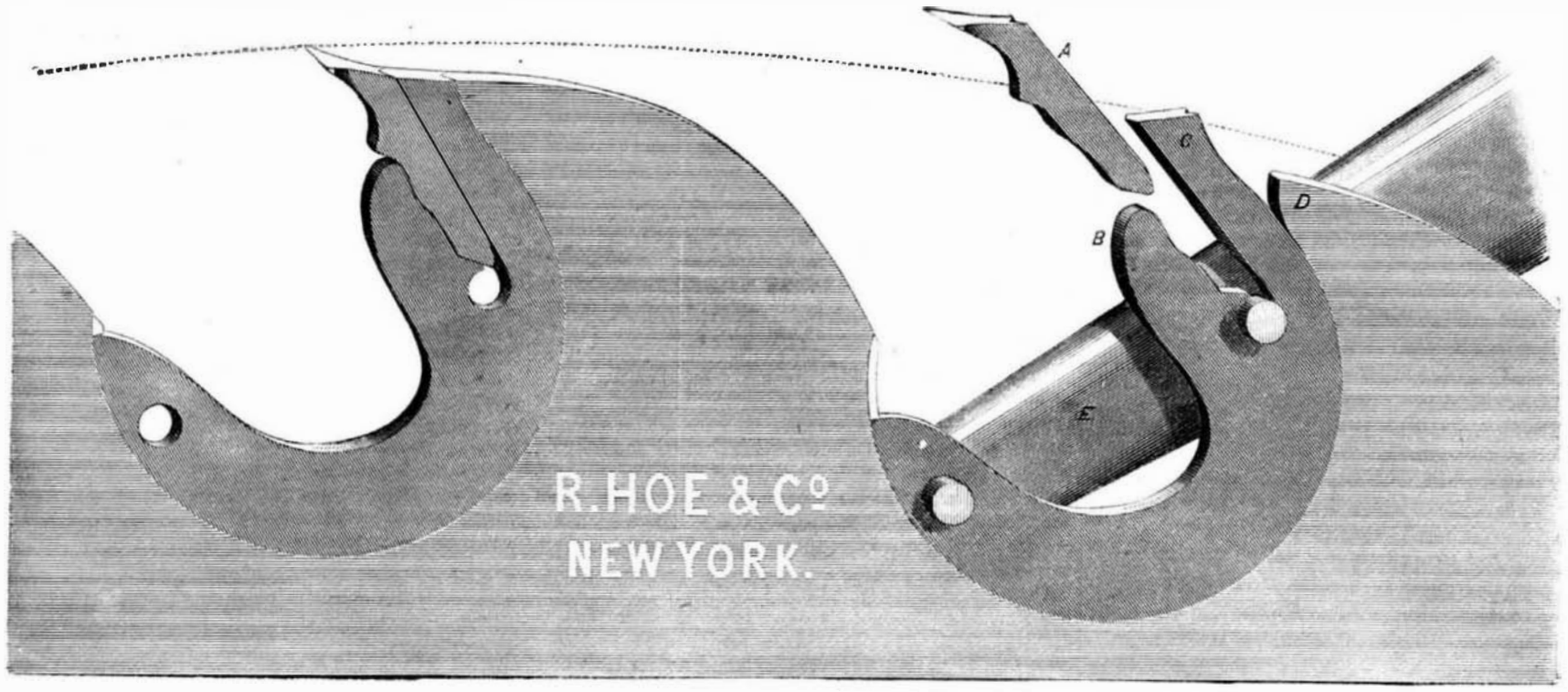
IMPROVED CHISEL TOOTH SAW.

The engraving given herewith represents a new chisel tooth saw, in which the teeth are highly tempered bits of steel, about one inch and a quarter in length, confined securely in place without wedges. No filing is required to keep the teeth in order. They are capable, we are informed, of cutting 45,000 feet of timber at an expense of not over three cents per thousand, and require no expert work to replace or keep them in order.

The mode of removing and inserting the teeth is shown on the right of the illustration. E is the wrench, which is applied to the shank and turned forward sufficiently to relieve the jaw, C, which will open and allow the tooth to come out. In the act of turning in, the projection on the inner edge of the jaw, B, closes into the depression in the front of the tooth, holding the latter thus firmly.

The first trial of this saw took place during the competitive tests conducted during the Cincinnati Exposit on of last fall. The diameter of the tool was 56 inches; teeth, 36; gages 5 eye, 7 teeth, and 2 kerf. An oak log, 16x16, was to be divided into 12 boards, and a poplar log, 20x20, into 16 boards. The following is the record of the saw: For oak—revolutions, 602; feed, 2¼: time, 1m. 58s.; number of perfect boards, 12; horse power indicated, 98·82; square feet of lumber per minute, 90; percentage of power used. 0·720. For poplar—revolutions, 605; feed, 3⅜; time, 2m. 45s.; perfect boards, 8; imperfect, 8; horse power, 114·73; square feet of lumber per minute, 109·1; percentage of power used, 0·689.

From the table showing the performances of this and other saws, which will be found in another column, the chisel tooth appears to be the only one which cuts a whole log into perfect boards. The tool was patented May 19, 1874, and is manufactured by Messrs. R. Hoe & Co, 504 Grand street, of this city, who may be addressed for further particulars.



HOE'S CHISEL TOOTH SAW.

ENGINE VALVE MOTION.

Our engraving represents an improved method of operating the slide valves of reciprocating engines, the construction of which will be clearly understood from the annexed engravings.

Fig. 1 is a longitudinal vertical section of Fig. 2, taken on the line *x x*. