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H. AIKEN.

COUNTER BALANCE FOR METAL SHEARS, &c.

No. 421,537. Patented Feb. 18, 1890.

Fig. 2.

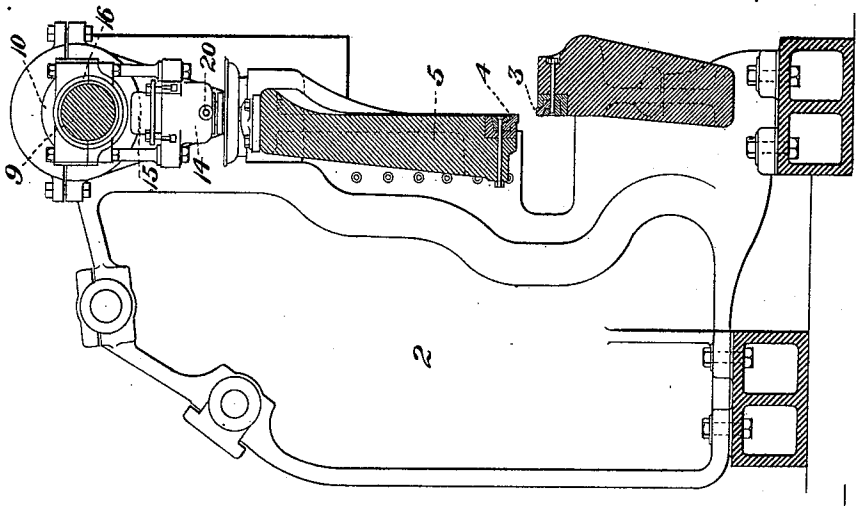
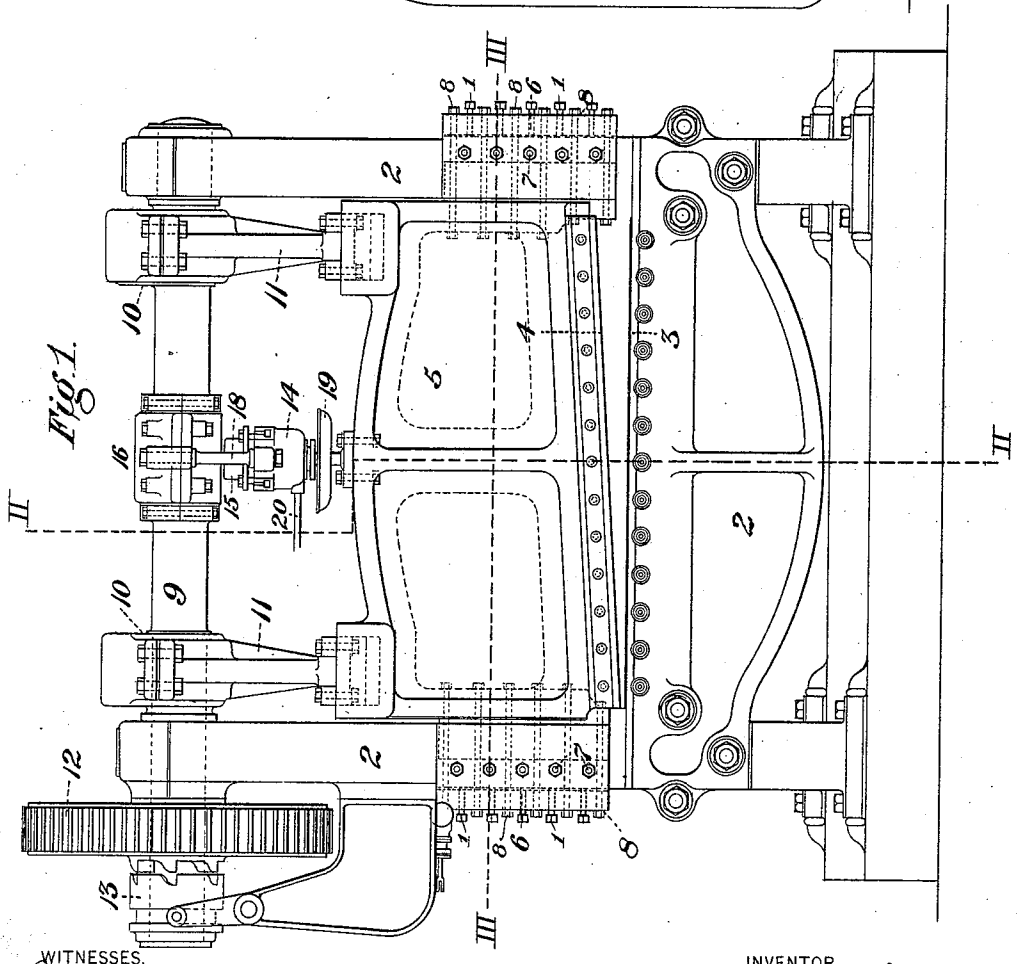


