2 Sheets—Sheet 1.

T. J. CORNELL.

MACHINE FOR DRESSING GRANITE.

No. 2,329. Patented Nov. 3, 1841.

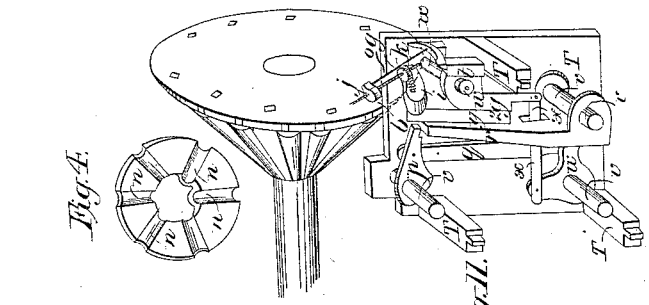

Fig. 4.

Fig. 11.

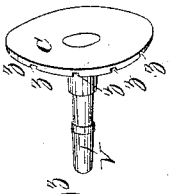

Fig. 2.

Fig. 7.

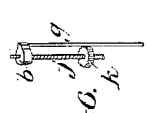

Fig. 6.

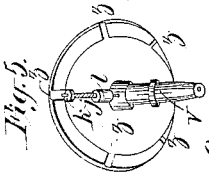

Fig. 5.

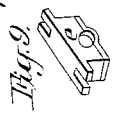

Fig. 9.

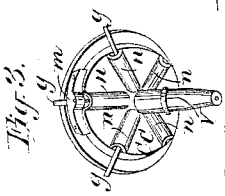

Fig. 3.

Fig. 10.

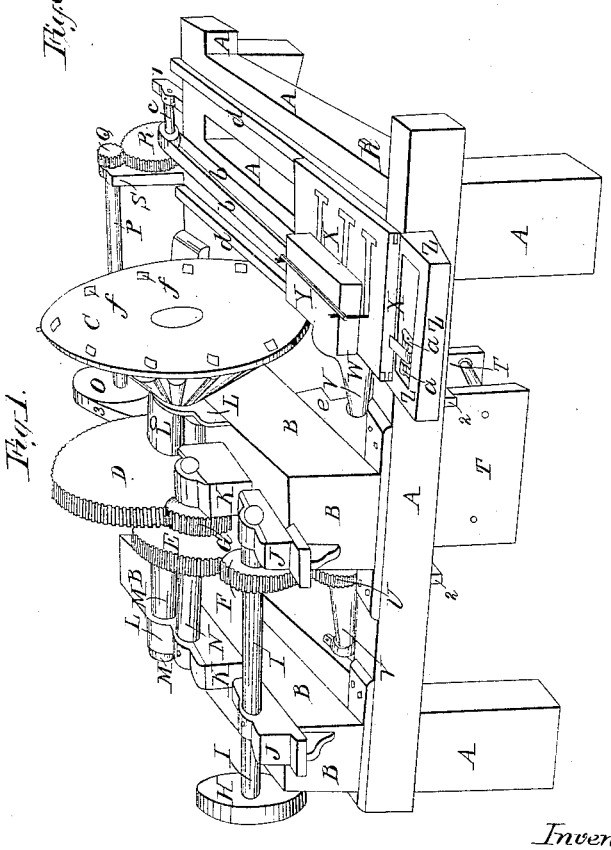

Fig. 1.

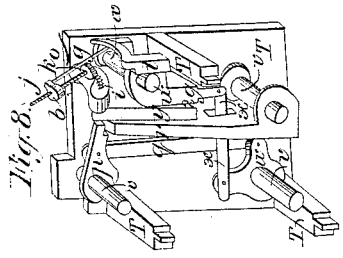

Fig. 8.

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Fig. 13.

