source of power drives both grinding wheels and guide feed rollers of a row.

Other and further objects of this invention will be more fully apparent from the following description taken in connection with the drawings in which:

Fig. 1 is a side elevation of the machine as viewed along lines 1—1 of Fig. 2.

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Fig. 2 is a plan view of the machine.

Fig. 3 is a sectional end view of the macnine as viewed along lines 3—3 of Fig. 1.

Fig. 4 is an elevational detail which shows how the grinding wheels are pivotally balanced.

Fig. 5 is a plan view of the details shown in elevation in Fig. 4.

Fig. 6 is a fragmentary sectional elevation taken along line 6—6 in Fig. 2 to show the details of the flexible drive of a grinding wheel.

Fig. 7 is a fragmentary plan view of the details shown in Fig. 6 to show the sprocket chain assembly.

Fig. 8 is a side view of the details shown in Fig. 7, in which the sprocketed teeth of the flange element are also shown.

The frame 1 of the machine is supported from a floor or base 2 by legs 3 which are connected to the lower frame unit 4 which is in turn adjustably connected by means of jacks 5 to the upper frame unit 6. The driving elements of both upper and lower frame units comprise a row of alternately spaced grinding wheels 7 and guide feed rollers 8, mounted on the frame units as will be hereinafter described.

Transmission units 9 and 10 drive respectively the upper row and lower row of rotatable elements. These transmission units comprise a motor 11 mounted on an end of the machine which is connected to drive the sprocket 12 on the jack shaft 13, the jack shaft being rotatably mounted on the frame by any suitable journal members 14. The jack shaft 13 in turn has a sprocket 15 thereon which is connected to drive a sprocket 16 on the first grinding wheel shaft 17 to drive the first grinding wheel 7.

A sprocket 18 on the grinding wheel shaft 17 is connected to drive a sprocket 19 on the shaft of a speed reducer 20, the speed reducer being also rigidly mounted at the end of the frame. The speed reducer 20 in turn is connected to drive a sprocket 21 on the first guide feed roller shaft 22. The first guide feed roller shaft 22 also has a sprocket 23 thereon which is connected to drive a sprocket 23 on the second guide feed roller shaft 22 and each guide feed roller shaft in turn is connected to drive the successive guide feed roller shaft on down through the last guide feed roller shaft on the machine.

The grinding wheel shaft 17 has a sprocket 26 thereon which is connected to drive a sprocket 24 on the second grinding wheel shaft 17 and each grinding wheel shaft is in turn connected to drive each successive grinding wheel shaft on down to the last grinding wheel shaft on the machine.

The guide feed roller shafts 22 are journaled in pillow blocks 26 which are rigidly mounted on the frame units. The grinding wheel shafts, on the other hand, are journaled at one end only in pillow blocks 30 which are rigidly mounted to the frame. The other end of the grinding wheel shafts 17, however, terminate in the first flange element 31 of a flexible coupling 32. The opposing flange element 33 of the flexible coupling 32 is rigidly connected by means of stub shaft 34 to the first flange element 35 of a second flexible coupling 36. The second flange element 37 of the flexible coupling 36 is in turn connected to the stub shaft 38. This stub shaft is journaled in the arms 40 of the bracket 41 and the grinding wheel 7 is rigidly mounted on this stub shaft 38 for rotation between these arms 40. The bracket 41 is pivotally mounted on a pin 43 which extends through the head 44 of an adjustable arm 45 which is adapted to be rigidly positioned at variable elevations on the frame by means of the U-bolt 46 which passes through a leg 47 rigidly connected to the frame. The bracket 41 is pivotally balanced on the lower frame unit by means of the tension spring 48 which is connected to cross-arm 49 of the bracket at one end and which is connected at the other end to a bar 50 on the frame unit.