Fig. 1.



WITNESSES.

C. M. Clarke

Thomas W. Bakewell

INVENTOR.

Henry Aiken

N. PETERS, Photo-Lithographer, Washington, D. C.

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H. AIKEN.

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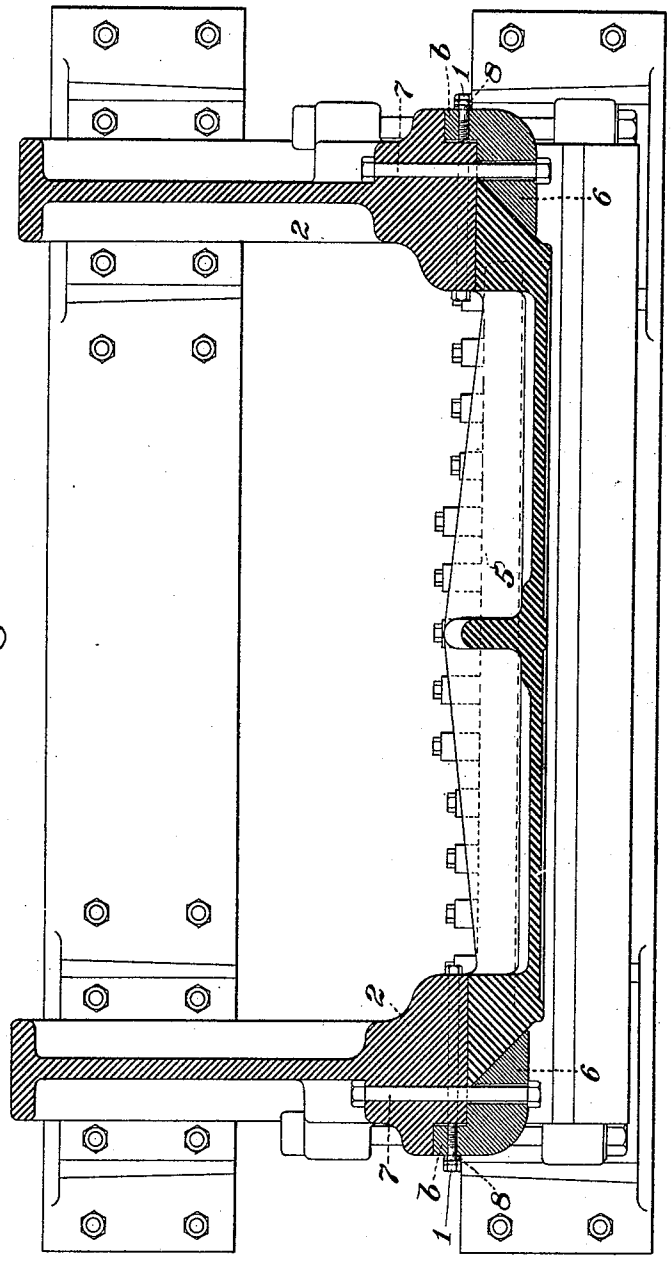


Fig. 3.

WITNESSES.

J. M. Clarke

Thomas W. Bakewell

INVENTOR.

Henry Aiken

N. PETERS, Photo-Lithographer, Washington, D. C.

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H. AIKEN.

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Fig. 4.

