No. 842,729. PATENTED JAN. 29, 1907.

A. VERNET.

PUNCHING MACHINE.

APPLICATION FILED NOV. 6. 1906.

4 SHEETS—SHEET 1.

Fig. 2.

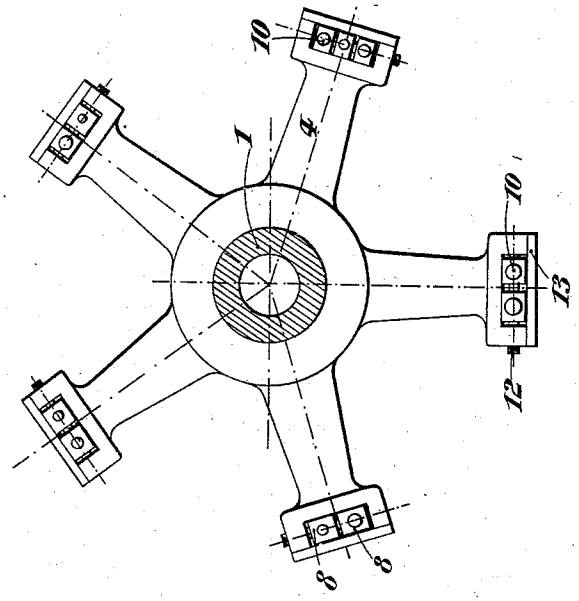
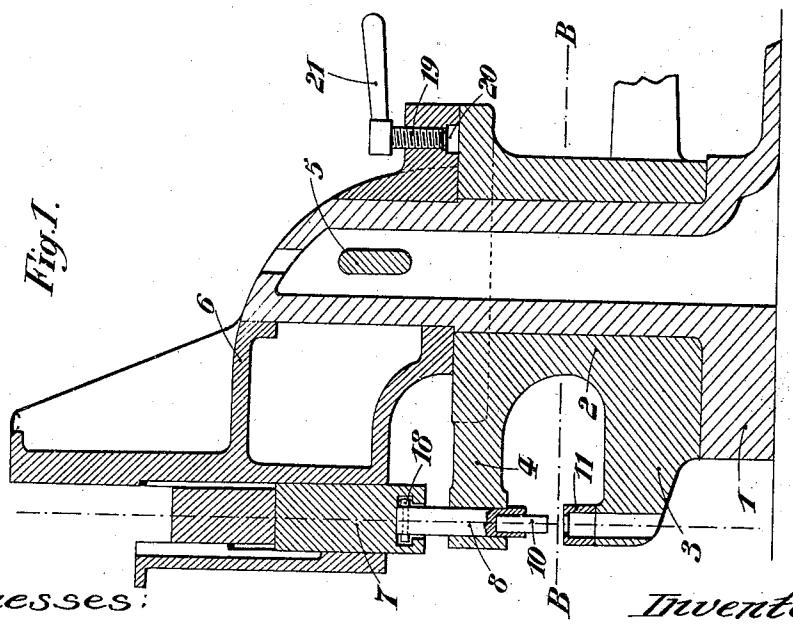


Fig. 1.



Witnesses:

C. D. Kesler

Inventor

Arthur Vernet

By

James L. Norris

Atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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4 SHEETS—SHEET 2.

Fig. 5.

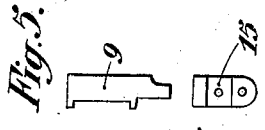


Fig. 4.

