July 25, 1933. A. HAPPEL 1,920,076

MACHINE FOR TRUING TILE

Filed Aug. 20, 1927 5 Sheets-Sheet 1

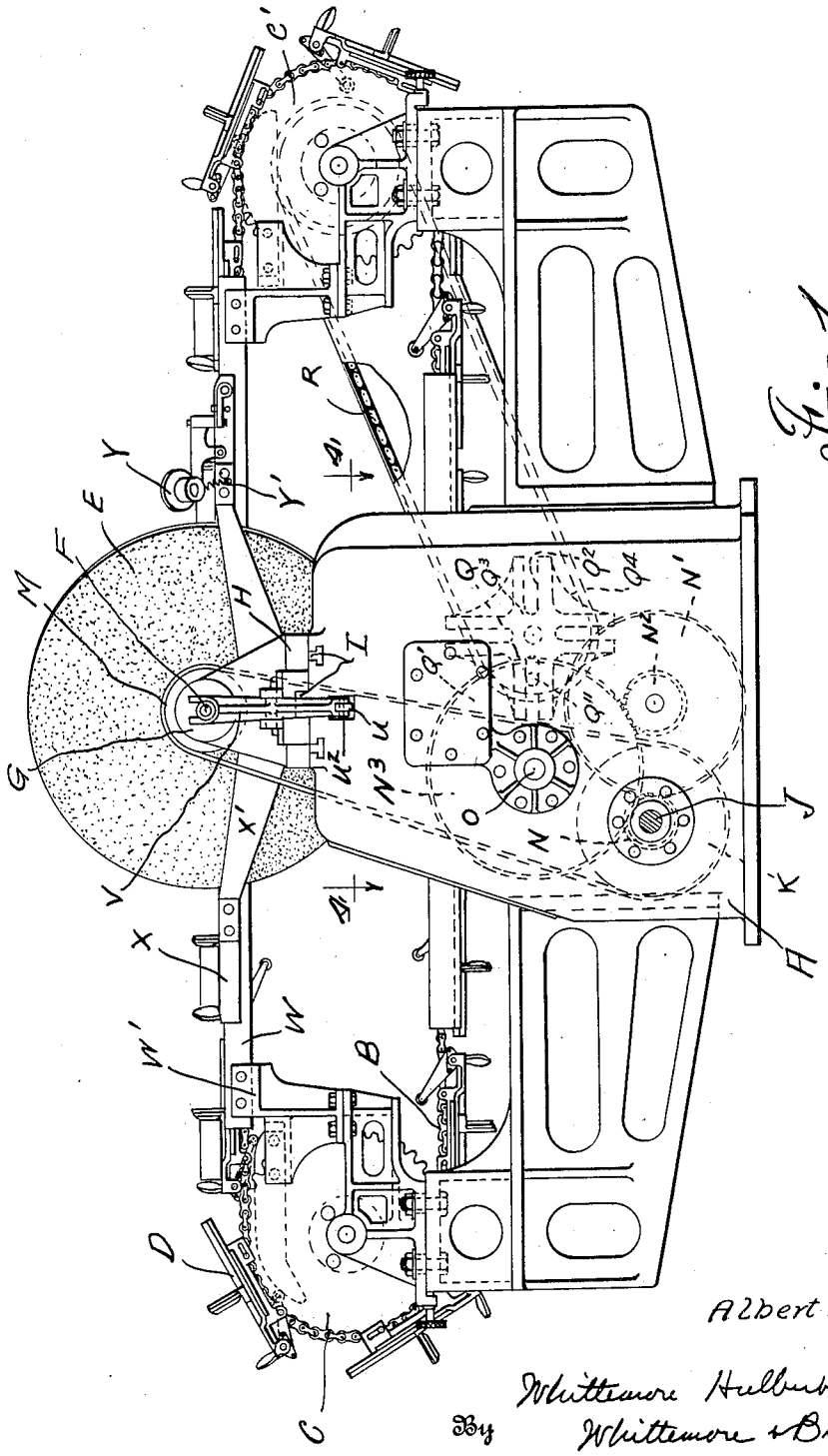


Fig. 1.