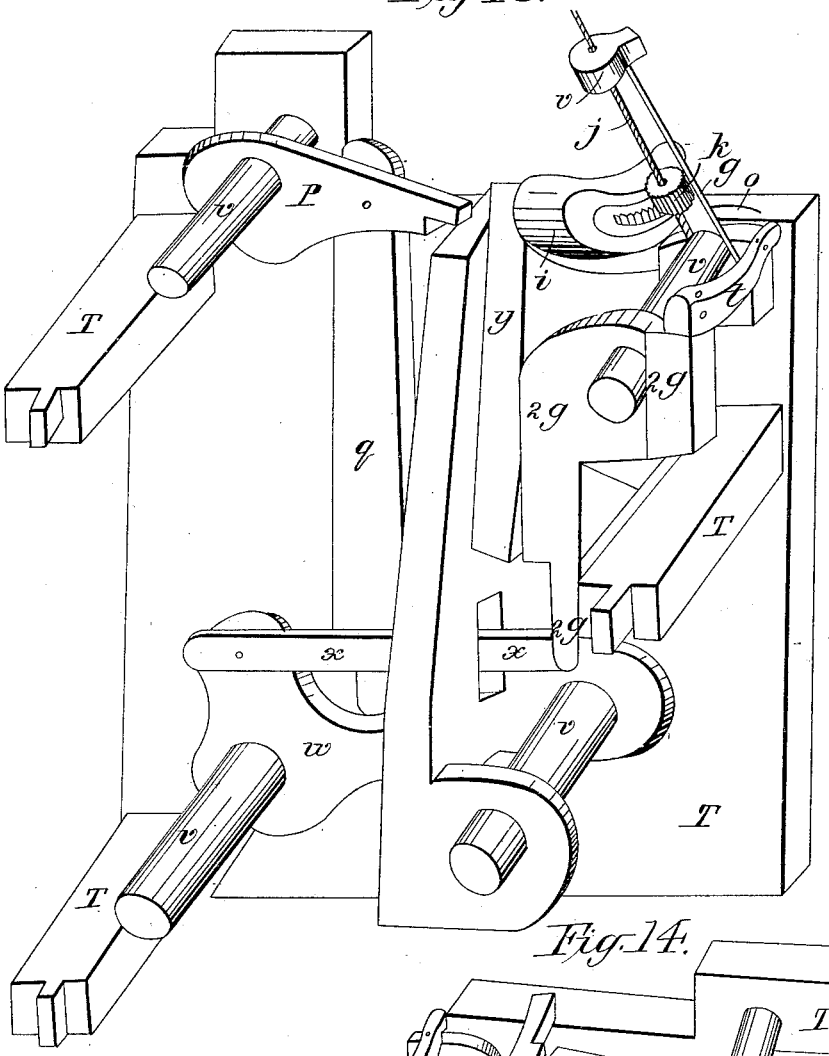


Fig. 14.

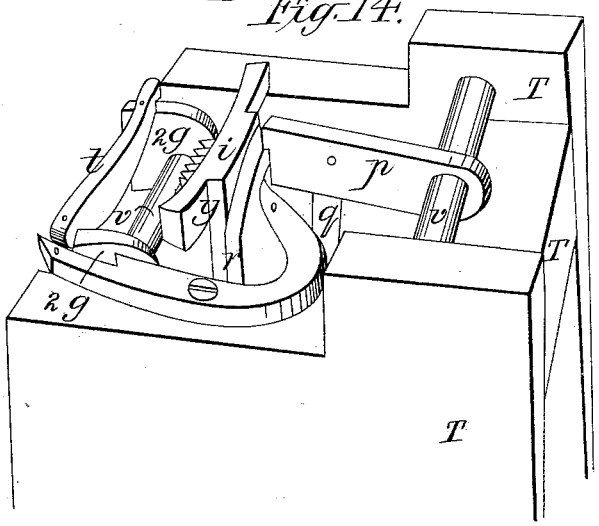
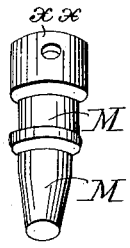


Fig. 12.



Witnesses:

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UNITED STATES PATENT OFFICE.

THOMAS J. CORNELL, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR CUTTING AND DRESSING STONE.

Specification of Letters Patent No. 2,329, dated November 3, 1841.

