(No Model.)

4 Sheets—Sheet 1.

J. BÊCHÉ, Jr.

FILE CUTTING MACHINE.

No. 531,251. Patented Dec. 18, 1894.

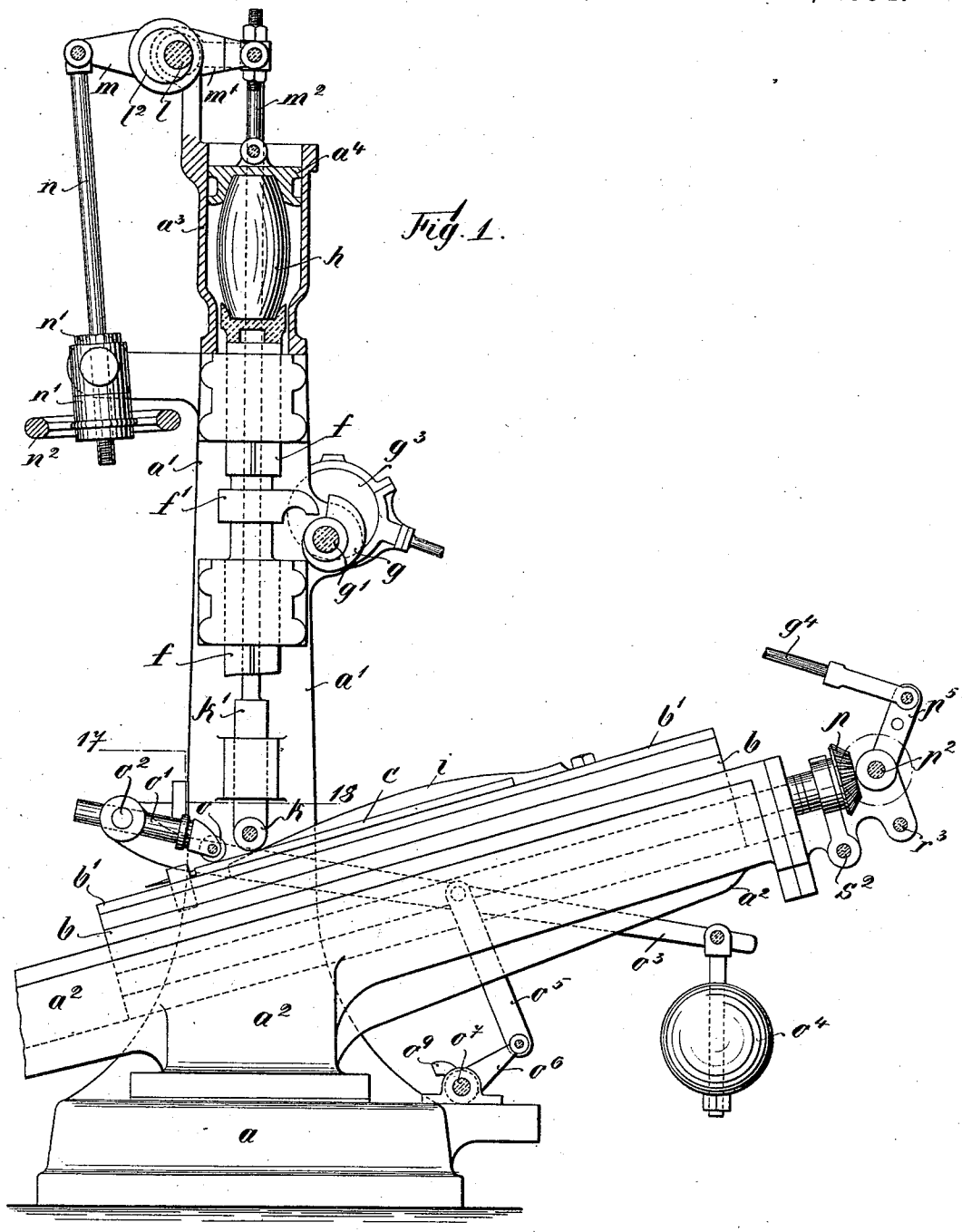

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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