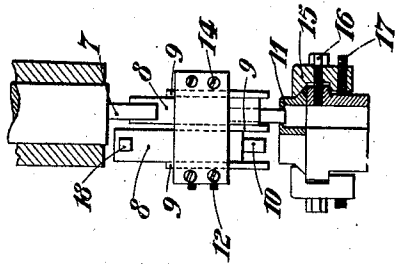
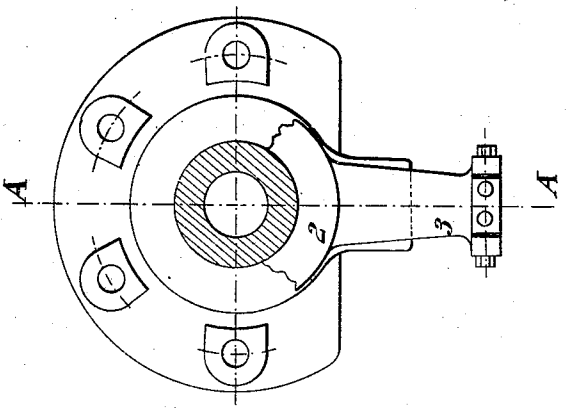


Fig. 3.



Witnesses:

Inventor

Arthur Vernet

By James L. Norris.

Atty

THE NORRIS PETERS CO., WASHINGTON, D. C.

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4 SHEETS—SHEET 3.

Fig. 6.

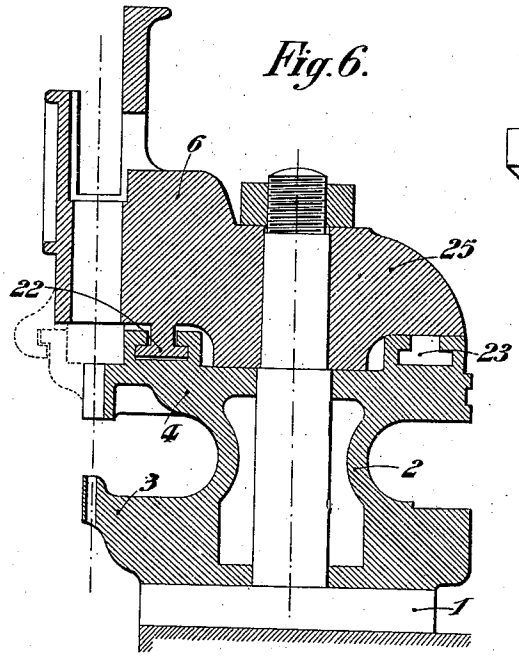


Fig. 8.

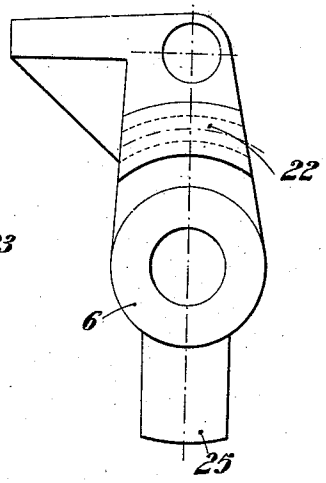


Fig. 7.

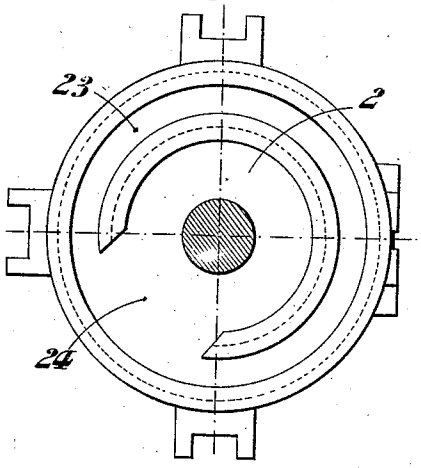
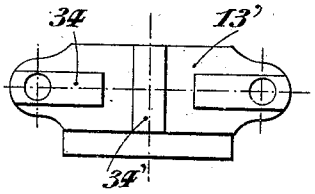


Fig. 14.



Witnesses:

W. B. Kesler

C. D. Kesler

Inventor

Arthur Vernet

By

James L. Norris.

Atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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4 SHEETS—SHEET 4.

