

(No Model.)

3 Sheets—Sheet 1.

G. B. TAYLOR.
MACHINE VISE.

No. 381,890.

Patented Apr. 24, 1888.

Fig. 2.

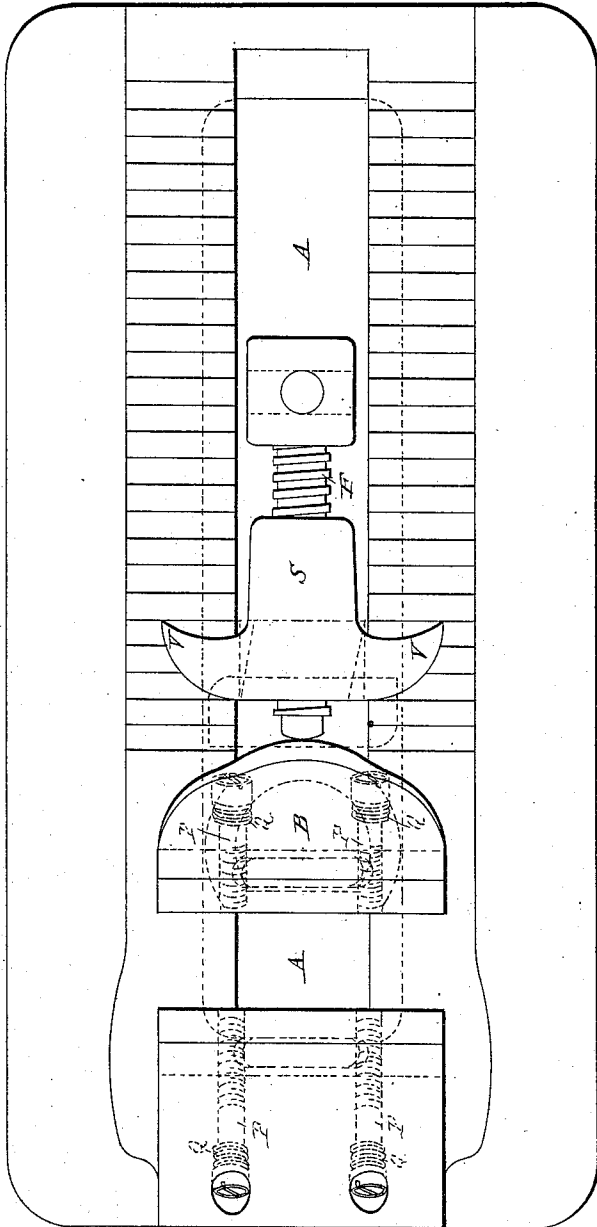
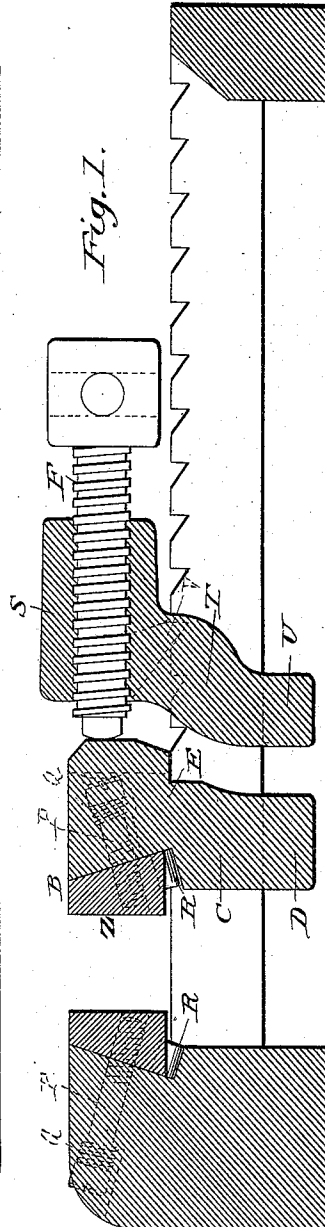


Fig. 1.



