A. Brown,

Boring Machine,

No. 12,503, Patented Mar. 13, 1855.

Fig. 4.

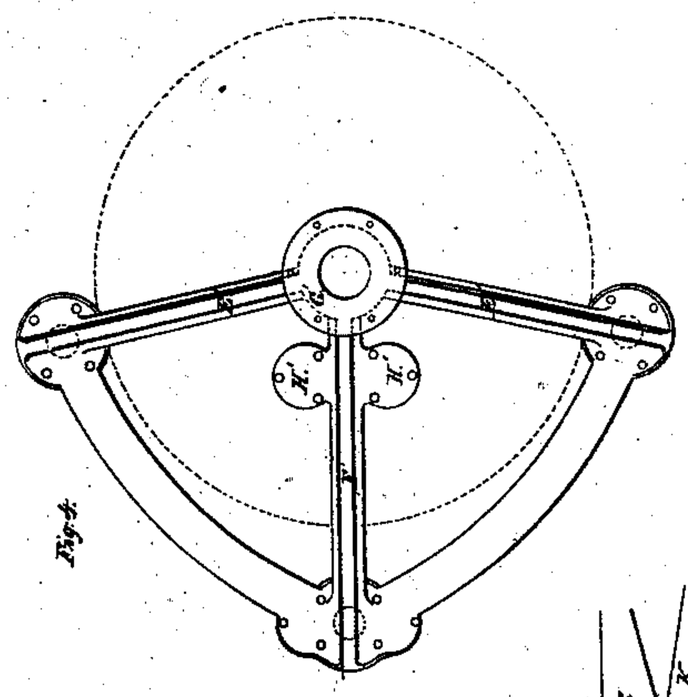


Fig. 5.

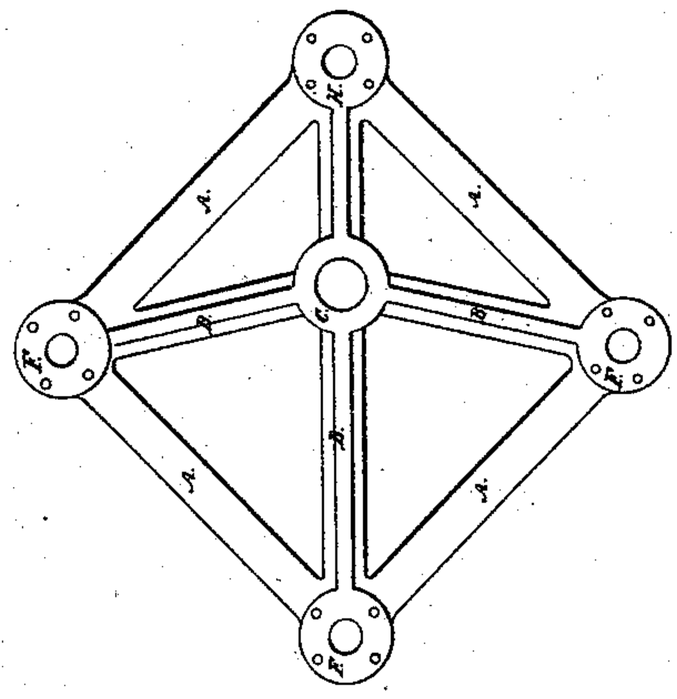


Fig. 6.

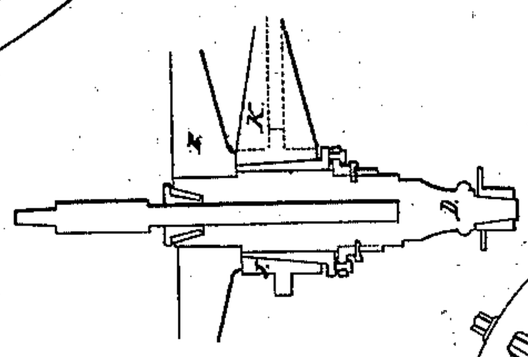


Fig. 2.