The interconnecting elements interposed between the journalled portions 60 of the grinding wheel shafts 17 and the balanced grinding wheels 7 is shown accomplished in this particular form of the invention by the means of pairs of flexible couplings. However, such flexibility of connection may be accomplished by a universal joint or by any other well-known means of this class. The details by which this flexibility is accomplished in this disclosure rest in the particular structure of the sprocketed flange elements of the flexible couplings and in the sprocket chains which are mounted thereon.

A pin 61 extends through the links 62 of the sprocket chain 63 and spacers 64 of greater width than the widths of sprocket teeth 65 are interposed between the links to ride between the teeth. When the grinding wheels 7 are forced downwardly or upwardly the flexible ends 65 of the grinding wheel shafts 17 are displaced accordingly. Such displacement is permitted since the flange elements 33 and 35 can rest in the positions disclosed in Fig. 6.

The grinding wheel brackets 41 on the upper frame unit are positioned in the same way as are the brackets 41 of the lower frame unit, shown in Fig. 4, but on the upper frame unit the balancing is accomplished by spring 48, which is a compression spring, which forces upward on the crossarm 49 in a well-known manner to resiliently force the grinding wheels 7 downwardly.

The grinding wheels 7 and the guide feed rollers 8 have a plurality of grooves 52 of a width to accommodate the largest thickness of sheet to be processed through the machine.

In operation, sheets of glass or similar material 55 are inserted in the machine at the motor end thereof. These sheets are positioned with the transverse axes of the sheets extending in parallel vertical planes. The entering end of the sheets are inserted between the grooves 52 of the first guide feed roller 8 of the upper row and the first guide feed roller 8 of the lower row, these guide feed rollers being the only pairs of rollers on the machine which are paired vertically above each other.

A feature of this machine permits the use of

only one row of grinding wheels when desired. This is accomplished by adjusting the bolts 51 threaded through the bars 50, so as to reduce the balancing force of the springs 48 attached to these bolts to a sufficient degree to remove either upper or lower row of grinding wheels 7 from contact with the sheets being processed through the machine.

As shown in Fig. 1 the elements of the upper transmission row rotate in a direction opposite to the elements of the lower transmission row, the upper elements being shown as rotating in a counterclockwise direction while the lower elements are shown rotating in a clockwise direction.

The transmission units 9 and 10, through the obvious means of their transmission systems hereinbefore described, are geared to drive the grinding wheels 7 at an appreciably higher speed than the guide feed rollers 8, the ratio being 356 to 2 in the specific model disclosed. As the edges 56 of the sheets pass into contact with the grinding wheel grooves 52 the sheets are urged rapidly forward. However, the contact which the sheets maintain at the same time with the much slower moving guide feed rollers 8 insures that the passage of the sheets through the machine is retarded by a braking effect. This braking effect insures that the edges 56 of the sheets are maintained in contact with the fastly rotating grinding wheel grooves 52 a sufficient time to receive the desired edging and polishing.

In their passage through the machine it should be noted that the glass sheets 55 may be subjected to contact with grinding wheel grooves 52 of diminishing widths, and it is also possible in this invention to provide successive grinding wheels of materials of varying fineness. When it happens that a sheet of glass is inserted into the machine which is not rectilinear but which has a configuration defined by parallel extending upper and lower edges of sinuous contour, the machine is adapted to receive such sheets and to uniformly process the edges thereof since the balancing effect lent to the grinding wheels 7 insure that the grinding wheel grooves 52 are continuously urged into contact with the sheet edges.

It is possible with the device of this machine to accommodate sheets which are not uniformly the same transverse width throughout their longitudinal length to receive such sheets it is only necessary to substitute for either the upper or the lower pillow block 26 any well-known mounting unit which is retractable in a vertical direction toward the frame unit on which it is mounted.

To minimize the heat of friction and to otherwise abet the edging or polishing, a fluid circulating head 70 is supplied as shown in Fig. 3 from which pipes 71 lead the fluid to be applied at suitable points on the peripheries of the upper grinding wheels. Similar means, not shown, are also provided for the lower grinding wheels.