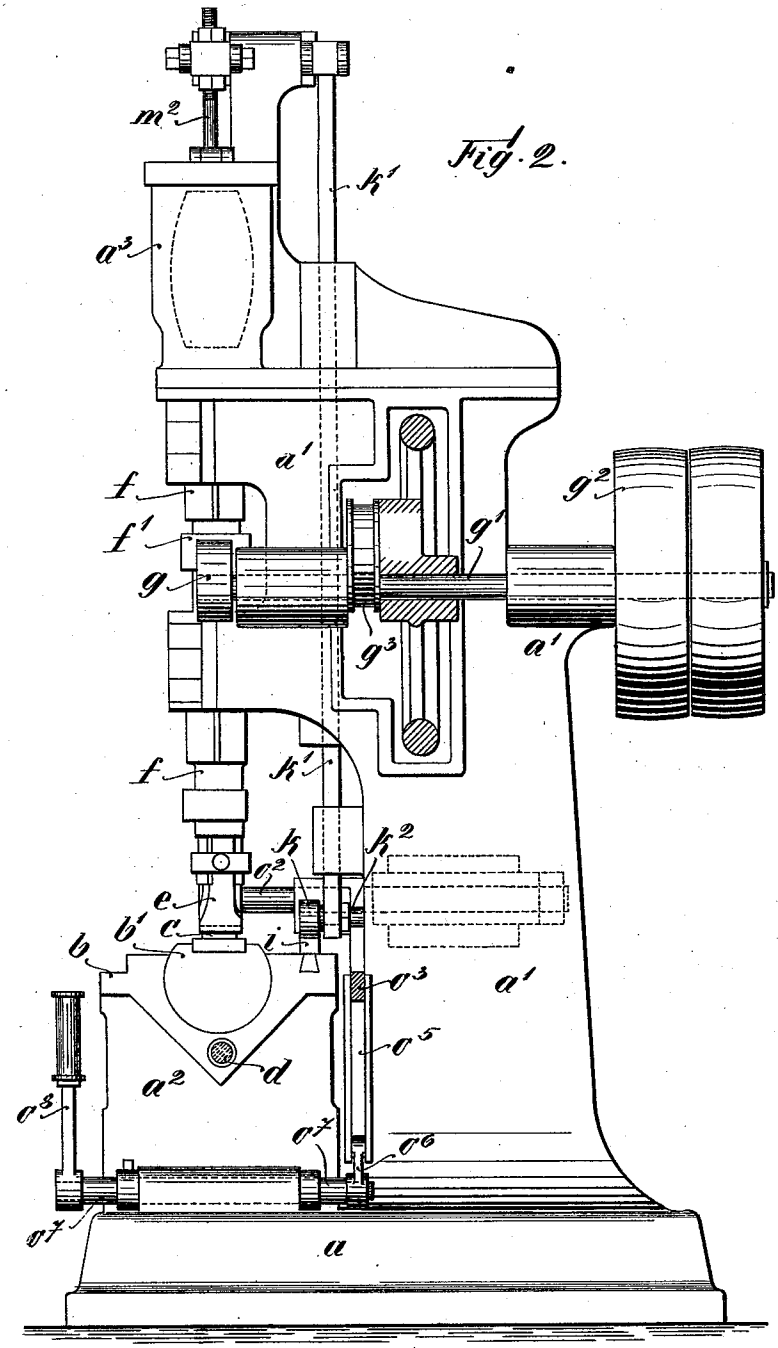
No. 531,251. Patented Dec. 18, 1894.

Fig. 2.



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FILE CUTTING MACHINE.

No. 531,251. Patented Dec. 18, 1894.

Fig. 3.