Inventor
Albert Happel

Whittemore Hulbert
By Whittemore & Belknap
Attorneys

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Filed Aug. 20, 1927 5 Sheets-Sheet 2

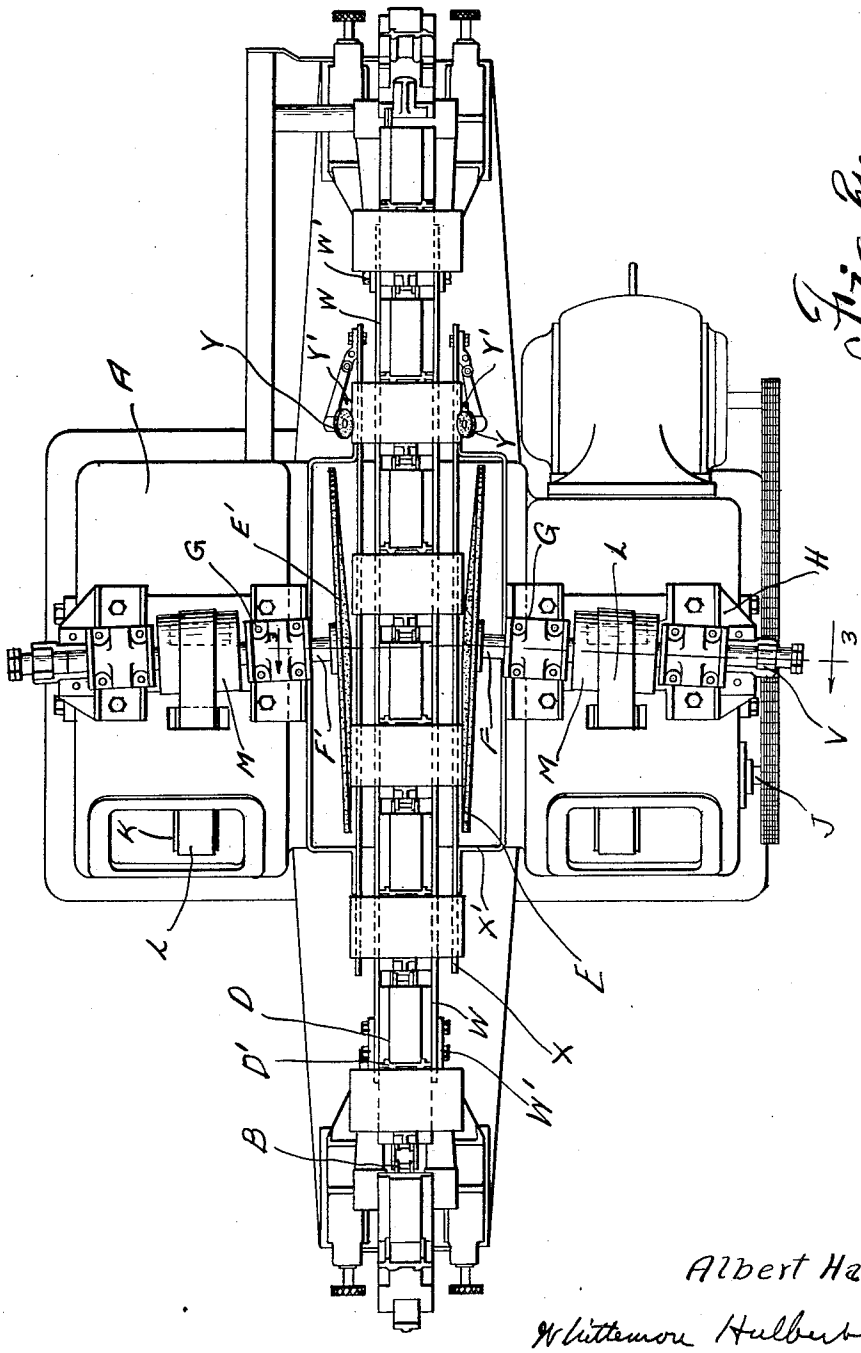


Fig. 2.