To all whom it may concern:

Be it known that I, THOS. J. CORNELL, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Machine for Cutting Stone, called a Stone-Cutting Machine; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

In the first place I make a frame of wood or other strong material to contain the machine and sustain its operation. This frame may be seen in Fig. 1 marked (A) in several places. I then place across the frame two strong bearers or headblocks, one of which, is placed across one end of the frame, and the other across the middle of the frame, and may be seen in Fig. 1 marked (B) in several places. Across these headblocks (B) and parallel with the length of the frame (A), I place a shaft or axle which is marked (M) in Fig. 1. On this shaft are made two bearings or gudgeons, which are made to revolve in two boxes which are made fast to the headblocks (B). At one end of this shaft (M) is attached a wheel marked (C). On the shaft (M) I make fast a strong gear or cogged wheel marked (D), the cogs of which lock into the cogs upon the pinion (G), which is made fast to the shaft (N); upon this shaft (N), is made fast also a cogged wheel (E), the cogs of which lock into the pinion (F), which is made fast to the shaft (I). Upon one end of the shaft (I) is a pulley (H), over which, a band or belt passes which gives motion to the machine. The ends of the shafts (I, N, M,) are each, firmly secured by appropriate boxes, which are seen in Fig. 1 marked (L, K, J). These boxes are all made fast to the upper side of the headblocks (B) so, that, motion being communicated to the pulley (H) turns the shaft (I) and pinion (F); the cogs on the pinion (F) lock into the cogs of, and turns the wheel (E), which is made fast to the shaft (N). The pinion (G), is also made fast to the shaft (N) by the side of the wheel (E); the cogs on the pinion (G) lock into the cogs of, and turns the wheel (D). The wheel (D), being made fast to the shaft (M), upon one end of which, is also attached the wheel (C), causes the shaft (M) and the wheel (C) to revolve.

The wheel (C) is the cutting wheel and performs the operation of cutting the stone. In the edge of the wheel (C) are made several long mortises, extending from the edge, nearly to the center of the wheel and are marked (Z) see Fig. 2. In these mortises, the tools which cut the stone are placed. The end of one of these tools is distinctly seen in Fig. 1, projecting out from the upper edge of the wheel (C), marked (*g*) in Fig. 3 the tools are seen in their places in the wheel, in Fig. 6 one of the tools is seen entire marked (*g*). These tools (*g*) are made of steel or chilled cast iron, and are about three eighths of an inch in width and about one fourth of an inch in thickness, and of equal dimension throughout their length. These tools (*g*) are placed in the mortises (Z) in the wheel (C), and by the mortises (Z) are held so tight as not to slip or fall out of the wheel (C) without the application of some power or force for that purpose. When the tools (*g*) are in the mortises (Z), the wheel (C), has the appearance of a circular saw, the tools (*g*) projecting out from the edge of the wheel (C), from the teeth of the saw, and the operation of the wheel (C), in cutting the stone, is like that of sawing it with the common circular saw, with this difference; the tools or teeth (*g*), of the wheel (C), are projected or extended out the wheel (C), as fast as they are worn off in sawing or cutting the stone, and instead of a quick rotary motion like the circular saw, the wheel (C) has a slow geared motion like that of the engine lathe for turning iron. These tools (*g*) are projected or extended out of the wheel (C), by means of a screw, nut, and pinion, all of which are distinctly seen in Fig. 6, together with their connection with the tool (*g*) which cuts the stone.

In Fig. 6, (*j*) is the screw, (*b*) is the nut, (*k*) is the pinion, which is made fast to the screw (*j*) and turns it. Beyond the pinion (*k*) on one end, and beyond the nut (*b*) at the other end are shown the pivots of the screw (*j*) upon which it turns. Now it is obvious, that if the pivots at each end of the screw (*j*) are firmly se-

cured by appropriate boxes, and if the screw (*j*) is then turned, the nut (*b*) if prevented from turning with the screw (*j*) will be brought by the thread of the screw (*j*) so as to come in contact with the pinion (*k*), and that the tool (*g*), one end of which, is seen, in Fig. 6, resting against the underside of the nut (*b*), would be brought, nearly its whole length out beyond the pinion (*k*). This is the manner in which the tool (*g*) is extended or projected out of the wheel (C) as fast as it is worn off in cutting the stone.