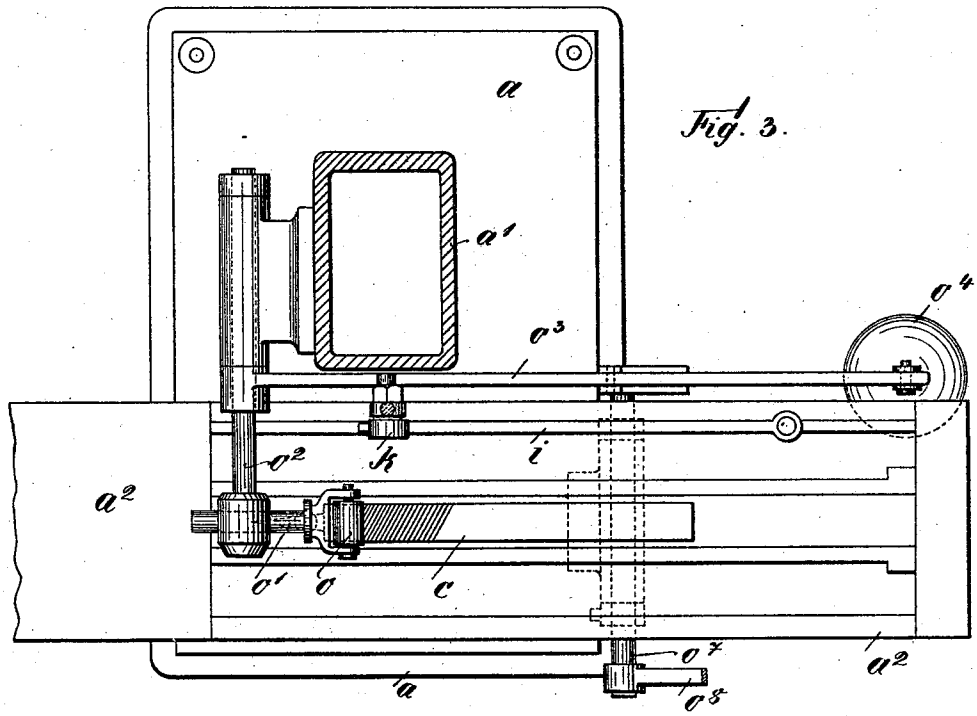
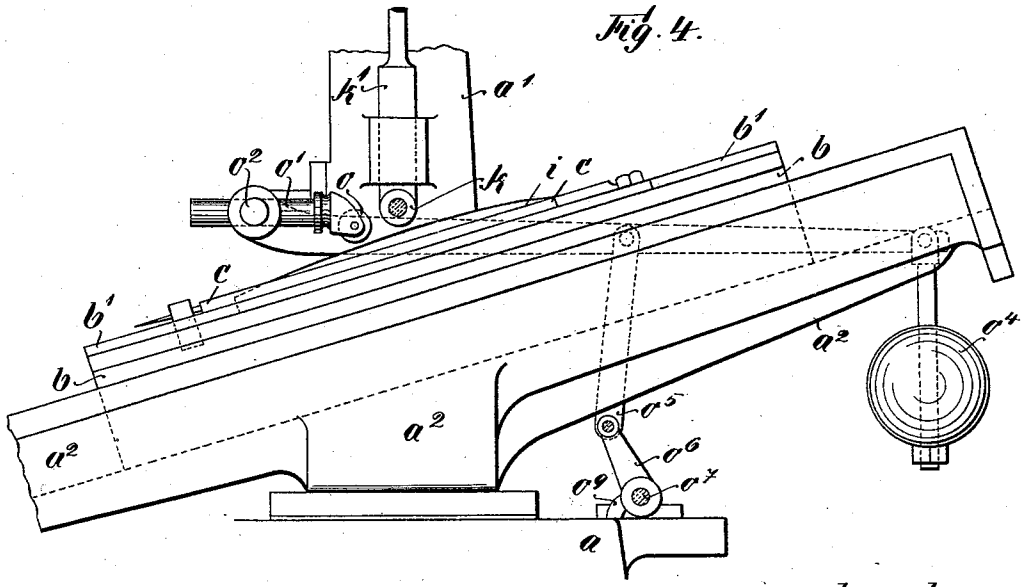


Fig. 4.



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FILE CUTTING MACHINE.

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Fig. 5.

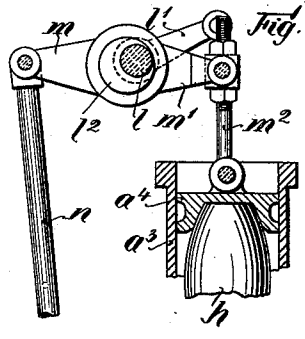


Fig. 6.

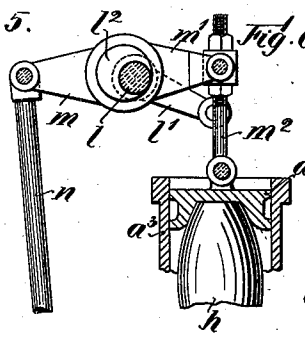


Fig. 7.