Inventor
Albert Happel
Whittemore Hulbert
Whittemore & Belknap
By
Attorneys

July 25, 1933. A. HAPPEL 1,920,076

MACHINE FOR TRUING TILE

Filed Aug. 20, 1927 5 Sheets-Sheet 3

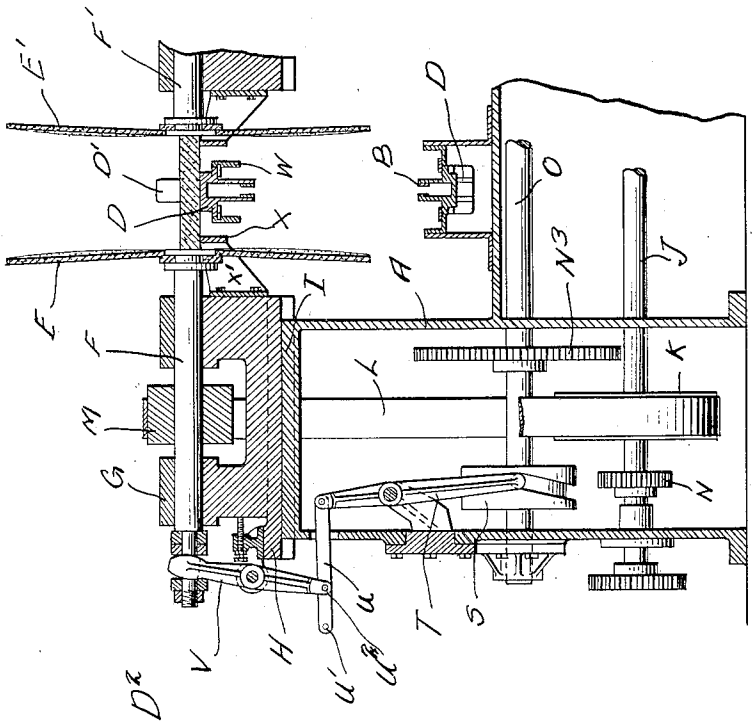


Fig. 3.

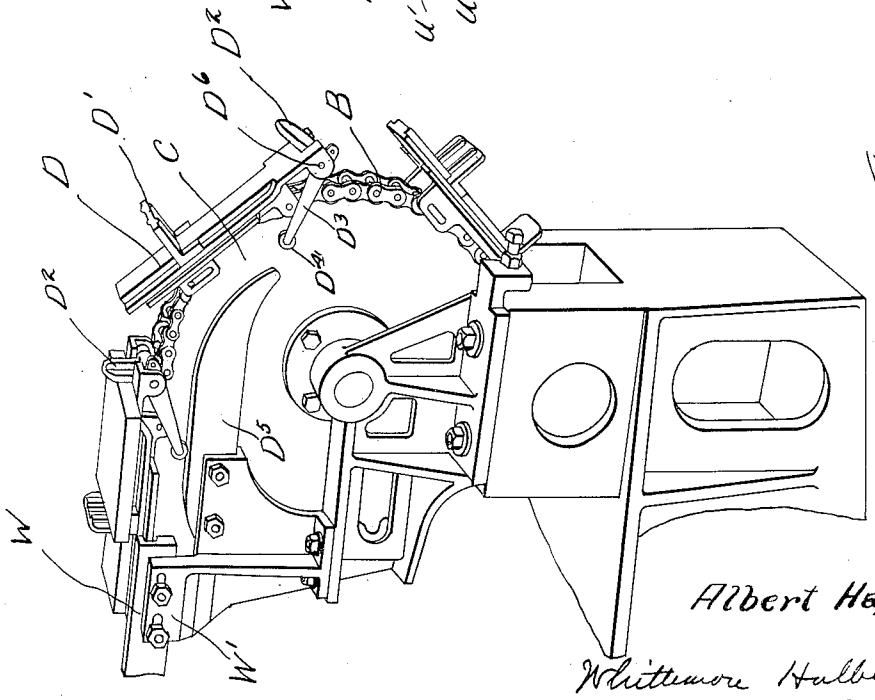


Fig. 5.