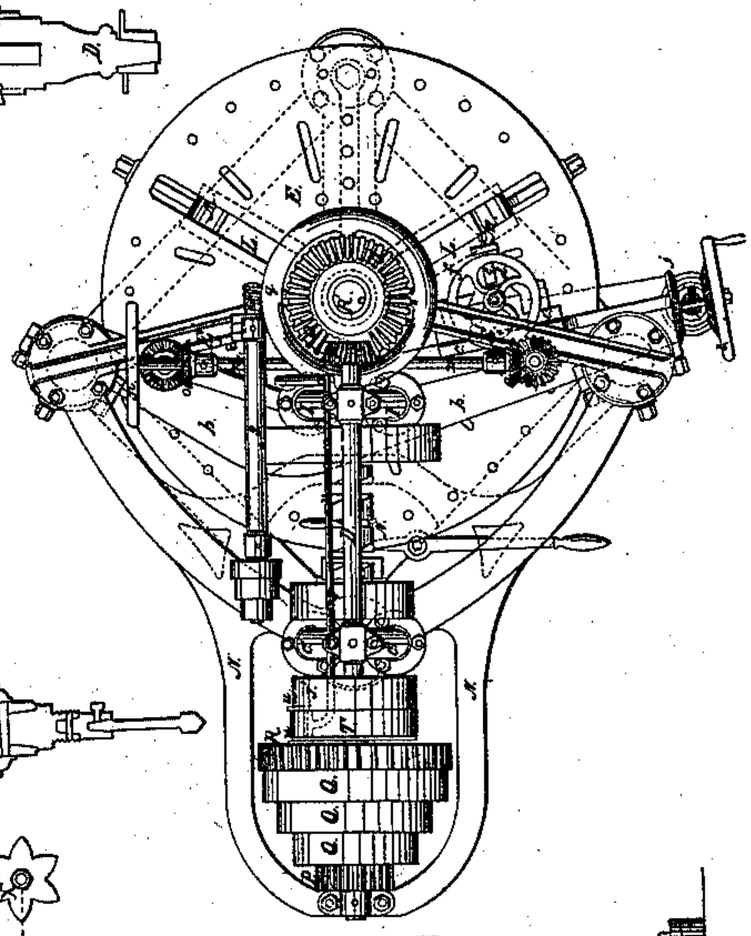


Fig. 3.

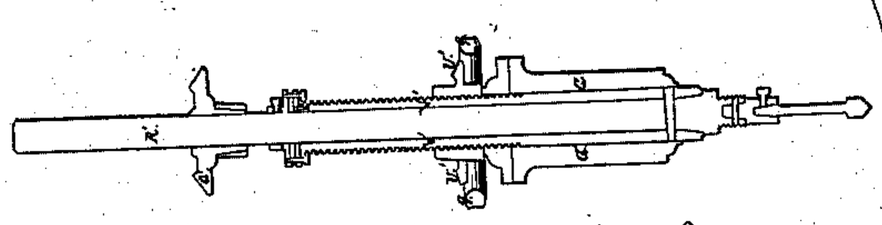


Fig. 7.

Fig. 8.