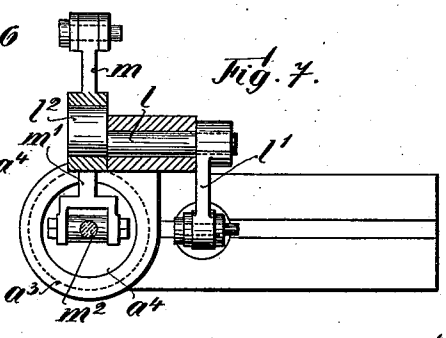


Fig. 8.

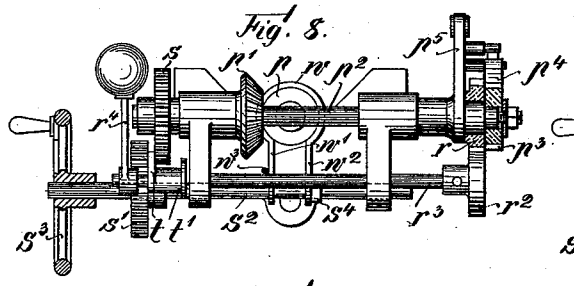


Fig. 9.

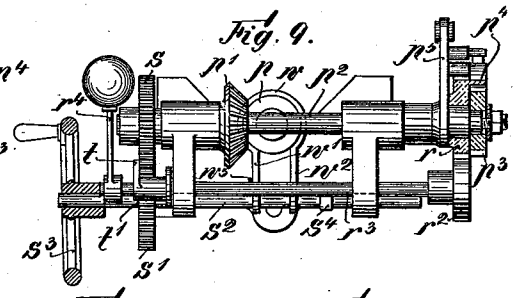


Fig. 10.

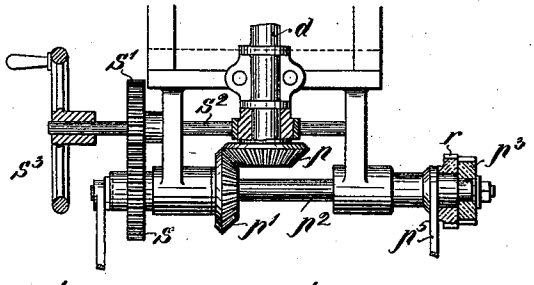


Fig. 11

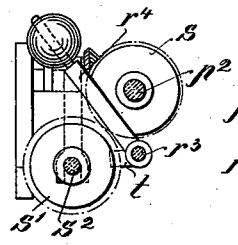


Fig. 12.

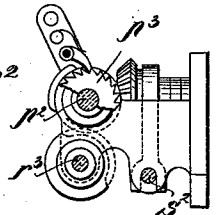


Fig. 13

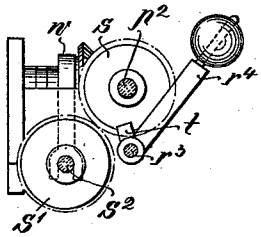


Fig. 14.

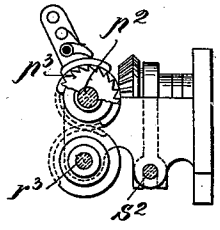


Fig. 15

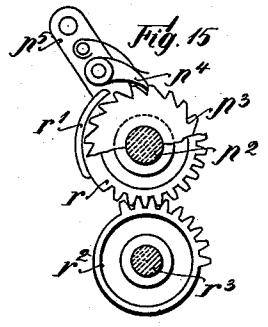
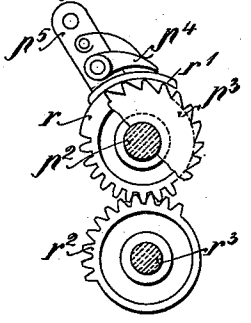


Fig. 16.



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Inventor
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UNITED STATES PATENT OFFICE.

JEAN BÊCHÉ, JR., OF HÜCKESWAGEN, GERMANY.

FILE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 531,251, dated December 18, 1894.

Application filed March 14, 1894. Serial No. 503,658. (No model.)