Inventor
Albert Happel

By Whittemore Hulbert & Belknap

Attorneys

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MACHINE FOR TRUING TILE

Filed Aug. 20, 1927 5 Sheets-Sheet 4

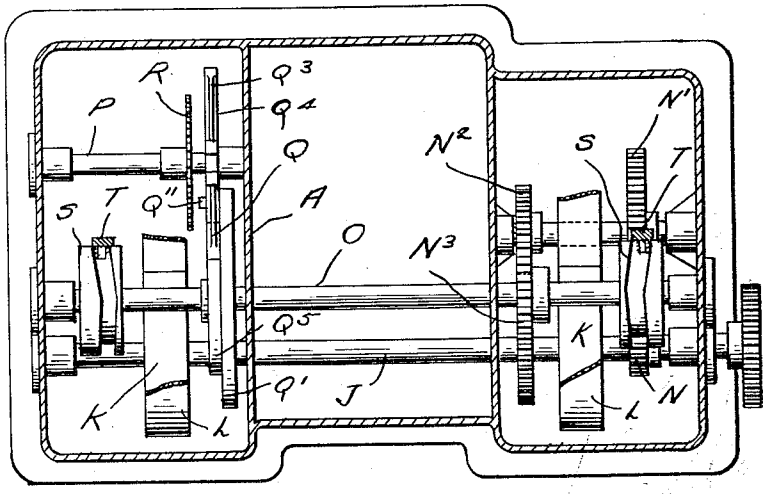


Fig. 4.

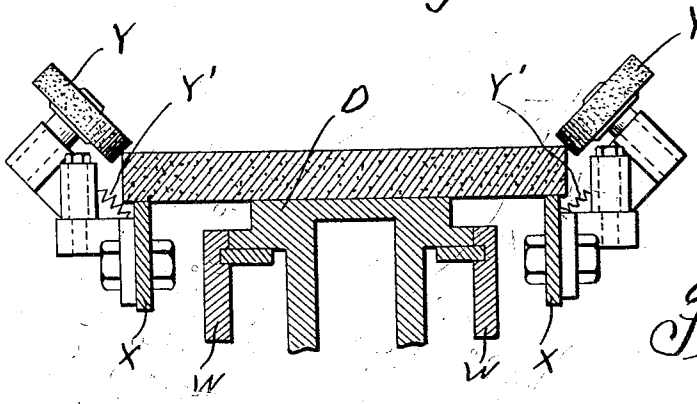


Fig. 6.

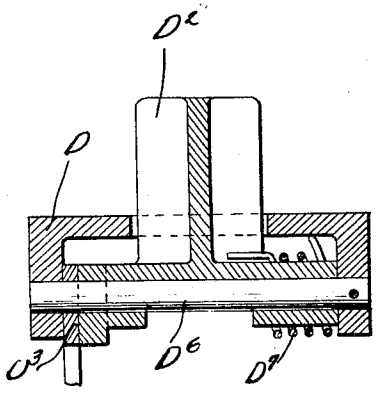


Fig. 7.