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William Lebeck Taylor.

Inventor:

George Benjamin Taylor.

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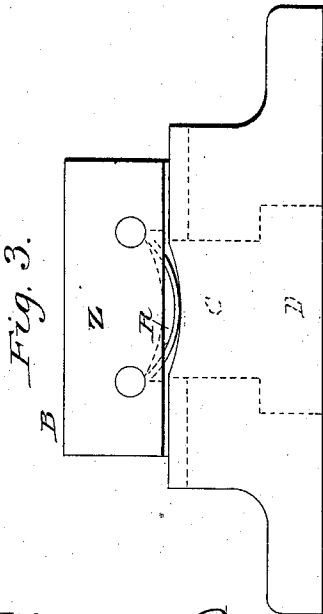
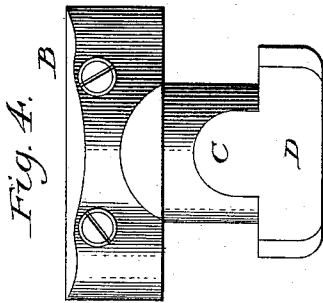
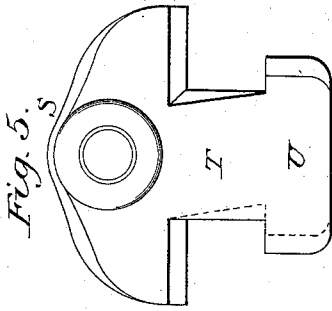
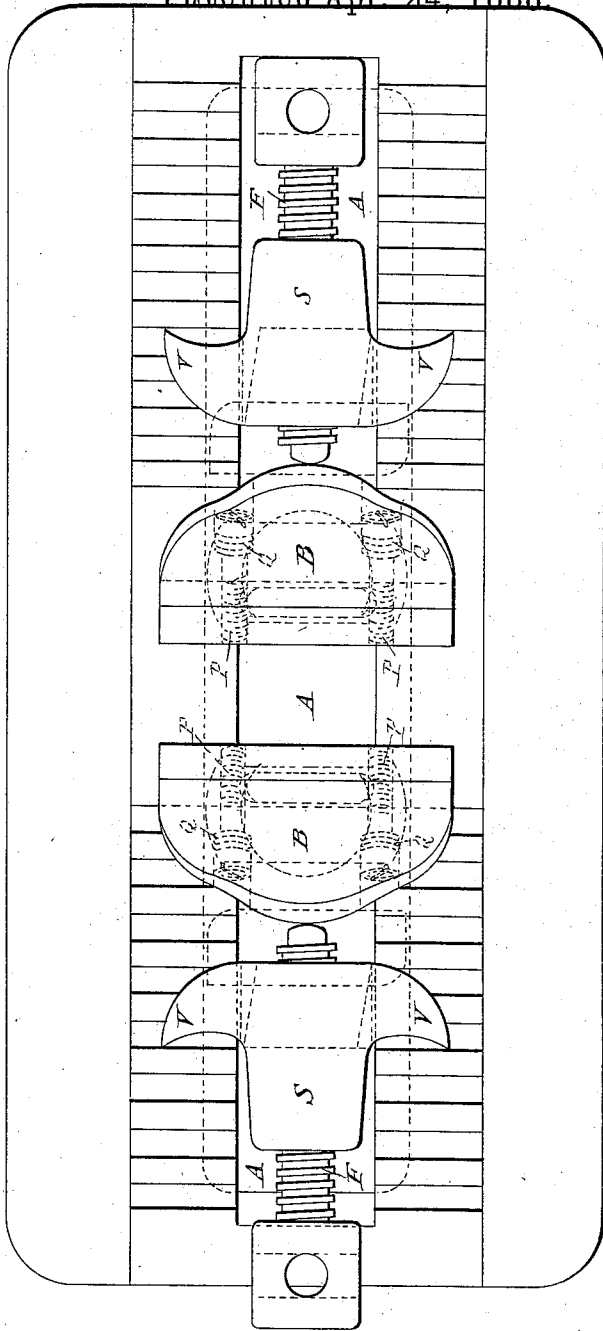


Fig. 1A.