To all whom it may concern:

Be it known that I, JEAN BÊCHÉ, Jr., a subject of the King of Prussia, German Emperor, and a resident of Hückeswagen, in the Province of the Rhine, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in File-Cutting Machines, of which the following is a specification.

This invention refers to machines for providing files automatically with the cuttings, and my improvements in such machines relate, first, to means for varying the force of the blows of the cutting-chisel automatically as well as by hand; and second, to means for effecting the intermittent motion of the file during cutting, as will be more fully described hereinafter.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 shows the front-view of the improved machine, the cylinder on the top being in section, and the left-hand part of the file-cutting-bed being broken off. Fig. 2 shows a side-view of the machine. Fig. 3 is a plan of the lower part of the machine, the section being taken on line 17—18 of Fig. 1. Fig. 4 is the front-view of the lower part of the machine, the left hand part of the file-cutting-bed, as well as the upper part of the frame being broken off. Figs. 5, 6 and 7 are details belonging to the upper part of the machine. Figs 8 and 9 are front-views of the intermittent gearing-device. Fig. 10 is an upper view of the same. Figs. 11, 12, 13 and 14 are left hand side-views and right hand side views of the gearing-devices in two positions corresponding to Figs. 8 and 9. Figs. 15 and 16 are details of the gearing-device.

The base a, Figs. 1 to 3, of the machine carries besides the frame proper a' a special bed a^2 of oblique configuration, forming the file-cutting-bed. This bed contains a slide b with a special bearing-piece b', to which is secured the file c to be cut. The said slide may be intermittently moved upward by means of a screwed spindle d, Fig. 2, as will be more fully described hereinafter.

The chisel e, Fig 2, by means of which the cuttings on the file are produced, is attached to a strong bar f, the upper end of which extends into the cylinder a^3 at the top of the frame as seen in Fig. 1. A cam g, Figs. 1 and 2, fixed to shaft g' and driven from pulley g^2, acts intermittently on a projection f' secured to bar f, so that thereby this bar is alternately raised and released, together with chisel e. The latter on each fall produces a cut on file c. The force of the blow is given not only by the weight of bar f, but mainly by the reacting elasticity of an india-rubber-block h, Fig. 1. This block is held at its upper end by the cylinder-cover a^4, and is compressed from below by the action of cam g on projection f', so that bar f with the chisel is thrown powerfully downward as soon as the parts g and f' have come out of contact.

In some sorts of files the thickness increases toward the middle part of the same. These parts when coming under the chisel will not receive as powerful blows as the other parts, as the height of stroke of bar f is reduced then corresponding to the greater thickness of the file. To compensate this, the india-rubber block h should be compressed in a correspondingly higher degree, which is automatically effected by the following arrangement: A ledge i, Figs. 1 and 2, the shape of which is dependent on that of the respective file, is attached to slide b, and acts on a roller k, secured to the lower end of a rod k'. This rod extends upward beyond cylinder a^3, Fig. 2, and is connected at this end with an axle l by means of a lever-arm l', Figs. 5 to 7. The other end of said axle carries an eccentric l^2 adapted to serve as fulcrum for a double-armed lever $m\,m'$. Arm m' is connected by link m^2 with the movable cylinder-cover a^4 above block h, while arm m is movably connected with a spindle n, the lower threaded end of which extends through the long nave n' of a hand-wheel n^2. If, now, rod k' is raised by the projecting part of ledge i (which, as a matter of course, occurs always when a thicker portion of the body of a file comes under the chisel), shaft l will be turned in such a direction by lever arm l', Fig. 5, that eccentric l^2, which in Fig. 1 has a middle position, moves downward, so that lever $m\,m'$ is turned like one lever-arm, the upper end of rod n forming the fulcrum. The movable cover a^4 is, thus, lowered, Fig. 5, so that a pressure is ex-

erted on the india-rubber block h from above, and the stronger reaction of the india-rubber, when compressed also from below co-operates with the less force of the fall of rod f, so that on the whole the chisel is thrown downward onto the file always with the same power. If, however, the force of the blows is to be altered by hand, the wheel n^2 is turned, so that rod n is lowered and raised, according to the direction of rotation of said wheel. In either case, eccentric l^2 will form then the journal for lever $m\ m'$, and the latter thus will raise or lower the cover a^4.

