or driving lever, which acts upon the progressive levers, or toggle joint; the arrangement of the machinery being such as to cause this to be done in nearly a direct line. It would require a drawing to explain the precise mode of effecting it, but the skilful machinist will, probably, catch the general idea from a short description. The lever with which the pull is made, has two projecting pieces at the head of it, giving it somewhat of a T form; in one of these projecting pieces, there is a friction roller which bears against the face of a piece of metal, which may be cast with, or attached within, the frame, or cheek, of the press. The opposite projection, through the intervention of a jointed lever, forces the pitman forward, upon the progressive levers. We think the arrangement a very good one, and a real improvement on this part of the printing press.

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a patent for a Hydrostatic Safety Valve for Steam Boilers. Granted to THOMAS EWBank, city of New York, August 27, 1832.

With a Copperplate.

To all whom it may concern, be it known, that I, Thomas Ewbank, of the city of New York, have invented a new safety valve, for the boilers of steam engines, which I denominate the hydrostatic safety valve, and that the following is a full and exact description thereof.

The form of my safety valve may be the same as that ordinarily used, namely, a truncated cone; instead, however, of being pressed downwards in the usual way, it is pressed upwards, by the weight of a column of water, mercury, or other fluid.

In the accompanying drawing those parts which are similar in the different figures are represented by the same letters.

Fig. 1 represents a section of the vessels by means of which the hydrostatic pressure is made. A, is an inner cylindrical vessel, which may be open at top, but is closed at bottom. This is placed within a second vessel, B, which is to contain water, or other fluid, by which the pressure is to be made. It is evident that when the vessel A is placed within the vessel B, and water is poured into the cavity between them, A will be pressed upwards with a force proportioned to the area of the bottom of A, and the altitude of the fluid in the cavity. C is a shallow vessel in which B stands, and is intended to receive any fluid which may escape from B. D, E, F, are cocks placed in B, to regulate the height of the fluid, and consequently to graduate the pressure; say to 50, 40, 30, and 20 lbs. to the square inch. G is a disk of wood, or other light material intended to stiffen the bottom of A, and which may also serve to receive the lower end of the valve rod, each end of which passes into cavities without the use of joints as ordinarily made.

Fig. 2 is a section of the valve in action. H, H, is a tube, one or

both ends of which open into the boiler at I, I. The inverted valve seat is seen at J in the upper part of this tube. K, K, are ledges to support the hydrostatic apparatus above the boiler. A piece of plank, or other bad conductor, is usually first placed upon the ledges. The valve L is drilled deeply on its lower side, to receive the rod M, the lower end of which rests on G.

Fig. 3, is a perspective view of the whole apparatus, the graduation by means of the corks being represented by figures.

As the steam in blowing off passes downwards, I usually place a cover on the vessel A, as shown at N, Fig. 4. A hole left in the centre of this cover allows the rod to play through, and a collar, O, formed upon the rod may cover the holes.

Fig. 4, represents a valve in its usual position, this section shows two holes drilled through the valve at P, P. I intend sometimes to drill a number of such holes, to prevent, or lessen, that adhesion which is known to men of science as having been described by Mr. Clement. The same provision is shown at Fig. 5. These holes I intend, in some instances, to connect together by turning grooves on the face of the valve, removing a portion of metal between them.

By the arrangement here described, the danger which arises from overloading the safety valve is entirely obviated, or rendered so difficult, and so palpable, if attempted, as to afford complete security on this score.

I have thus given particular exemplifications of the principle upon which my improved valve operates, not, however, intending to confine myself to the precise arrangement herein set forth, as this may be variously modified, whilst the general principle remains unchanged.

What I claim as my invention is the employment of hydrostatic pressure to close the safety valve; the using of the valve in the reversed position; the passing the ends of the valve rod into cavities prepared to receive them without the use of joints; and the drilling of holes through the valve, as above described, in order to prevent adhesion.

THOMAS EWBANK.

References to the Plate.

Fig. 1. Section. A, the inner cylinder closed at bottom. B, outer cylindrical vessel containing the water. B, lower vessel to receive the waste water from B. D, E, F, cocks to regulate the height of the water.

Fig. 2. Section of the valve in action. H, H, tube opening into the boiler at I, I. J, inverted valve seat. K, K, ledges or brackets which support the apparatus. L, valve. M, valve rod.

Fig. 3. Exterior view. The numerical figures exhibit the graduation by means of the cocks.

Fig. 4. Section, showing N a cover to the middle vessel, and O, a collar on the valve rod, to prevent the steam entering it; holes are also shown as drilled through the valve to prevent adhesion. These

are also shown at P, P, Fig. 5, where the valve is in its ordinary position.

Fig. 6. In this figure the dotted lines show how a tube may be placed to direct the steam upwards.

Fig. 7 shows a glass tube, substituted for the graduating cocks. This tube communicates at bottom with the water in the vessels; it is open at top, is graduated, and protected by a metallic case, with a slit its whole length to allow the height of water to be seen, the graduations being made either on the tube or its casing.

Remarks by the Patentee.

The defects in, and abuses of, the ordinary safety valve, which I have attempted to avoid in this, are,

1st. *The facility of overloading it, and that to any extent.*—This defect is greatly diminished, if not entirely obviated, in the hydrostatic valve; for when the extreme force of steam intended to be used in a boiler is determined, the diameter of A, and depth of B, are regulated to the pressure required, so that when the cavity between them, is filled with water, (or whatever fluid they are designed for,) the amount of pressure on the valve is then at its maximum: it cannot be increased: consequently, the elastic force of the steam can never rise higher than is sufficient to open the valves against that pressure.

The cocks are merely to ascertain, if desirable, the force of the steam when below its maximum.

2. *The strength of steam required to open the common valve cannot accurately be ascertained.* This arises from several causes, as the friction of the lever and connecting rod joints; which, from rust, &c. is often considerable, and cannot be exactly calculated, because not uniformly the same; the mode of raising the valve by the lever, which has a tendency to draw the top of it towards the fulcrum, and to move its spindle in an opposite direction to one side of the hole in the guide piece, against which it rubs; uniting the valve to the lever by bolts through the connecting rod, increases the evil, because the necessary play of these bolts, and the wear of the holes, prevent the true centre of pressure from being always precisely on the centre of the valve; consequently, the steam cannot raise it perpendicularly, but will influence it in an oblique direction, towards that side on which the external pressure is greatest; this will, of course, move its spindle in a contrary way when it binds itself against the guide piece as above mentioned. Its resistance, in such circumstances, will increase with the increasing force of the steam.

In the hydrostatic valve the whole of these defects are avoided. The bolts and lever are not used at all; and the rod which communicates to the valve the pressure against it, being tapered at its ends, presses only on its central points in countersunk holes; one on the under side of the valve, and the other on a piece of iron or brass attached to the bottom of vessel A. There is no friction in obtain-