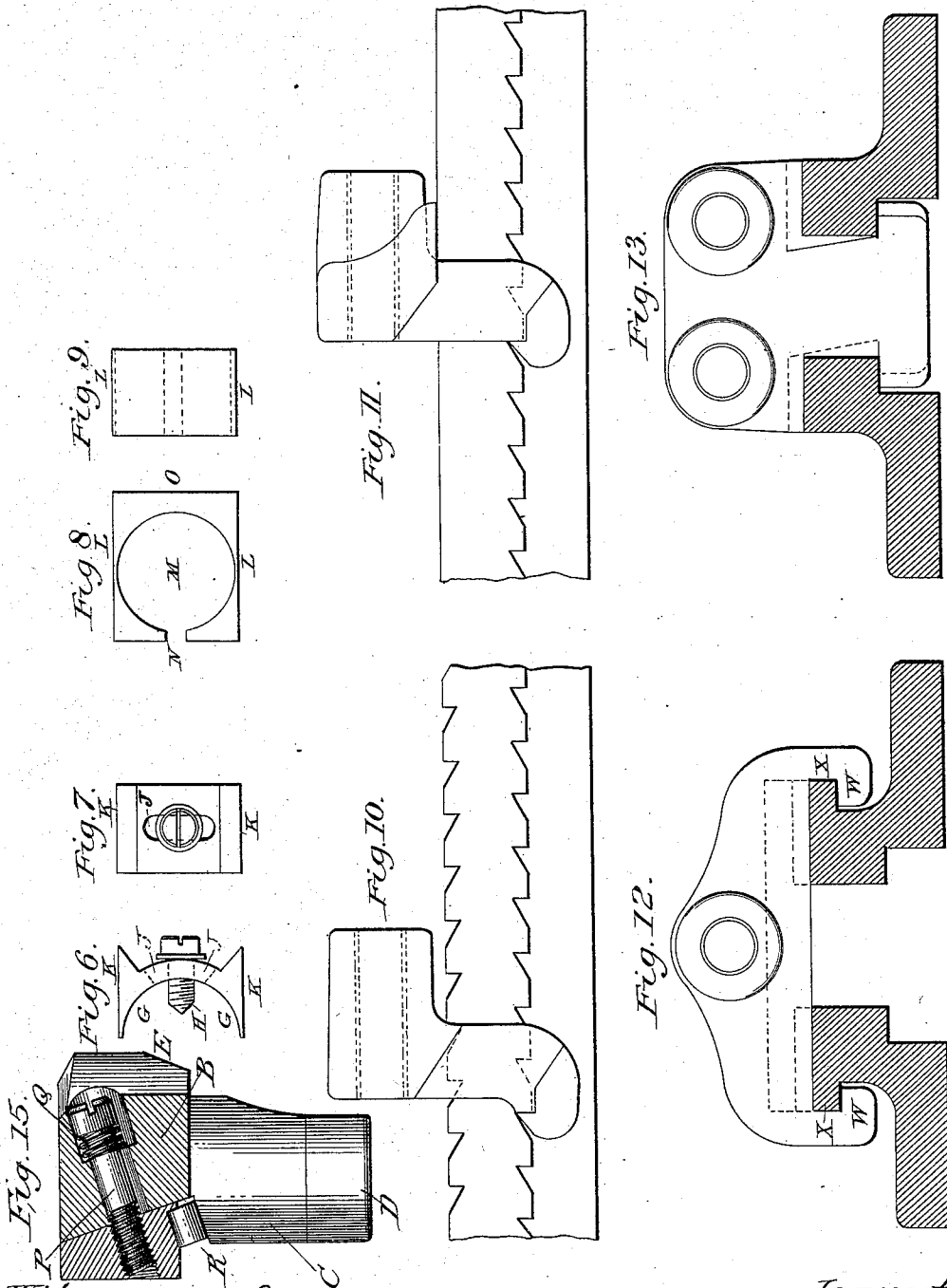
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 William Frederick Taylor.
 John Henry Taylor.