Fig. 9

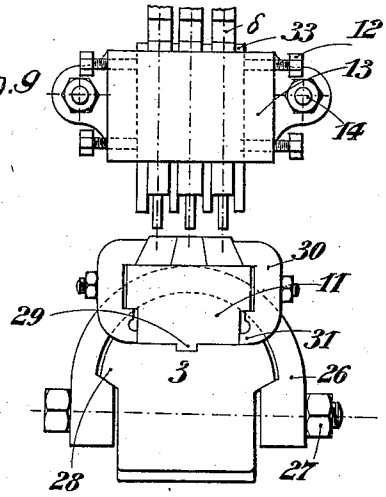


Fig. 10.

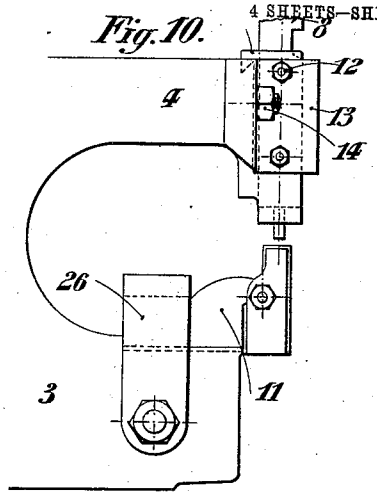


Fig. 11.

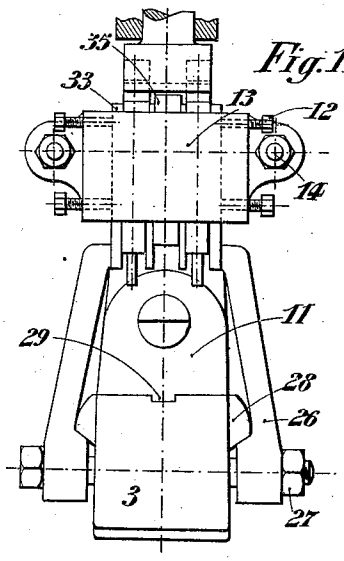


Fig. 12.

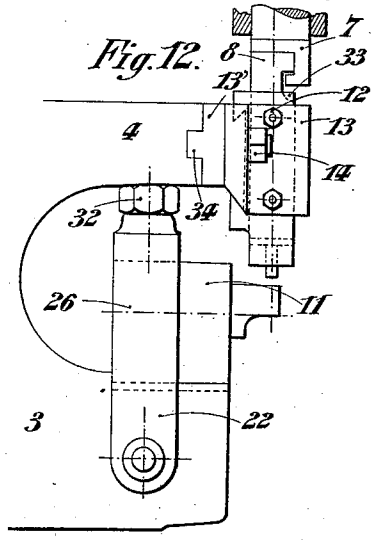


Fig. 13.

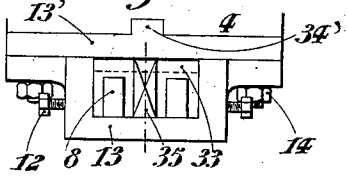


Fig. 15

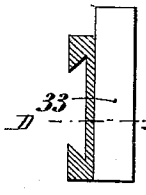
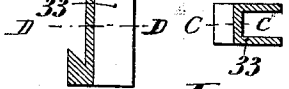


Fig. 16.



Witnesses:

C. D. Kesler

Inventor

Arthur Vernet

By James L. Norris

Atty

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ARTHUR VERNET, OF DIJON, FRANCE.

PUNCHING-MACHINE.

No. 842,729. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed November 6, 1906. Serial No. 342,290.

To all whom it may concern:

Be it known that I, ARTHUR VERNET, engineer, a citizen of the French Republic, residing at Dijon, Department of Côte d'Or, France, and having post-office address 4 Rue de Colmar, in the said city, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

This invention has for its object improvements in the disposition of the punches and dies in punching-machines and in multiple-action punching and shearing machines operated by hand or power. This arrangement permits of changing the punch and the corresponding die by a simple rotation, while at the same time leaving free access for the punching.