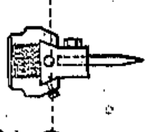
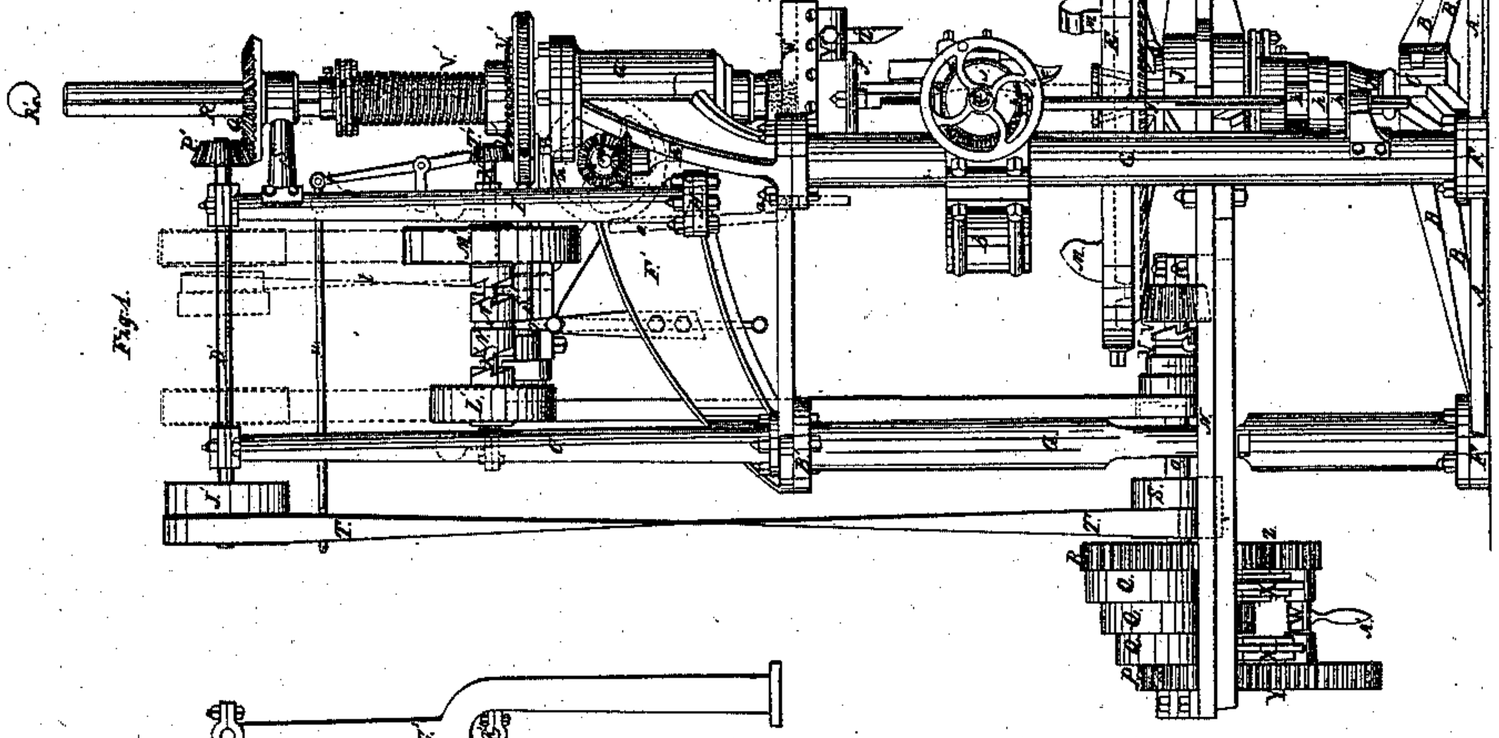
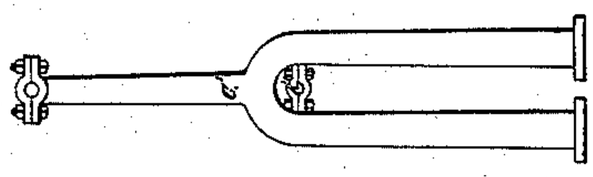


Fig. 1.





UNITED STATES PATENT OFFICE.

ALANSON BROWN, OF ROCHESTER, NEW YORK.

MACHINE FOR TURNING, BORING, AND SLOTTING METALS.

Specification of Letters Patent No. 12,503, dated March 13, 1855.

To all whom it may concern:

Be it known that I, ALANSON BROWN, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Machines for Turning, Boring, and Cutting Key-Seats, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part thereof, in which—

Figure 1, represents a side elevation. Fig. 2, represents a top or birds eye view. Fig. 3, represents a vertical section through the upper spindle. Fig. 4, represents a top view of the arch detached. Fig. 5, represents a top view of the base detached. Fig. 6, represents a vertical section through the lower spindle. Fig. 7, represents the star wheel of the revolving head detached. Fig. 8, represents the tool stock of the revolving head detached.