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John Henry Taylor.

Inventor:
George Benjamin Taylor.

UNITED STATES PATENT OFFICE.

GEORGE BENJAMIN TAYLOR, OF BIRMINGHAM, ENGLAND.

MACHINE-VISE.

SPECIFICATION forming part of Letters Patent No. 381,890, dated April 24, 1888.

Application filed January 4, 1886. Serial No. 187,620. (No model.) Patented in England April 29, 1884, No. 6,964, and November 11, 1884, No. 14,833.

To all whom it may concern:

Be it known that I, GEORGE BENJAMIN TAYLOR, a subject of the Queen of Great Britain, residing at Edmund Street, Birmingham, England, have invented new and useful Improvements in Machine-Vises, (for which I have obtained two patents in Great Britain, No. 6,964, bearing date April 29, 1884, and No. 14,833, bearing date November 11, 1884,) of which the following is a specification.

My invention consists of the improvements hereinafter described in machine-vises—that is to say, the vises which are employed on lathes and on milling, planing, shaping, slotting, and other machines for holding the article being operated on by the machine.

The objects of my invention are principally, first, to give a very slight downward movement to the article held in the vise, so bringing the under surface of the article held into the same plane as the upper surface of the vise, the obvious advantage being that any part of an article shaped or bored in a vise such as is hereinafter described may be depended upon to be true with its under surface; second, to give an equal grip to each end of the article held, even when it is of a taper form; third, to permit of the rapid adjustment of the loose jaw to articles of different sizes; fourth, to obviate the necessity for weakening the body and jaws of a vise by boring for the central screw ordinarily required; fifth, by dispensing with the said ordinary central screw to thereby permit the article operated on, as well as the drill or cutter operating, to pass through the slot in the body of the vise; sixth, to facilitate the taking out of the loose jaw for cleaning or other purposes. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of the entire vise. Fig. 2 is a plan of the entire vise. Fig. 3 is a vertical cross-section of vise, showing loose jaw in position. Fig. 4 shows the loose jaw separate. Fig. 5 shows the grip-plate separate. Figs. 6 and 7 and Figs. 8 and 9 are plan and elevation of two designs of parts forming loose wearing-surfaces for leg of loose jaw. Fig. 10 is a section of part of vise, showing teeth on upper part of lower half of the

slot in the vise in addition to those on the top face of the vise and suitable grip-plate in position. Fig. 11 is a section of part of vise, showing teeth only on upper part of lower half of the slot in the vise and suitable grip-plate in position. Fig. 12 is a cross-section of vise, showing alternative form of grip-plate. Fig. 13 is a cross section of vise, showing another alternative form of grip-plate. Fig. 14 is a plan of vise, showing opposing sets of jaws, grip-plates, teeth, &c. Fig. 15 is a vertical section of the jaw, showing the connection of the sliding plate of the jaw, the pins, and springs.

The body of the vise (see Figs. 1, 2, and 3) I make similar to the usual pattern, having a longitudinal slot, A A, Fig. 2, in the middle for the passage of the loose jaw B, Figs. 1, 2, 3, and 4, which slot is enlarged at the bottom for its whole length, forming a recess, (see Figs. 2 and 3,) so far being identical with the ordinary machine-vise body; but I do not drill it for the reception of the usual central screw, which said screw I dispense with, and I form a series of ratchet-teeth on its top surface. (See Figs. 1 and 2.)