In accompanying drawings, Figure 1 represents a vertical section through the device on the line A A of Fig. 3. Fig. 2 is an underneath view of the upper part of the machine on the section-line B B of Fig. 1. This figure shows the punch-carrying arms. Fig. 3 is a horizontal section on the line B B of Fig. 1, showing the disposition of the frame and of one of the die-carrying arms, the other arms being broken away. Fig. 4 is a front elevation, partly in section, of a punch-holder with the corresponding die-holder. Fig. 5 shows a detail. Fig. 6 is a vertical section of a modified form of the device. Fig. 7 is a corresponding plan view of the cylinder carrying the punches and dies. Fig. 8 is an underneath view of the piece carrying the device which puts in motion the punches. Figs. 9 and 10 represent in elevation and in side view a modification of the ends of the arms carrying the punches and dies. Figs. 11 and 12 are analogous views to Figs. 9 and 10, showing another modification. Fig. 13 is a plan view of this last modification. Fig. 14 is a back view of the same. Fig. 15 is a vertical section of a slide through line C C of Fig. 16, and Fig. 16 is a transverse section of a slide through line D D of Fig. 15.

The machine comprises a base-plate 1, forming an upright around which a cylinder 2, provided at its lower part with arms 3, carrying the dies, and at its upper part with arms 4, carrying the punches, is able to rotate. At the upper part of the upright of the box-plate 1 there is fixed, by means of a key 5, another cylinder 6, which forms the upper part of the frame and in which there moves a slide-block 7, operating the punch-holders. This slide-block is actuated by any appropriate means. Each of the punch-carrying arms 4 of the rotatable cylinder 2 terminates in a fork. The number of these arms should not exceed five in order to give free access and wide clearance for the punching. In this fork there are engaged two or three punch-holders 8, for example, which are of rectangular cross-section and which are separated by distance-pieces 9. (Represented in detail in Fig. 5.) These distance-pieces 9 serve both to guide and stop the plate that is being operated upon.

The punches 10, fixed to the punch-holders, may be of any appropriate kind, as may also the dies 11, corresponding to them.

12 designates a set-screw of the punch-holders, and 13 a plate fixed in front of the fork of the arms 4 for retaining the punch-holders. This plate 13 is fixed by means of screws 14.

The arms 3 carry at their extremities the dies 11. These are held by claws 15, fixed by means of screws 16 and regulated by screws 17. The punch-holders are provided at the upper part with a square-headed screw 18, intended to engage in the fork of the slide-block 7 in order to permit of lifting them. The punch and die that it is desired to employ are brought beneath the slide-block 7 in such a manner that the square-headed screw 18 of the punch-holder engages in the recess formed at the lower part of the slide-block.

In the back part 6 of the frame there is formed a screw-threaded hole in which a lock-screw 19 engages. This screw bears against a wedge 20 and is operated by means of a handle 21. This screw serves to momentarily fix the position of the rotatable cylinder 2 and at the same time permits of the partial revolution into traction of the reaction upon the frame 1 in the punching operation. In fact, the reaction of the punching operation and the reaction of the lock-screw 19, both forces being applied upon the cylinder 6, have as a result a force directly following the axle of the pivot of the machine. This column is so not subjected to flexion.

In order to obtain the same result, the frame of the punching-machine may be modified as it is shown on Figs. 6, 7, and 8. The base-plate 1 of the punching-machine is provided with a column around which is able to rotate a cylinder 2, provided with arms 3,

carrying the dies, and arms 4, carrying the punches—four arms of each species, for example. At the upper part of the column there is fixed a piece 6, forming the upper part of the frame and in which there moves the block operating the punch-holders. The piece 6 carries under itself a T-shaped circular key 22, which moves without play in a like-shaped groove 23, made on the upper part of the cylinder 2. In order to permit the setting, a part 24 of the internal edge of this groove is left out. This part 24 may after setting be closed with an adjusted and bolted piece in order to provide the groove with a continuous circular internal edge. Moreover, the back part 25 of the piece 6 lays on the cylinder 2. With such a device the central column is quite delivered from flexion. It must be remarked that the key 22 may be a part of the cylinder 2, while the groove 23 may be made in the piece 6.