Inventor
Albert Happel

Whittemore Halbert

By Whittemore & Belknap

Attorneys

July 25, 1933. A. HAPPEL 1,920,076

MACHINE FOR TRUING TILE

Filed Aug. 20, 1927 5 Sheets-Sheet 5

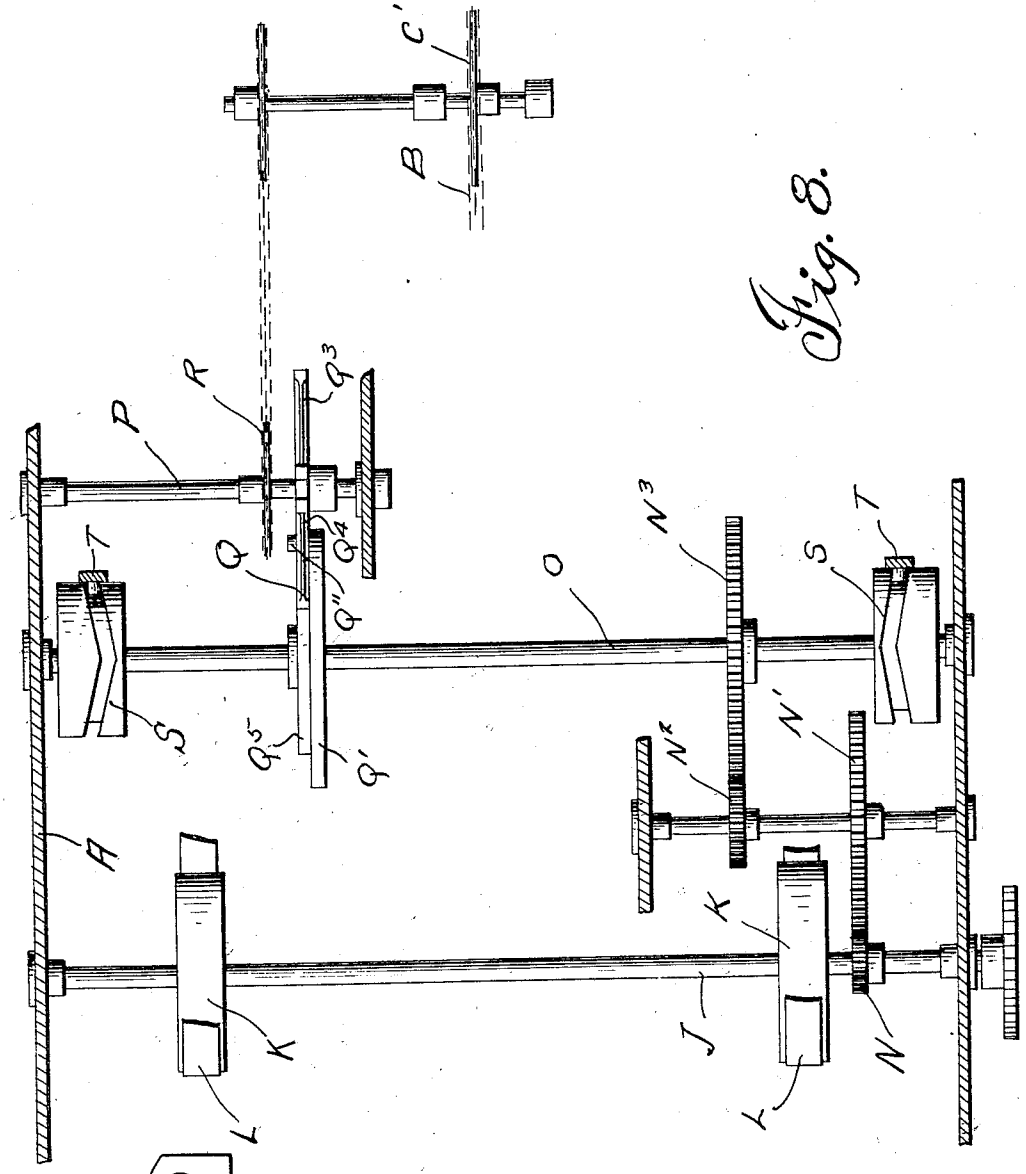


Fig. 8.