It is also possible within the scope of this machine to substitute for the jacks 5 a system of fluid actuated elevating devices or any other well-known elevation means, and it is also possible to provide an upper frame unit which can be lowered from a beam and rigidly positioned at any desired position above the lower frame unit.

It is obvious that the scope of this invention is not limited to the form of disclosure specifically shown in the drawings and that it contemplates any means designed to urge sheets of glass, plastic or the like forward along a predetermined path

into contact with guide feed rollers and with edging or polishing means which are retractable in a direction perpendicular to the path of travel of such sheets.

What is claimed is:

1. A machine for grinding the edges of a sheet of glass comprising, a frame, upper and lower, vertically spaced apart, horizontally extending rows of shafts extending transversely of the longitudinal axis of said frame and being spaced apart along said axis and rotatably mounted on said frame, a grinding feed roller for each shaft and having peripheral groove means therein, said rollers being of substantially uniform diameter, grinding wheels having peripheral groove means therein and grinding wheel mounting means on said frame and adapted to normally position said grinding wheels so that an upper grinding wheel is vertically spaced above a lower feed roller and so that a lower grinding wheel is vertically spaced below an upper feed roller, said mounting means including rigid shaft portions for each wheel extending transversely of the longitudinal axis of said frame, a connecting means between each shaft portion and each wheel adapted to move universally with relation to the direction of the axis of said shaft portion, and bracket means adapted to support said connection means and said wheel and pivotally mounted on said frame and adapted to move yieldably in a vertical plane, means for driving said upper shafts and shaft portions to rotate respectively said upper rollers and wheels in one direction, and separate means for driving said lower shafts and shaft portions to rotate respectively said lower rollers and wheels in the opposite direction, said sheet being passed between said upper and lower wheel and rollers, with upper and lower edges respectively in said upper and lower peripheral groove means so that the rotational contact of said rollers and wheels moves said sheet longitudinally through said machine as said wheels grind said edges.

2. A machine for grinding the edges of a sheet of glass comprising, a frame, upper and lower, vertically spaced apart, horizontally extending rows of shafts extending transversely of the longitudinal axis of said frame and being spaced apart along said axis and rotatably mounted on said frame, a grinding feed roller for each shaft and having peripheral groove means therein, said rollers being of substantially uniform diameter, grinding wheels having peripheral groove means therein and grinding wheel mounting means on said frame and adapted to normally position said grinding wheels so that an upper grinding wheel is vertically spaced above a lower feed roller and so that a lower grinding wheel is vertically spaced below an upper feed roller, said mounting means including rigid shaft portions for each wheel extending transversely of the longitudinal axis of said frame, a connecting means between each shaft portion and each wheel adapted to move universally with relation to the direction of the axis of said shaft portion, and bracket means adapted to support said connection means and said wheel and pivotally mounted on said frame and adapted to move yieldably in a vertical plane, means for driving said upper shafts and shaft portions to rotate respectively said upper rollers and wheels in one direction, and separate means for driving said lower shafts and shaft portions to rotate respectively said lower rollers and wheels in the opposite direction, said sheet being passed between said upper and lower wheel and rollers, with upper and lower edges respectively in said upper and lower peripheral groove means so that the rotational contact of said rollers and wheels moves said sheet longitudinally through said machine as said wheels grind said edges, said upper and lower driving means being adapted, respectively, to drive said upper and lower rollers at a slower speed than said grinding wheels.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,731,987	Schwabe	Oct. 15, 1929
1,958,526	Weber	May 15, 1934
1,980,932	Schottland	Nov. 13, 1934
2,108,193	Brackett	Feb. 15, 1938
2,175,296	Kirkman	Oct. 10, 1939
2,296,934	Kirkman et al.	Sept. 29, 1942
2,299,850	Schafer et al.	Oct. 27, 1942