The file is held in position during cutting by a presser-roll o, Figs. 1, 3 and 4, held by an arm o'. The latter is secured to a shaft o^2 which has fixed to it a long lever-arm o^3 carrying at its end a weight o^4, by the influence of which latter the roll o is strongly pressed onto the file and the file onto its bed, on which it is held by friction. If, after finishing cutting, the slide with the bed shall be brought back to its former, initial position (which is effected by hand in a manner afterward explained), it becomes necessary to free the same from the pressure of roll o, as otherwise the said backward movement would be rendered difficult by that pressure. This is more the case, since the pressure exerted by the heavy bar f must be considered. In order, now, to release the slide from those two pressures, lever o^3 is connected by means of a link o^5 with a lever-arm o^6 fixed to a shaft o^7. The front-end of this shaft carries a hand-lever o^8, Figs. 2 and 3, by means of which lever o^6 and link o^5 may be moved from the position in Fig. 1 into that shown in Fig. 4. The parts in question are held in this position by a thumb o^9, Fig. 4, fixed to shaft o^7. Roll o has then left the file, so that the latter is freed from the draft of weight o^4. Lever o^3 then being in the position shown in Fig. 4 has lifted also roll k a short distance from ledge i by pushing against a projection k^2, Fig. 2, forming an elongation of the journal of roll k in the lower end of rod k'.

There remains now to be described the mechanisms for moving the spindle in one or the other direction, by power or by hand, which is performed by aid of the following arrangement: The inclined spindle d carries at its upper end a bevel-wheel p meshing with a like wheel p', Figs. 8 to 10, on shaft p^2. The latter carries at its right hand end a ratchet wheel p^3, Figs. 8 to 10 and 15, into which takes a pawl p^4 attached to a lever p^5. The latter is loosely fulcrumed on shaft p^2, and is oscillated from shaft g', Figs. 1 and 2, by eccentric g^3 and eccentric-rod g^4. Shaft p^2 is, thus, intermittently rotated in the same direction. If now, the file has been cut and slide $b\ b'$ is to be moved back to its former, initial position, the gearing between ratchet p^3 and pawl p^4 must be interrupted for that time. For this purpose, a wheel r, Figs. 8 to 10, 15 and 16, which is loosely arranged on shaft p^2 between ratchet-wheel p^3 and pawl-lever p^5, is provided with cogs on but a part of its circumference, and carries opposite thereto a curved projection or ledge r' (Figs. 15 and 16) that is adapted to lift pawl p^4 out of the ratchets and hold it off therefrom, as represented in Fig. 16. Wheel r meshes with a similar wheel r^2 having but as few teeth as necessary for turning wheel r with ledge r' from the position shown in Fig. 15 into that shown in Fig. 16. Wheel r^2 is fixed to the right hand end of a shaft r^3, Figs. 8, 9, 11 to 16, which at its other end carries a weighted lever r^4, Figs. 8, 9, 11 and 13, the purpose of which is to maintain ledge r' of wheel r in either of its two end-positions, the position of lever r^4 in Fig. 13 corresponding to that of ledge r' in Fig. 15, while Fig. 11 corresponds to Fig. 16.

The left hand end of shaft p^2 carries a cog-wheel s, Figs. 9 and 10, meshing with a cog-wheel s' on shaft s^2, Figs. 8 to 10 and 11 to 14. This shaft is longitudinally displaceable in its bearings, and has a hand-wheel s^3 by means of which it may be turned. Normally, the shaft s^2 has the position shown in Fig. 8, in which the cog-wheels $s\ s'$ are out of gear. They are prevented from coming spontaneously into gear by a thumb t, Figs. 8 and 11, forming part of a sleeve t' fixed to shaft r^3. This thumb is wedge-like, its edge being at that rim, which first touches the side of cog-wheel s', Figs. 8 and 11, when the thumb is moved from its position of rest, Fig. 13, to its working-position, Fig. 11. The thumb is also used for keeping the said two wheels in gear after shaft s^2 has been displaced to the right. This is effected by first changing the position of the weighted-lever r^4, so that the latter gets the position shown in Fig. 13, then displacing the shaft s^2 with wheel s', so that this wheel comes into gear with cog-wheel s, and finally changing the position of lever r^4 again, so that thumb t of sleeve t' is laid now against the other side of cog-wheel s', as to be seen in Fig. 9. In order to effect that, bevel-wheel p with spindle d instantly ceases turning when pawl p^4 has ceased to act on the ratchet-wheel p^3 (for the purpose of getting perfectly equal and sharp cuttings), the nave of wheel p is to its greatest part surrounded by a strong spring w, Figs. 8 and 9, the two legs $w'\ w^2$ of which are forked and embrace the shaft s^2, as shown in dotted lines in Figs. 11 and 13. Leg w' of spring w is prevented from giving way to the left side by a pin w^3 screwed into the frame of the machine, while the other leg can be moved a short way left hand by a swell s^4 of shaft s^2 every time when this shaft is set out of gear with shaft p^2 (by the cog-wheels $s'\ s$). The spring $w\ w'\ w^2$ is then pressed on the nave of wheel p, so as to act now as a brake with regard to this wheel, and to prevent undue movements of the latter. The braking power is, however, not so great as to interfere with the proper intermediate rotation of spindle d by pawl p^4 and ratchet-wheel p^3. If, afterward, shaft s^2 is displaced to the right (Fig. 9), the swell s^4 leaves the