The teeth described, although preferably made on the upper face only of the body, may instead be made on the upper face of the lower half of the slot in the body, (see Fig. 11,) or on both the said surfaces. (See Fig. 10.) The leg C of the loose jaw B, Figs. 1, 3, and 4, is nearly cylindrical in form, as shown in Figs. 1, 2, and 4, being also narrower than the remainder of the jaw and of the same diameter as the longitudinal slot in the body of the vise, the bottom part, D, Figs. 1, 3, and 4, being widened, (see Figs. 1, 3, and 4,) forming a shoulder of the same diameter as the aforesaid enlarged recess in the vise-body. Thus the aforesaid loose jaw is free to turn or slide backward or forward therein. Flats are formed on the front and back of the bottom part, D, of the leg of the loose jaw, (see Figs. 1 and 4,) which enable it to be passed downward into the slot in the vise, when a quarter-revolution given to it will bring it into working position, and the jaw may be instantly drawn out of the vise after another quarter-turn. I prefer to continue the flats of bottom part, D, onto

leg C, leaving both of a partially cylindrical form; but this continuation is not essential. The upper part, E, Figs. 1, 3, and 4, of the loose jaw is also of greater width than the middle part, thus forming a shoulder, which rests upon the top face of the body of the vise. The back of the upper part of the said loose jaw is made concentric with the leg, and may have a steel plate attached to it to take the wear of the pin F, Figs. 1 and 2, to be afterward described.

If desired, separate pieces may be attached to the leg of the loose jaw, (in which case the diameter of the leg must be made a little less than in the aforementioned case to allow of this,) in order to give extended wearing-surfaces to the said jaw by any of the following methods: First, as in Figs. 6 and 7. This is a piece of metal the curved part G G of which fits upon the leg of the loose jaw, and is attached to it by a pin, H, which pin, when the jaw is moved about its axis, moves in the slot J J, the faces K K, being the wearing-surfaces, bearing against the sides of the slot in the vise; second, as in Figs. 8 and 9. This is a piece of metal of a cubical form, two of the sides of which—namely, L L—form the wearing-surfaces bearing against the sides of the slot in the vise. Through this piece of metal a hole, M, is bored, which cuts through one side of the cube, as shown at N. The leg of the loose jaw is made to fit the said hole. The aforesaid piece of metal may be put into its position by heating it at the point O, and then forcing it open and closing it upon the leg of the loose jaw; or a hinge may be formed at the point O to answer the same purpose. Either of the aforesaid pieces of metal, shaped as above described, may be used for the purpose of affording wearing-surfaces for the above-described leg of loose jaw, and may be put in its working position on the leg of the loose jaw first, and the jaw then put into its place in the vise in the manner above described—that is to say, by inserting the narrower part of it into the aforesaid slot in the vise and then giving it a quarter-revolution on its axis. I make that face of each jaw to which the jaw-plate is usually attached an inclined plane, the upper edge (see Figs. 1 and 2) of the said plane being nearer to the opposite jaw than its lower edge; also, I make that face of each plate which I attach to the said inclined surface of the jaw to correspond with it and be free to slide thereon in the direction of its inclination for a certain limited distance. The other surfaces of the said plates I make as is usual in the jaw-plates of ordinary machine-vises—that is to say, the toothed faces vertical and the other faces at right angles with the said vertical faces. (See Figs. 1 and 2.) The aforesaid plates I fasten to the jaws by any suitable means, preferably pins P P, Figs. 1 and 2, the heads of which may be let into the plates, as usual; but preferably I so bore the holes for the