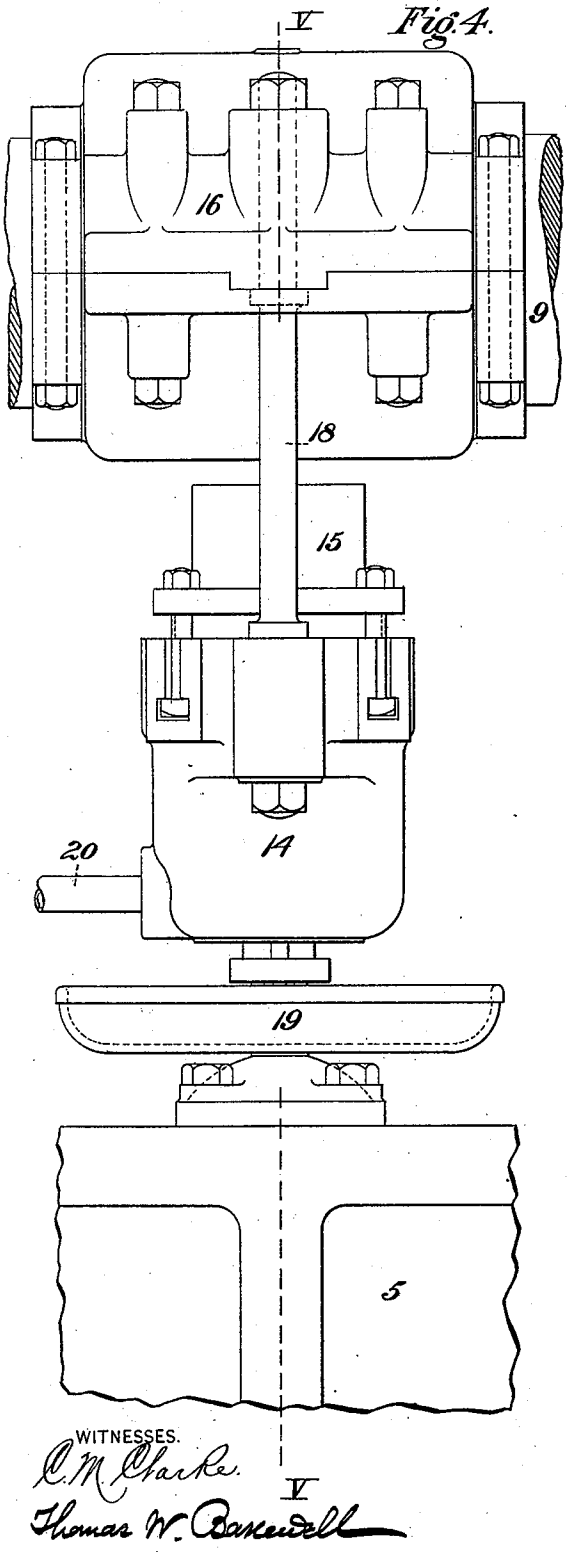
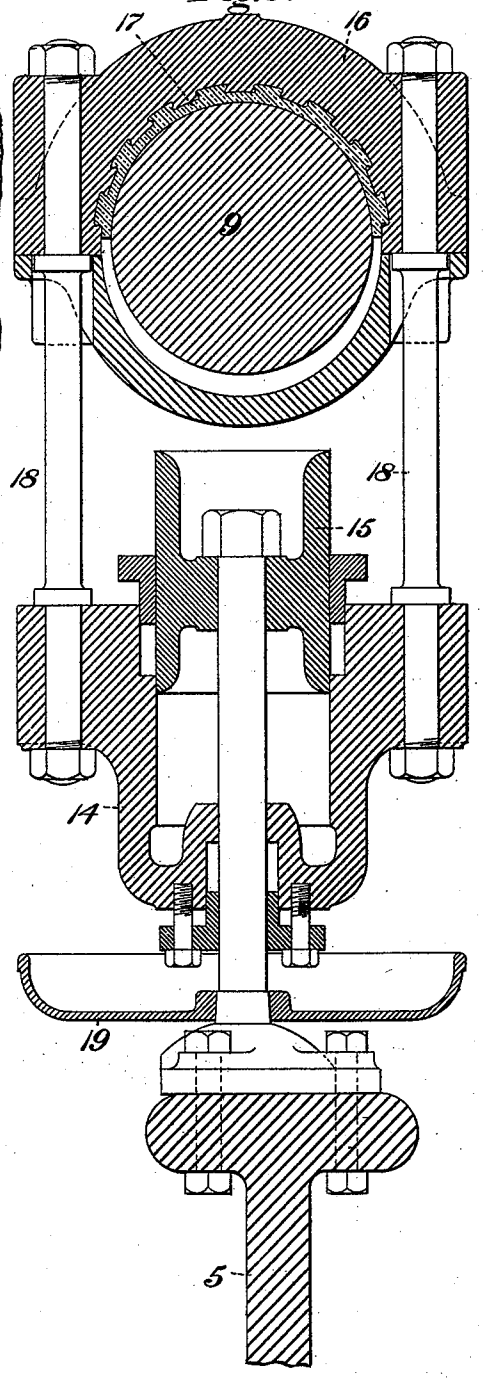


Fig. 5.