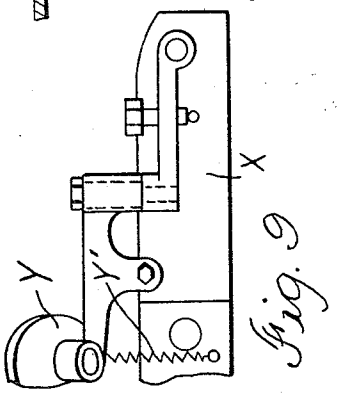
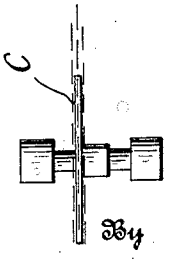


Fig. 9



Inventor
Albert Happel
Whittemore Hulbert
Whittemore & Belknap
By
Attorneys

Patented July 25, 1933 1,920,076

UNITED STATES PATENT OFFICE

ALBERT HAPPEL, OF TOLEDO, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED STATES QUARRY TILE COMPANY, OF PARKERSBURG, WEST VIRGINIA, A CORPORATION OF DELAWARE

MACHINE FOR TRUING TILE

Application filed August 20, 1927. Serial No. 214,323.

The invention relates to the manufacture of tile such as used in the construction of floors, walls, and for other purposes. One method of manufacture largely used is to force a column of clay outward from an adjustable nozzle and then sever the column into blocks of the required length by wire cutters or equivalent means. The blocks which are produced by this process are not usually exactly square or smooth on the cut sides and it is therefore necessary to refinish them to produce a high grade product.

While the invention finds particular utility in connection with machines for truing tile and while the illustrative embodiment of the invention herein shown and described is adapted for refinishing the sides of the tile, nevertheless as this description proceeds it will become immediately apparent to those skilled in this art that in special instances the invention may be used in whole or in part for finishing various other articles.

It is the object of the present invention to provide means for squaring and finishing such blocks and to this end the invention consists in the construction as hereinafter set forth.

In the drawings:

Figure 1 is a side elevation of the machine.

Figure 2 is a plan view thereof.

Figure 3 is a sectional view taken on the plane indicated by the line 3—3 of Figure 2.

Figure 4 is a sectional view taken on the plane indicated by the line 4—4 of Figure 1.

Figure 5 is a detailed perspective view showing one end of the machine.

Figure 6 is a detailed view partly in section showing the trimming mechanism.

Figure 7 is a detailed view partly in section showing a portion of the automatic clamping mechanism, and

Figure 8 is a diagrammatic view of the general arrangement of the driving mechanism.

Figure 9 is a detail view showing the auxiliary grinders and the various adjustments thereof.

My improved machine comprises essentially means for intermittently advancing a series of blocks to be refinished and means operating at one point in the travel thereof for grinding the opposite ends of the blocks to true and finish the same. The blocks are operated on before going to the kiln and consequently are merely dried clay having very little tensile strength. It is therefore necessary to avoid chipping or breaking the surface and particularly to guard against injury to the face side of the tile. This I accomplish by subjecting opposite ends of the blocks to the action of face grinders which are located in parallel planes perpendicular to the sides and top and bottom faces of the block and are travelling in a direction toward the finished face. The grinders are also movable laterally toward and from each block during the interval in which it is held in grinding position so as to perform the work and then provide clearance for the movement away from said block and the positioning of another block to be ground.

In detail A is the frame of the machine on which is mounted an endless chain carrier B travelling over sprockets C, C′ at opposite ends of the frame. This carrier has mounted thereon a series of clamps D for receiving the blocks to be ground and for holding the same rigidly during the grinding operation. E, E′ are grinder disc wheels which are mounted upon arbors F, F′ and are arranged on opposite sides of the carrier B.