pins that their heads may be at the back of each jaw, the other ends of the pins being screwed into the plates, as shown, by this means cutting away less of the toothed surface of the plate than by the first-mentioned method. Between the under side of the head of each of the said pins and the shoulder formed by the bottom of the hole cut in the jaws for the reception of the said pin-head I place a small spiral spring, Q Q, for the purpose of producing an elastic pressure between the inclined faces, before described, of the jaws and jaw-plates, the object of which is to prevent dust, &c., from entering between the said faces, and to still allow a free sliding movement between them. When an article is gripped between the jaws, (by means to be afterward described,) the said plates are, by the action of the inclined surfaces depressed until the under surface of the article held is brought exactly into the same plane as the top face of the vise. The distance of this movement is but slight. The aforesaid pins, being screwed into the plates, move with them, the pin-holes in the jaws being slotted to allow of the said movement. When the article is removed from the vise, the jaw-plates are raised to their original positions by a spring (see Fig. 3) working in the recess R, Figs. 1 and 3, (shown at the bottom of each plate.) The said springs may be made of any simple form. Behind the loose jaw is placed a part (see S, Figs. 1, 2, and 5,) which I call the "grip-plate," and which is of oblong section in its lower half, T U, and fits the upper and lower parts of the slot in the vise in the same way as the loose jaw does, but has one of its corners on each side rounded, so as to allow of its being passed into its position as the said loose jaw is by a quarter-turn. On the upper half of the said grip-plate two or more strong teeth, V V, are formed, which engage with the previously-described teeth formed on the upper surface of the vise; also, when teeth are formed, as before mentioned, on the upper face of the lower half of the slot in the body, teeth are formed on the said grip-plate to correspond with them also. (See Figs. 10 and 11.) When the said grip-plate is tilted slightly forward, the teeth upon it are disengaged from the teeth upon the vise-body, and the aforesaid grip-plate may then be moved forward or backward instantly. In a threaded hole made in the top of the aforesaid grip-plate is fitted a screw, F, Figs. 1, 2, and 5, the axis of which is parallel with the length of the vise, and may be at any level above the face of the vise. If the form of the article to be held make it desirable, the loose jaw may be dispensed with and the article held between the fixed jaw and the point of the pin in the grip-plate above described; or, if required, the grip-plate may be so formed as to carry two or more pins, Fig. 13, for the better holding of the article, in which case the loose jaw may be used or dispensed with, as required. A further modification of the grip-

plate is to make it of such a form that instead of passing into the slot of the vise it shall span or sit astride the vise, (see Fig. 12,) when the lips W W will bear under a flange or rib, *x x*, which in this case is formed along the outer sides of the vise for the purpose.

To hold an article in the vise, place it between the jaws, slide the loose jaw to it by the hand, which may be done instantaneously, the jaw being quite free to slide backward or forward, and adjust the teeth of the grip plate into the nearest convenient ratchet-teeth of the vise. Then tighten the screw of the aforesaid grip-plate against the back of the loose jaw, which, being free to turn on its own axis, will adjust itself to the article held, even if it be of a taper form, the back of the loose jaw being turned concentric with its leg for the screw-point to bear upon it in any position when taper work is held.

A modification of the vise may be made by dispensing with the fixed jaw and using instead another set of parts, as described, loose jaw, grip-plate, and ratchet-teeth, to confront and oppose the first set of same, (see Fig. 14;) also, three or more sets may be used when it is required to hold an article on three or more sides, the said sets of parts to be disposed at any suitable angle with each other, the body of the vise being shaped accordingly.

I am aware that prior to my invention machine-vises have been made with ratchet-teeth and with jaws capable of swiveling, so as to hold taper articles. I therefore do not claim such as my invention; but

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

1. The combination, in a machine vise, of ratchet-teeth, as described, the toothed grip-plate S, carrying the screw F, the loose jaw B, (the leg C and bottom part, D, of which are nearly cylindrical, having flats formed on the front and back,) and the inclined plate Z to each jaw, with its springs Q Q, pins P P, and spring working in the recess R, substantially as described.

2. In a machine vise, the combination, with suitable jaws, of the inclined jaw-plates with their respective springs Q Q, pins P P, and spring working in the recess R, substantially as described, the plates being applied to the jaws, and the said jaws being suitably shaped to receive them, all substantially as described.

GEORGE BENJAMIN TAYLOR.

Witnesses:

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WILLIAM SMITHSON CRAMPTON.