Similar letters in the several figures denote like parts.

The nature of my invention consists first, in so arranging the table or face plate, and upper spindle or tool holder, on a machine for turning, boring, and cutting key-seats, in car wheels, cranks, or other pieces of machinery, as that either one of the two may be revolved, and the other remain stationary, as the character of the work may require. Second, in combining with the upper spindle, a revolving slide head carrying a cutter susceptible of either a horizontal or vertical motion or adjustment for the purpose of turning-off work either inside or outside that will not revolve between the columns. Third, in the arranging of the two, three, or more supporting columns in rear of a line drawn through the centers of the operative parts of the machine, for the purpose of leaving an unobstructed front for the introduction of the piece to be dressed.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A, represents the base of the machine, having four arms B, B, B, B, meeting and forming a hub C, in which the lower spindle D, (of the shaft on which the table or face plate E, is fixed) is stepped. From three of the four corners (F, F, F) rise long columns G, G, G, for supporting the main parts of the machine, as will be hereafter described, whilst the fourth corner H, supports a short column I, rising up to within a short distance of the underpart of the table, and may be entirely underneath the table.

It will be perceived that the hub C, is not centrally placed between the columns, but is placed forward of the center, and that a short column is used at that part of the machine, which may be called the front thereof, for the purpose of affording an unobstructed front for the introduction of pieces which are to be finished or wrought on the face plate.

If the machine had four columns—or, if the column I, were to extend above the table or face plate, a piece of machinery, which would readily turn between the columns on the face plate when arranged on it, could not be passed through between said columns, the capacity of the machine would be therefore restricted to the space between the columns, and not to the diameter of the face plate.

It is actually necessary to firmly support the machine, as the least springing or yielding of the machine, will make inaccurate work. Four columns, therefore, as an under bearing, appears to be necessary, and three above the table, to support the various parts of the machine. A single column above the table is out of the question, as the part supporting the mandrel, tool stock or upper spindle would have to project so far, as to be infirmly supported unless by going on the other extreme, it is made so heavy as to be an incumbrance to itself. My machine is therefore a four column machine as regards strength, and a three column machine, as regards the facility for introducing work on the face plate.

The shaft which supports the face plate E, immediately underneath the face plate passes through, and is supported in a hub J, which is firmly held in position by arms K, connected therewith, and to the columns I, G. The face plate is provided with any suitable number of radial slots L, in which are placed the dogs M, for chucking up the pieces to be turned, bored or slotted.

A substantial curved iron plate N, having its two ends secured to the columns G,

passes in rear of the machine, to afford a base and support for the driving machinery, and the plate N, is further supported by being connected to the rear, as well as the side columns G.

A shaft O, supported in suitable bearings on the plate N, has upon its rear end first a small gear wheel P, next a series of graduated pulleys Q—next a larger gear wheel R, and lastly a pulley S, around which passes an endless band T, for driving the upper parts of the machine, as will be described. The inner end of the shaft O, has upon it a clutch U, and at its extreme inner end a bevel pinion V, which works into the circular rack underneath the table or face plate E to give it motion. When however the table is to remain stationary, the clutch U is moved back on the shaft. Underneath the extreme rear end of the shaft O, is hung upon a shaft W eccentrically supported in the hangers X, two cog wheels Y, Z, the larger one Y, meshing with the small one P, on the shaft O, when the shaft is turned by handle A′ for that purpose, and the smaller one Z, taking into the larger one R, on the shaft O, by turning the shaft W, in a contrary direction; this being for the purpose varying the speed with which the table or face plate may be turned.

The rear column G, has secured upon its cap B′, a forked column C′ (a rear view of which is shown separate, to the left of its position in the machine (Fig. 1,) and on top of this column C′, is supported one end of a shaft D′, which is parallel with that O, heretofore described. From the tops or caps of the side columns G, springs an arch piece E′, which beside its arched form from column to column, projects forward as seen in Figs. 2, 4, for the purpose of bringing the center of the boring or turning stock which is supported in it, directly over the line of centers of the face plate and its supports.