In Fig. 5, and Fig. 3, the manner in which the screw (*j*), nut (*b*), and pinion (*k*) together with the tool (*g*) are connected with the wheel (C) is there represented. It will be seen by referring to Fig. 5, that the screw (*j*), nut (*b*), and pinion (*k*), are placed in a position directly over the mortise (*z*) which is to receive the tool (*g*). The mortises (*z*) extend from the edge of the wheel (C) to the shaft (M); a hole is bored into the shaft (M) near its junction with the wheel (C), see (*x x*) Fig. 12 into this hole, one of the pivots of the screw (*j*) is inserted, which supplies the pivot with a box in which the pivot can turn or revolve. The pivot at the other end of the screw (*j*) is secured by the box (*m*) see Fig. 7. In the middle of the box (*m*) and near one edge, is seen the hole into which the pivot is inserted. At each end of the box (*m*) are seen the screws which make it fast to the flange or edge of the wheel (C). In Fig. 3 this box (*m*) may be seen in its place extending across the tool (*g*) which is there seen occupying its proper place, the mortise (*z*). The screw (*j*) being thus hung and sustained by the pivot at each end, is made to revolve by turning the pinion (*k*); by the revolutions of the screw (*j*) the nut (*b*) is made to pass from one end of the screw (*j*) to the other. The tool (*g*), by lying in the mortise, directly under the screw (*j*), is brought out by the nut (*b*) in its passage, from near the center, toward the edge of the wheel (C). On one side of the nut (*b*) is a small projection or shank, which extends into the mortise (*z*) and one end of the tool (*g*) rests upon this shank or projection of the nut (*b*); this shank or projection of the nut (*b*) by extending into the mortise (*z*) prevents the nut (*b*) from revolving with the screw (*j*) and in its passage, from one end to the other of the thread of the screw (*j*), comes in direct contact with the end of the tool (*g*), and not only forces it out of the wheel (C), but also, prevents it from being driven back again into the wheel (C), by the pressure it receives from being brought, by the wheel (C), in forcible contact with the stone to be cut.

Fig. 4 represents an outside flange or covering to the wheel (C), which is bolted to the back side of the wheel (C) and is intended to cover and protect the screws (*j*), nuts (*b*), and tools (*g*), from external injury; the parts marked (*n*) are grooves, which are sufficiently large to admit the nuts (*b*) to pass under them without coming in contact. Fig. 3 shows this flange or covering (Fig. 4) in its place and attached to the wheel (C), the parts marked (*n*) covering the nuts (*b*), the screw (*j*), and the tools (*g*), and leaving the pinion (*k*), without being covered.

Having thus described the wheel (C), together with the tools (*g*), their attachment to the wheel (C), and manner of adjustment, I shall next describe the regulator, see Figs. 8, 11, and 13, which by its operation upon the pinions (*k*), keeps the tools (*g*) adjusted in such a manner that they shall extend out from the edge of the wheel (C), the same length, however much or little they may wear off in cutting the stone.

Figs. 8, 11, and 13, are views of the regulator, one side of its frame (T) being suppressed or removed, to bring its inside movement to view. This regulator turns the pinions (*k*) which causes the tools (*g*) to extend out of the wheel (C), as fast as the ends of them wear off in cutting the stone. The regulator is provided with a rack or segment "see Fig. 10" marked (*i*). The teeth or cogs of the rack (*i*) lock into those of the pinions (*k*); the pinions (*k*) together with the tools (*g*), the screws (*j*), and nuts (*b*); being attached to the wheel (C) as before described, are carried around with every revolution of the wheel (C). The regulator Figs. 8, 11, 13 I make fast upon the under side of the machine and directly under the lower edge of the wheel (C) (see Fig. 11) in which the position of the regulator with regard to the wheel (C) is distinctly seen. In the regulator (see Figs. 8, 13, and 14) the rack (*i*), Fig. 10, is made fast to the upper end of the upright bar (*y*), the upright bar (*r*) is hung upon an arbor or shaft marked (*v*) near its lower extremity, in such a manner as to allow the top of the bar to vibrate to and fro; the upright bar (*y*) is made fast to the upright bar (*r*) and the rack (*i*) is made fast to the upright bar (*y*) so that the rack (*i*) vibrates to and fro with the upper ends of the upright bars (*r y*). The object of this vibration of the rack (*i*) and the upright bars (*r y*) is to bring the rack (*i*) in contact with the pinions (*k*) and to turn them, by means of the cogs on the rack (*i*) locking into those on the pinions (*k*), and also to allow the rack (*i*) to fall back out of the way, and let the pinions (*k*) pass without turning them, in case the tools (*g*) are already extended out from the edge of the wheel (C) the required length. To determine when the tools (*g*) are too short, or do not project