WITNESSES.

C. M. Clarke.

Thomas W. Bakewell

INVENTOR.

Henry Aiken

N. PETERS, Photo-Lithographer, Washington, D. C.

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H. AIKEN.

COUNTER BALANCE FOR METAL SHEARS, &c.

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Fig. 6.

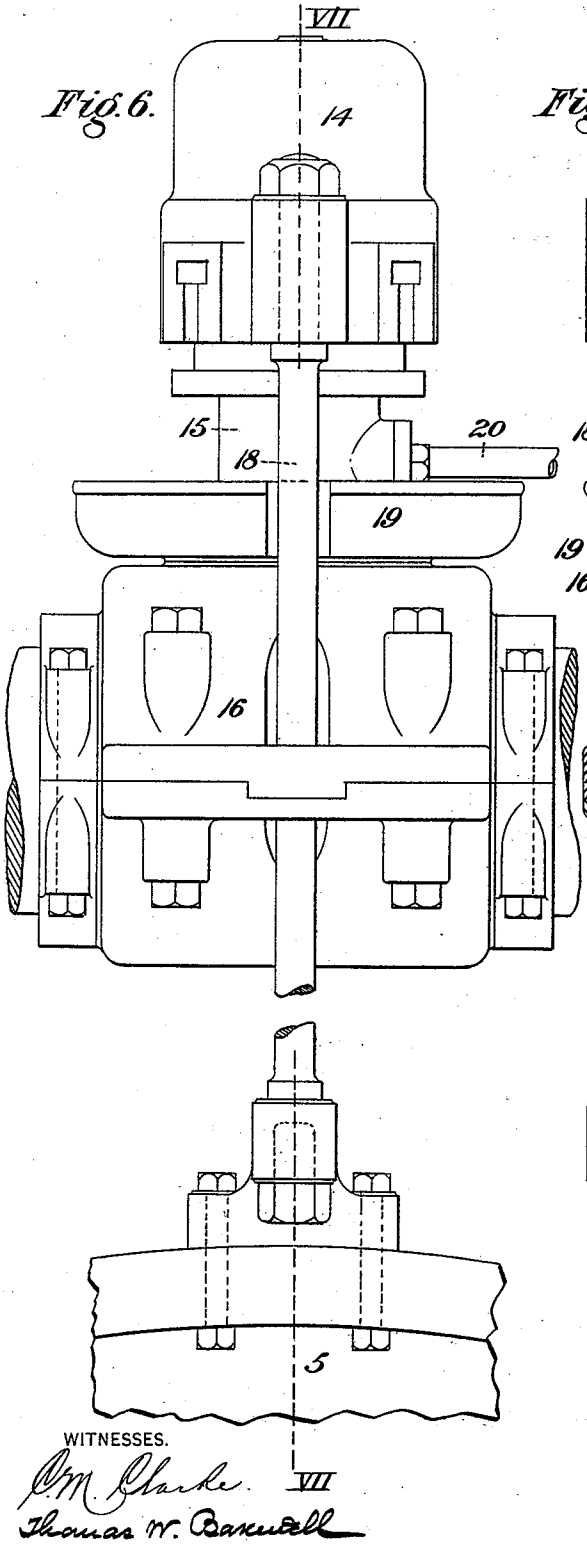
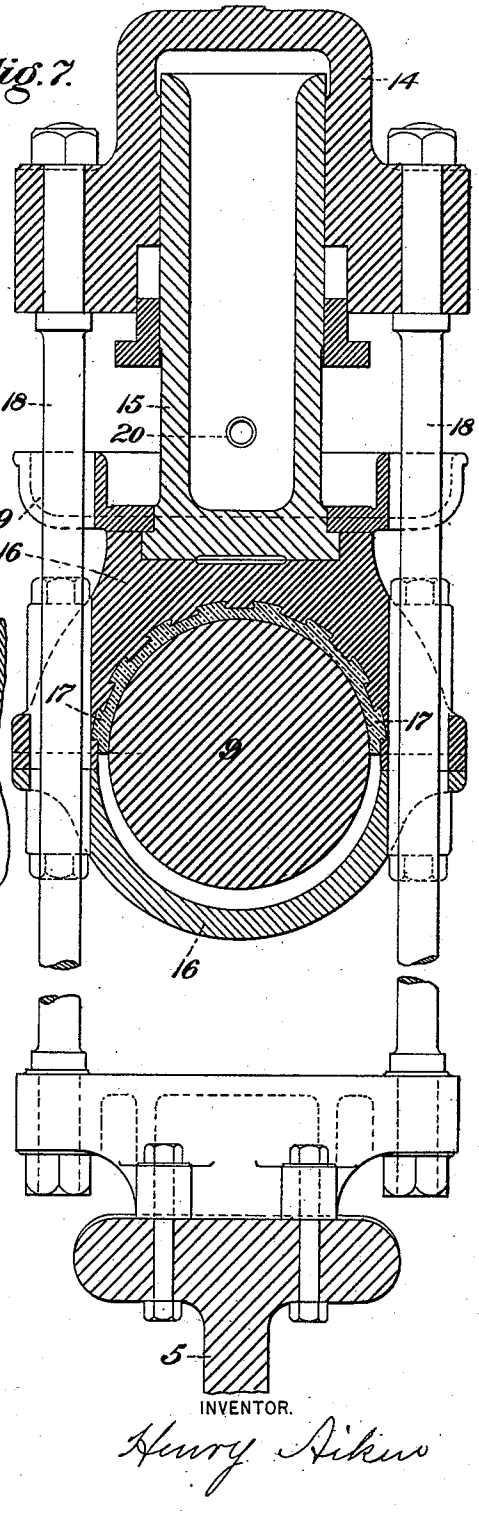