The object of setting the side columns G, back of the line of centers has heretofore been stated viz: to afford an unobstructed front so that pieces, of such size as the face plate will carry after they are placed thereon, may be readily introduced. This double curving of the arch therefore becomes necessary, to bring the centers of the working parts in line again. From the rear column G, between the forks of the column C′, springs an arch piece F′, projecting toward those E′, and where the three unite, is formed a hub G′, for supporting the tool stock. This entire piece is shown separate in Fig. 4, and is usually cast in one piece. From the projections H′ H′, on this arch piece rise the forks of a single (or two columns) I′, and in its top is supported the other end of the shaft D′. The endless belt T, from the first mover, passes over a fast pulley on the shaft D′, when the tool stock is to be rotated, or shifted to the loose one J′, alongside of it, when otherwise. Underneath the shaft D′, is a shaft K′, supported in the crotch or forked parts of the columns C′, I′, and on it are placed the pullies L′ and M′, and between said pullies a double clutch N′, operated by a shipper O′, so as to throw it into or out of gear with either of the pullies L′ M′, which are of themselves loose on their shaft, while the clutch is feathered on the shaft in a manner well known to machinists. On the end of the shaft D′, is a bevel gear P′ which takes into a larger bevel wheel Q′, on the top of or near the top of the spindle R′. This bevel wheel Q′, is also feathered on the spindle so that the spindle may rise and fall while the vessel wheel always rotates in the same place, it being supported by the arm S′, projecting forward from the column I′. On the shaft K′, at its inner end is placed a bevel wheel T′, which takes into a bevel gear U′, on a sleeve or collar V′, which passes through the hub G′, and may turn therein, so that the spindle which may carry a boring tool on its lower end may be boring out the hub of a car wheel or crank, while the sleeve or socket outside of it, but also rotating may be carrying a turning tool, and be facing off said crank or car wheel at the same time, and when these two operations are going on the table may remain stationary, by simply throwing out the clutch U. But either the boring, or the turning, may cease without in the least incommoding the other which may go on, or both the turning and boring tools may be fixed, or immovable while the table or face plate may be rotated, whichever is found most convenient.

It sometimes happens that a crank, or other piece of machinery, will not turn around between the columns, in such case the table remains stationary and the tools rotate. With other kinds of machinery the contrary may be required, and the machine is adaptable to either.

On the spindle R′, below the hub G′, is attached a tool stock W′, which rotates with the spindle when turned. A screw shaft passes horizontally through this tool stock, or rather arm, and has upon its outer end a star wheel X′, and upon this screw rod or shaft is a tool holder Y′, containing a cutting or turning tool Z′. As the arm W′, sweeps around, the star wheel strikes against a trigger *a* suspended from the arch piece F′ (and seen in red lines), which gives said star wheel and its screw shaft a partial rotation, which in turn causes the tool holder and tool to move slowly from the spindle toward the extreme end of the arm. This enables me while boring out a

hub, to commence at the hub and face it off at the same time.

A cross head *b*, underneath the arch pieces, passes across and is made to slide up and down on the side columns G, as will be described. This cross head curves backward, or behind the line of centers far enough to allow a sliding tool stock holder *c* to approach said center, and which is used for facing off work when the table or face plate is rotated.

d, is the stock in which the tool *e*, is held, and said stock and tool are raised or lowered in the sliding piece *c*, by a hand wheel *f*; the sliding piece is operated as follows: *g*, is a shaft having pullies *h*, *h*, *h*, feathered onto it, and around one of these pullies, and the spindle that supports the table or face plate may pass an endless band. On top of the shaft *g*, is a bevel wheel *i*, which takes into a similar bevel wheel *j*, on a shaft *k*, which shaft *k*, has a screw thread cut on it, and runs in a female screw cut in the sliding piece *c*, and moves it along toward the center of the table.

l, is a hand wheel on the shaft *k*, for working the slide by hand. The cross head *b*, is raised or lowered as follows: so as to adapt it to the piece to be worked. A horizontal shaft *m*, (Fig. 2) has upon one of its extreme ends a hand wheel *n* and near each of its ends a small bevel gear *o*, which take into bevel gears *p*, on the upper ends of rods—the lower ends of which are secured in the said cross head, and thus by turning the hand wheel *n*, the cross head is raised or lowered at pleasure. By this arrangement I face off work that rotates with the table, and by skewing the cross head I can work from the periphery to the center of the table, without coming in contact with the boring apparatus at the center.