In the powerful machines the point of catching instead of being situated between the points of application of the traction and of the compression may be situated before the point of application of the traction, as it is shown in dotted lines in Fig. 6.

Figs. 9, 10, 11, and 12 show modifications of the parts carrying the dies. The die-holders 11 can be fast and easily set up the arm 23 by means of a half-clamp 26, maintained upon the die-holder by the nut 27. The tightening is very strong, owing to the stocks 28, carried by the arm 3, against which tightens corresponding parts of the clamp 26. The exact position of the die-holders is secured by means of a piece 29, engaged into a corresponding hole made upon the arm 3. As it is shown in Fig. 9, the position of the dies can easily be ordered by means of a claw 30, provided with projections 31. In some cases the clamp 26 may have a bolt 32, Fig. 12, which by securing against the lower part of the arm 4 makes the whole of the two arms 3 and 4 very much stronger.

Figs. 9 and 10 show modifications of the parts carrying the punches. The end of the arm 4 is plane, and the punch-holders 8 are maintained against it by means of the piece 13, which has the same form that is shown in Fig. 13 and which is secured against the arm 4 by means of the nuts 14. The punch-holders move vertically in slides 33, which are seen in elevation view, Figs. 9 and 11, in side view, Figs. 10 and 12, in plan view, Fig. 13, and in section, Figs. 15 and 16. With such a disposition every punch may be acted successively by means of the block 7 or simultaneously, as it is shown in Fig. 11. In this case the lower part of the block 7 is enlarged in order to rest upon all the punch-holders, and the punch-holders may be separated by a distance-piece 35 of variable dimensions.

Instead of using the described means for maintaining the punch-holders against the arm 4 it is possible to set them in a kind of box 13 13′, as it is shown, Figs. 11, 12, 13, and 14. The back side 13′ of this box is provided with crossed projections 34 34′, which enter in corresponding holes made on the arm 4.

Having thus described and ascertained the nature of my invention and in what manner the same may be performed, I declare that what I claim is—

1. A punching-machine in which tools are carried upon arms forming part of a cylinder capable of turning around the vertical axle of the machine, means being provided for securing the cylinder in position and for avoiding the flection of the axle during the punch working, each upper arm of said cylinder carrying several punches, each lower arm of said cylinder being provided with means for facilitating taking up, taking down and regulating of the tools, substantially as described.

2. A punching-machine, in which tools are carried upon arms forming part of a cylinder capable of turning around the vertical axle of the machine, each upper arm of said cylinder carrying several punch-holders, each punch-holder being provided with one punch, these punch-holders being of a square section in order to permit an easily grouping of them at the end of said arm, the passage from one punch to the other being effected by partial rotation of the cylinder, substantially as described.

3. A punching-machine in which tools are carried upon arms forming part of a cylinder capable of turning around the vertical axle of the machine, a screw being engaged in a threaded hole formed in the upper part of the frame of the machine and bearing upon said cylinder, in order to fix the position of said cylinder and to avoid flection of the vertical axle, substantially as described.

4. A punching-machine in which tools are carried upon a cylinder capable of rotating around the axle of the machine, this cylinder being provided with a circular T-shaped groove in which engages a like-shaped key forming part of the upper part of the frame of the machine, substantially as described.

5. In a punching-machine, a base having an axis, a rotatable cylinder mounted on the axis and having a plurality of arms, punch-holders carried by the arms, and means for spacing the same from each other.

6. In a punching-machine, a base having an upright forming an axis, a rotary cylinder mounted on said upright and having arms, one for supporting punch-holders, and the other dies, means for mounting and adjusting the punch-holders relative to each other, a secondary cylinder above the first-mentioned cylinder and having a sliding block for actuating the punch-holders, and means for momentarily fixing the relative position of the cylinders.

7. In a punching-machine, a rotating cylinder having arms, one for supporting punch-holders and the other for supporting the dies, spacer means for the punch-holders to vary the relative distances to each other, and means for mounting the punch-holders and dies.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR VERNET.

Witnesses:
EMILE KLOTZ,
MAX DE RIVAUD.