Fig. 7.



WITNESSES.

O. M. Clarke.

Thomas W. Barnwell

INVENTOR.

Henry Aiken

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF HOMESTEAD, PENNSYLVANIA.

COUNTER-BALANCE FOR METAL SHEARS, &c.

SPECIFICATION forming part of Letters Patent No. 421,537, dated February 18, 1890.

Application filed March 30, 1889. Serial No. 305,412. (No model.)

To all whom it may concern:

Be it known that I, HENRY AIKEN, of Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Counter-Balances for Metal Shears, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved shears. Fig. 2 is a vertical section thereof on the line II II of Fig. 1. Fig. 3 is a horizontal section on the line III III of Fig. 1. Fig. 4 is an enlarged front elevation of a portion of the shears. Fig. 5 is a vertical cross-section on the line V V of Fig. 4. Fig. 6 is an enlarged front elevation of a modified form of that portion of the shears shown in Fig. 4. Fig. 7 is a vertical section on the line VII VII of Fig. 6.

Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the frame or body of the shears.

3 is the stationary shear-knife, and 4 is the moving shear-knife, which is secured to the lower edge of a vertically-movable knife holder or head 5, the shape of which is shown in front elevation, vertical section, and horizontal section, respectively, in Figs. 1, 2, and 3. The lateral ends of the knife-holder are made angular in form and fit against the vertical faces of the shear-frame, as shown in Fig. 3. It is held in place and guided in its vertical motions by means of face-plates 6, having beveled inner sides adapted to fit against the beveled ends of the moving head, and having lateral heels or projecting portions *b*, which extend to the sides of the shear-frame and bear against the ends of vertical recesses formed in the latter, as shown in Fig. 3.

7 7 are bolts, which extend through the shear-frame and the face-plates 6 at right angles to the outer faces of the latter.

8 are bolts traversing the shoulders *b* and the shear-frame transversely to the bolts 7, and 1 1 are set-bolts, which extend through the shoulders *b*, and at their inner ends bear against the shear-frame. By means of these several bolts the face-plates can be adjusted to fit very accurately against the ends of the moving knife-holder without binding upon the same, the bolt-holes of the bolts 7 being for this purpose laterally enlarged somewhat in the face-plates 6, so as to permit the face-plates to be moved sidewise in the act of adjusting them.