out, far enough from the edge of the wheel (C) a gage (*t*) see Figs 8, 11, 13, and 14 is placed in the regulator for that purpose. This gage (*t*) is made by bending a bar of steel, to the circle described by the revolution of the tools (*g*) in the wheel (C) and making it fast across the pronged or forked end of the bent lever (2*g*); the pronged or forked end of this bent lever (2*g*) is hung upon an arbor (*v*) which permits it to turn or move, so that the gage (*t*) may be pressed down a little when the tools (*g*) are brought to bear upon it by the rotation of the wheel (C). The tools (*g*) will, when brought in contact with the regulator, press down upon the gage (*t*) which will cause it to turn upon the arbor (*v*) this motion of the gage (*t*) will cause the shank or lower end of the forked bent lever (2*g*), to which is attached one end of the horizontal bar (*x*) to extend out in the direction of the horizontal bar (*x*), the other end of the horizontal bar (*x*) is attatched to the upright or vertical part of the quadrant or bent lever (*w*). This quadrant or bent lever (*w*) is hung upon an arbor (*v*) which allows it to turn; to the horizontal part or arm of this quadrant or bent lever (*w*), is attached the lower end of the upright bar (*q*), the other end of the upright bar (*q*) is made fast to the latch (*p*), one end of the latch (*p*) is hung upon an arbor which permits it to move. The motion of the gage (*t*) is, by means of the lower end or shank of the bent lever (2*g*) communicated to the horizontal bar (*x*) and by the horizontal bar (*x*) to the upright part of the quadrant or bent lever (*w*) and is, by this quadrant or bent lever (*w*) communicated to the upright bar (*q*) and also to the latch (*p*).

In the operation of the machine, if the tools (*g*) are already extended out of the wheel (C), the required length, they, the tools (*g*) will, when brought in contact with the regulators by the rotation of the wheel (C), bear or press down upon the gage (*t*) this will cause the lower end or shank of the forked, bent lever (2*g*), to extend out in the direction of and move the horizontal bar (*x*) the horizontal bar (*x*) will move the quadrant or bent lever (*w*) the quadrant or bent lever (*w*) will lift the upright bar (*q*) which will lift up or raise one end of the latch (*p*) from behind the upright bars (*r y*), the bars (*r y*), and the rack (*i*) will, as soon as the latch (*p*) is raised up fall back out of the way, far enough to permit the pinions (*k*) to pass the rack (*i*), without touching or coming in contact with it, and thus the tools (*g*) will pass the regulator without being extended or lengthened out of the wheel (C) any farther. The upright bars (*r y*) are hung upon an arbor (*v*), near the lower extremity, by means of two eyes which project out upon one side of the bar (*s*), by this means they are hung eccentric, or the weight of the upright bars (*r y*) and the rack (*i*) rests upon one side of the center of their arbor (*v*) so, that, whenever the latch (*p*) is raised up, which supports the upper ends of the upright bars (*r y*), and the rack (*i*), in a vertical position, they, (the upright bars (*r y*), will, by means of their own weight or gravity, fall back out of the way and allow the pinions (*k*) to pass the regulator without coming in contact with the rack (*i*).

Each of the tools (*g*) in the wheel (C) are brought by its rotation, to press or bear down upon the gage (*b*) of the regulator, and those that are already the length required, will press down the gage (*b*) so far as to raise up the end of the latch (*p*) from behind the upright bars (*v y*); and those, of the tools (*g*), that have become worn off, and do not project out from the edge of the wheel (C) the required length will not, when brought in contact with the regulator, press down the gage (*t*) so far as to lift up or raise, the latch (*p*) from behind the upright bars (*v y*) and the pinions (*k*) will be turned by means of their teeth or cogs locking into those of the rack (*i*) and thus the tools (*g*) will be further projected or extended, out of the edge of the wheel (C).