In order that the grinders E, E′, while operating upon the work will be moving toward the finished face of the block, said blocks are located for such operation on one side of the axis of the arbors F, F′. Inasmuch however, as the carrier travels past the entire face of the grinder and is as will be hereinafter explained intermittently operated step by step, it is necessary to avoid interference between the opposite sides of the grinders and the finished blocks. This I have accomplished by arranging the axes of the arbors at a slight angle to a line perpendicular to the travel of the carrier and by slightly coning the grinding faces of the grinders so that the portions operating upon the blocks will be substantially parallel to

each other. This will arrange the portions of the grinders on opposite sides of the axis at divergent angles and will provide abundant clearance for the movement between the same of the finished blocks.

More in detail the arbors F, F′ are mounted in bearings G upon blocks H which latter are adjustable upon ways I perpendicular to the plane of the carrier B. The bearings G are set at the desired angle to the ways I and the arbors F, F′ are longitudinally adjustable in said bearings. This permits of movement of the grinders laterally toward and from the carrier as will be hereinafter set forth.

The power for operating the machine may be furnished from any suitable source such as an electric motor which drives the shaft J having mounted thereon the pulleys K connected by belts L with pulleys M on the arbors F, F′. There is also a step-down gear train driven from the shaft J and comprising the gears N, N′, N^2, N^3 through which power is transmitted at a greatly reduced speed to the shaft O. The shaft O transmits motion to a parallel shaft P through the medium of a Geneva movement Q so that the shaft P is intermittently actuated. This shaft is connected through the sprocket and chain R to the shaft of one of the sprocket wheels C′ thereby intermittently rotating said sprocket wheel and advancing the carrier. Referring more in detail to the mechanism for accomplishing the intermittent operation, it will be noted that the gear Q′ is provided adjacent the periphery thereof with a lateral projection Q″ adapted to engage in the angularly spaced grooves Q^2 formed in a star wheel Q^3 which as shown in Figure 1 is connected to the carrier B through the median of a chain R. The projection Q″ is guided into the grooves Q^2 by means of cooperating cam surfaces Q^4 and Q^5 formed on the star wheel and gear Q′ respectively.

The mechanism for intermittently moving the grinder wheels into engagement with the work comprises cams S preferably mounted upon the shaft O adjacent the opposite ends of the frame. Each of these cams engages a lever T which is connected by a link U with another lever V fulcrumed upon the blocks H which support the bearings G for the arbors F and F′. The links U adjustably engage the lever V so as to permit of adjusting the blocks H upon the ways I to set the machine for various widths of tile. This adjustment, as shown, is provided with a series of apertures U′ in the link U for engaging the coupling pin U^2 with the lever V.

The clamps D which hold the tile while operated upon by the grinders are preferably automatically tightened and released during advancement of the carrier. This, as shown, is accomplished by providing each clamp with a stationary jaw D′ and a movable jaw D^2, the latter being carried by a bell crank lever D^3 having a roller D^4 engaging a cam track D^5. As shown the opposite end of the bell crank is journaled upon a shaft D^6 carried by the clamp D. A suitable coil spring D^7 is coiled about the shaft D^6 and has one end engageable with the bell crank to normally urge the same upwardly toward the clamp. With such an arrangement the jaw D^2 of the clamp will be normally held in clamped position. The track D^5 is so fashioned as to release the jaws at a point on the carrier where the blocks to be ground are placed in position. The track is then cammed to tighten the jaw D^2 holding the block while it is being ground and after passing out of engagement with the grinders the jaw D^2 is again released to permit of removing the finished block.

During the travel of the carrier the clamps D are supported on guides or tracks W mounted on brackets W′ at opposite ends of the frame. The tiles are, however, supported by outer tracks or guides X which latter are mounted on brackets X′ attached to the blocks H. This permits of supporting the tile adjacent to the edges to be ground as the tracks X being attached to the blocks H will be adjusted with the latter whenever the machine is set for operating upon any particular size of tile. It also permits of adjusting the machine to each size of tile by merely shifting the blocks H and correspondingly adjusting the connection between the link U and lever V.