The bevel gear U′, on the spindle R, has a worm wheel *q* underneath it, forming a part of it, into which a worm *r* (Fig. 2) on the end of a shaft *s*, driven by a cross belt *t* (in red, Fig. 1,) passing around a pulley on the shaft D′, and a pulley on said shaft *s*, and the worm *r*, can be thrown into and out of gear in a moment, its object being to furnish a slow feed motion to the spindle; the bevel gear T′, U′, of course are thrown out of action when the worm and worm wheel are required.

u, is a shipper for throwing the belt T, onto the fast or loose pulley.

I have thus far shown how boring or turning of various kinds may be done, either when the table or face plate revolves, or when it is stationary and the tools rotate, and it only remains to describe how a key seat is cut before unchucking the piece.

To give particulars of each and every part would make the specification prolix, and describing the main parts, I leave the others as they are fully shown in the drawings and I refer more especially to the bushings in the table and for supporting the spindle of the table.

I have heretofore called V′, Fig. 3, a sleeve, it is really a long tube, hollow so that the spindle R′ may pass through it, and having a screw thread cut upon it, into which a similar thread, in the nut which carries the bevel gear U′, and worm *q*, works. The spindle R′, may turn independently of the screw tube or sleeve, but when boring or turning the inside of a hub, the spindle is fed down by the worm and worm wheel before described. When a key seat is to be cut the bevel gearing P′, Q′, are thrown out of operation, and those T′, U′, into gear—the worm and worm wheel being also disengaged. Then by driving the shaft K′, with the clutch N′, in gear with either of the pulleys L′ or M′, as the case may be, the nut on which the bevel wheel U′ is arranged, by running in the screw on the hollow tube V′, gives said tube, and the spindle R′, with its cutting tool, a vertical motion, and thus the key seat may be chipped or cut out—the table and the piece being operated on it remaining stationary.

It will thus be seen the machine is adaptable to the turning, boring, facing, or drilling of heavy pieces of machinery, and also for cuttin the key seats, and this too, whether the character of the work, or its peculiar shape be such, as to require it to be rotated, or whether it must remain stationary and the tools be operated, or portions of either. The turning may be done on the inside of the hub, on the face, or on the outside of the hub as for instance in a crank, with equal facility. And as it is suceptible of all these various adaptations, it avoids the necessity of several separate machines for doing the same thing, and as a shop machine for various kinds of work is highly valuable and useful.

Having thus fully described the nature of my invention I would state that, I am aware that single column machines for boring and drilling small work have been used, in which the operative parts project forward of said column, this I do not claim as the support is not firm enough for accurate work of the kind which my machine is devised for and these I do not claim, but

What I do claim as new and desire to secure by Letters Patent is—

1. So arranging the table or face plate, and upper spindle or tool holder, on a machine for turning, boring, and cutting key-seats, as that either one of the two may be revolved, and the other remain stationary, as the character of the work may require, and substantially in the manner set forth.

2. I also claim combining with the upper spindle, a revolving slide head carrying a

cutter susceptible of either a horizontal or vertical motion or adjustment as set forth, for the purpose of turning off work either inside or outside that will not revolve between the columns.

3. I also claim the arranging of the two, three or more supporting columns in rear of a plane drawn through the line of centers of the operative parts of the machine, for the purpose of leaving an unobstructed front for the introduction of the piece to be dressed, as described.

ALANSON BROWN.

Witnesses:

A. B. STOUGHTON,

THOS H. UEPPERMAN.