I will now proceed to describe how, or in what manner the upright bars (*v y*), after the latch (*p*), which supports them in a vertical position, has been raised up, and the upright bars (*r y*) have fallen back, so as to permit the pinions (*k*) to pass the regulator without coming in contact with the rack (*i*) are again restored or raised up to a vertical position; this is done by means of the dog (*o*) (see Fig 14), this dog (*o*) is a crooked or bent lever, hung in the middle by a pin or pivot, and is attached to one side of the frame (T) of the regulator: One end of this dog (*o*) (see Fig. 14) projects out and hooks around upon the back side of the upright bars (*r y*), while the other end extends forward so far as to be moved by the tools (*g*) as they leave the regulator. In this manner each of the tools (*g*) on leaving the regulator comes in contact with and moves the dog (*o*) which brings up the upright bars (*r y*) to a vertical position, when the latch (*p*), by its own weight, will fall down behind them and support them in their vertical position. The pressure of the tools (*g*) upon the gage (*t*) lifts or raises up the end of the latch (*p*) and its own weight or gravity will cause it to fall down behind the upright bars (*r y*) whenever the pressure is removed from the gages. Upon the underside of the head blocks (B) is hinged another cutting wheel precisely like the wheel (C) excepting, it is of a smaller size, this wheel is made fast to

one end of the shafts (V), see Fig. 1, which revolves in boxes (*e*), Fig. 9, made fast to the underside of the head-blocks (B). Upon the shaft (V) is made fast a cogged wheel (W) the cogs of which lock or gear into those of the wheel (D) and from which it receives a rotary motion. This under cutting wheel is provided with tools (*g*) and a regulator to adjust them, in the same manner as the wheel (C). The object of this under cutting wheel is to cut upon the under side of the stone, and thereby prevent the lower edge or corner of the stone from being broken off or injured by the wheel (C). This under cutting wheel is not seen in Fig. 1, but it is represented separately in Fig. 2, and is also marked (C) as it is made precisely like the one seen in Fig. 1, marked (C).

I will proceed now to describe the carriage Fig. 1 (X) upon which, the stone to be cut is made fast and brought in contact with the tools (*g*) in the wheels (C). The carriage (X) is made to slide upon two rails (*a*) which extend across the width of the frame (A), and is moved by a belt or chain (*b*) which passes around a pulley, made fast to the shafts (*c*) upon one side of the frame (A), the other end of the band or chain (*b*) passes around the pulley (2) which is attached to the frame (Z) upon the other side of the frame (A) each end of band (*b*) is attached to the carriage (X) so that the carriage (X) can, by means of the band (*b*), be moved forward or back upon the rails (*a*). Upon one end of the shaft (*c*) is made fast a cogged wheel (R), this cogged wheel (R) is moved or turned by the pinion (Q) which is made fast upon the end of the shaft (P); the shafts (*c*) and (P) are each sustained by appropriate boxes or stands (1, S,). Upon one end of the shaft (P) is made fast the pulley (O), around which a band or belt passes and, also around the shaft (M) and thus, from the shaft (M) the carriage (X) receives a slow progressive motion upon the rails (*a*), from one side to the other of the frame (A). The stone to be cut (Y), is made fast to the carriage (X), and by its motion, is brought in contact with the tools (*g*) in the wheels (C). So much of the stone (Y) as is required to be cut off or removed, is extended over the side of the carriage (X), next to the cutting wheels (C).

Through the disk of the wheel (C) are made several holes or mortises (*f*) parallel with its axle or shaft (M), into which tools are made fast for the purpose of rubbing or smoothing the surface of the stone (Y). These tools (*f*) may be made in such form as shall be deemed most suitable for the purpose.

The whole machine being thus arranged, and power being communicated to the pulley (H) will cause the cutting wheels (C) to revolve; the carriage (H) will bring the stone (Y) in contact with the tools (*g*) in the wheel (C), each of the tools (*g*) will crush or cut away a portion of the stone which is to be cut off, and the smoothing tools (*f*) will rub or make smooth the surface of the stone. The tools (*g*) are, by means of the regulators extended out of the wheels (C) as fast as they are worn off in cutting the stone, and this operation is continued until the whole length or bigness of the stone (Y) is by the carriage (X) carried past the cutting wheel (C) when a true and smooth surface will be obtained upon the stone (Y).

What I claim as my invention, and desire to secure by Letters Patent is—

The mode of adjusting the tools (*g*) to one and the same length, from the edge of the wheel (C) however much or little they may wear off in cutting the stone, by means of the operation of the regulators acting upon the pinions (*k*) to turn the screws (*j*) and to move the nuts (*b*) as is fully described and set forth in this specification.

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