With the construction as described the complete operation is as follows: to set the machine for operation the blocks H, links U and levers V are first adjusted so that the parallel portions of the grinders E and E′ when at the innermost end of their travel are spaced from each other to correspond to the width of the finished block. This, as previously described will also adjust the supporting tracks X to position adjacent the edges of the tile.

The machine, being properly adjusted, it is set in operation, the shaft J being driven continuously and communicating continuous motion at a greatly reduced speed to the shaft O. Each revolution of the latter shaft will, through the star wheel Q impart a stepped movement to the shaft P with an interval of rest between succeeding steps. The chain R and sprocket C′ impart a similar timed movement to the carrier chain B. At the same time the continuous rotation of the cams S will impart a reciprocatory movement to the arbors F and F′ in the bearings G through the medium of the levers T links U and the levers V. These two movements are so timed that during the interval of rest when the tile in one of the

holders is arranged between the parallel portions of the grinder wheel these grinder wheels will be moved toward each other simultaneously contacting with the opposite edges of the tile and grinding to finished size. This grinding, as before stated, is by movement of the grinding faces toward the upper or finished face of the tile thereby avoiding any danger of splitting off the corners.

After each grinding operation and during the interval when the grinders are moving away from each other the carrier chain is advanced moving the tile just ground to the opposite side of the axis of the grinder and bringing another tile into position to be ground. The grinder wheels then approach each other again but do not come in contact with the previously finished tile due to the clearance provided by the angular arrangement of the arbors and the conical shape of the grinder wheels. Thus it is not necessary to advance the carrier so as to completely clear the grinder wheels after each operation thereby making a more compact and slower moving mechanism.

It is desirable to remove the sharp corner which is produced by the intersection of the ground edge with the upper face of the tile. This is accomplished by a pair of grinder wheels Y positioned upon diametrically opposite sides of the machine and mounted upon the tracks X, in a position to engage the corners of the tile during advancement of the carrier. As shown, the grinders Y are yieldably forced toward the tile by means of the springs Y'. The grinder wheels Y are also capable of vertical adjustment as well as the transverse adjustment to accommodate tiles of various thickness.

It will be understood that the clamping faces of the jaws D', D^2 which engage the parallel sides of the tile are perpendicular to the plane of advancement of the carrier so that the grinder wheels in operating upon the ends of the tile will square the same to said sides. It will be also apparent that the grinder wheels being conical will produce a slight curve in the ground surface but on account of the large diameter of the wheel this curve very closely approximates a straight line.

What I claim as my invention is:

1. In a machine for truing tile, the combination with means for intermittently advancing a series of tile, of a pair of grinder wheels disposed upon opposite sides of the advancing means and engageable with opposite edges of the tile for finishing the same, tracks for supporting the tile adjacent the edges to be ground, trimmers positioned upon said tracks for trimming the corners of the tile after the grinding operation, and common means for adjusting said grinder wheels, tracks and trimmers as a unit to accommodate tiles of various widths.

2. In a machine for truing tile, the combination with a frame and a carrier supported by the frame for intermittently advancing a series of tile, of a grinder wheel positioned to one side of the carrier, means for moving the grinder wheel into operative relation to one tile of the series to square the end thereof, said means also operable upon completion of the grinding operation to move the grinder wheel away from the carrier, means operable during the interval the grinder is moving away from the carrier to advance the latter a predetermined distance to bring the next adjacent tile into operative position, and means including grinders mounted upon said frame for removing the sharp corner produced by the intersection of the ground edge with the upper edge of the tile.

3. In a machine for truing tile, the combination with means for intermittently advancing a series of tile and means for clamping the tile to the carrier, of a grinder wheel, means operable during the intervals of rest of the series for moving said grinder wheel into operative relation to one tile of the series to square the end thereof, means operable upon completion of the grinding operation to remove the sharp corner produced by the intersection of the ground edge with the upper edge of the tile and means for automatically releasing the clamping means upon completion of the operation of said last mentioned means.

ALBERT HAPPEL.