leg w^2 of the brake-spring, so that the backward movement of the slide by means of hand-wheel s^3 is not hindered.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a file-cutting machine, the combination with a chisel-bar f adapted to be raised intermittently, of an elastic body h adapted to be compressed or strained by the raised chisel bar, and to strengthen the blows of the same; a counter bearing a^4 for said elastic body; a double-armed lever $m\ m'$ connected with one end to said counter-bearing; an eccentric l^2 holding said double-armed lever, and adapted to raise and lower the same; a draw- or push rod n connected with the other end of said lever, and adapted to turn the latter on said eccentric; a lever l' connecting the shaft of said eccentric with a rod k' arranged parallel to the chisel-bar; and an exchangeable ledge i arranged on the file-bed and adapted to displace said rod longitudinally, substantially and for the purpose as described.

2. In a file cutting machine, the combination with a chisel-bar f adapted to be raised intermittently, of an elastic body h adapted to be compressed or strained by the raised chisel bar, and to strengthen the blows of the same, a counter bearing a^4 for said elastic body; a double-armed lever $m\ m'$ connected with its one end to said counter-bearing; an eccentric l^2 holding said double-armed lever, and adapted to raise and lower the same; a draw- or push-rod n connected with the other end of said lever, and adapted to turn the latter on said eccentric; a lever l' connecting the shaft of said eccentric with a rod k' arranged parallel to the chisel-bar; an exchangeable ledge i arranged on the file-bed, and adapted to displace said rod longitudinally, a weighted lever o^3 adapted to press the file onto said bed by the mediation of a roller o; and a lever o^6 having a thumb o^9 and connected by a link o^5 with said weighted lever; the latter being adapted to be held in raised position by said thumb, and to raise in its turn the said rod k', substantially and for the purpose as described.

3. In a file cutting machine, the combination with a chisel-bar f adapted to be raised intermittently, of an elastic body h adapted to be compressed or strained by the raised chisel-bar, and to strengthen the blows of the same; a counterbearing a^4 for said elastic body; a double-armed lever $m\ m'$ connected with its one end to said counter-bearing; an eccentric l^2 holding said double-armed lever, and adapted to raise and lower the same; and a draw- or push-rod n connected with the other end of said lever, and adapted to turn the latter on said eccentric; a lever l' connecting the shaft of said eccentric with a rod k' arranged parallel to the chisel-bar; an exchangeable ledge i arranged on the file-bed, and adapted to displace said rod longitudinally, a rod g^4 connecting an eccentric g^3 on the shaft g' with a lever p^5 carrying a pawl p^4; a shaft p^2 having a ratchet-wheel p^3 operated by said pawl, and a bevel-wheel p' gearing with a bevel wheel p on a threaded spindle d adapted to intermittently displace the file-bed $b\ b'$; a rotatable ledge r' adapted to disengage pawl p^4 from ratchet-wheel p^3; a shaft r^3 carrying a weighted lever r^4, and a cog-wheel r^2 gearing with a like wheel r carrying the said ledge r', substantially and for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JEAN BÊCHÉ, JR.

Witnesses:
WM. ESSENWEIN,
F. H. STRAUSS.