In adjusting the face-plates their proper position relatively to the shear-knife is determined by setting of the bolts 1, and when thus set in such position as to confine the shear-blade without binding they are firmly locked in place by tightening the bolts 7 and 8.

I am not the first to form a shear-knife holder with laterally-beveled edges and to hold it in place by face-plates or guide-strips. The novelty of my invention in this regard consists in providing the face-plate with a lateral shoulder or projection bolted to the shear-frame and provided with means for adjustment, substantially as hereinbefore described, the advantage of this construction being that the knife-holder is adjustably held with great security, the face-plate is very easy to adjust, and is so braced by its bearing at the lateral shoulder that it will not yield under the lateral strain to which it is subjected in the use of the shears. This construction is simpler, requiring fewer parts and possessing greater strength, and affording better facilities for adjustment than any prior construction known to me.

The knife-holder is reciprocated vertically by power transmitted from a rotary shaft 9 through eccentrics 10 and connecting-rods 11, the shaft being driven by means of suitable gearing 12 and a clutch 13 or otherwise.

In order to counterbalance the knife-holder and to prevent loose motion between it and the ends of the connecting-rods 11, I employ the device shown in Figs. 1, 2, 4, and 5, consisting of a motor-cylinder 14, connected with or mounted on the shaft 9 and having a piston 15, whose rod is connected directly with the knife-holder. A continuous pressure of a fluid—such as steam or water—is exerted on the piston, and is transmitted to the knife-holder, which is counterbalanced thereby, and as this pressure is opposed to the action of the eccentrics the shaft itself is balanced and strain thereon in the act of shearing is very largely prevented, while the constant drawing of the knife-holder against the ends of the connecting-rods entirely prevents loose mo-

tion of these parts and renders the shears noiseless and regular in their action.

The cylinder is mounted on the shaft preferably as follows: A box 16, made in sections, having an internal anti-friction lining 17, is placed around the shaft and is connected by rods 18 with the cylinder 14, so that the shaft can rotate freely within the box.

20 is the fluid-supply pipe of the cylinder, and 19 is a cup or pan situate on the piston-rod below the cylinder and designed to catch the drip therefrom.

In Figs. 6 and 7 I show a modified form of this arrangement of the counterbalancing cylinder, in which the cylinder, instead of being suspended from the box 16, is placed above the same, the plunger or piston 15 being preferably fixed to the box, and the cylinder being vertically movable thereon. The rods 18, connecting the cylinder with the knife-head, pass through suitable sockets in the box. The fluid-supply pipe 20 enters the plunger, which for this purpose is made hollow, and instead of the plunger being vertically movable, as in Figs. 4 and 5, the cylinder is vertically movable; but the principle of operation in both forms of the apparatus is substantially the same.

Other modifications in form and arrangement of the parts of the apparatus within the scope of my invention will suggest themselves to the skilled mechanic.

I do not claim, broadly, a counterbalanced shear-knife holder; but I believe I am the first to arrange the counterbalancing mechanism on the shaft instead of placing it on a special entablature, the advantage of my construction being that it is very simple and comparatively inexpensive, and that it not only counterbalances the knife-head, but by opposing the cams renders the motion of the machine very regular.

I claim—

1. The combination of the moving head, its driving-shaft, and a counterbalancing cylinder mounted on the shaft and connected with the head, substantially as and for the purposes described.

2. The combination of the moving head, its driving-shaft, a box 16, set on the shaft so that the latter is rotatory therein, and a power-cylinder connected with said boxes and also connected with the head, substantially as and for the purposes described.

3. The combination of the moving head, the machine-frame, a retaining face-plate having a lateral projection or heel *b*, having a bearing at the end against the machine-frame, and securing-bolts, substantially as and for the purposes described.

4. The combination, with the moving head, of the machine-frame, a laterally-adjustable face-plate having a projection or heel, set-screws 1, passing through said projection and bearing against the machine-frame, and locking-bolts 7 and 8, by which the face-plate may be adjusted and fixed, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 23d day of March, A. D. 1889.

HENRY AIKEN.

Witnesses:
W. B. CORWIN,
THOMAS W. BAKEWELL.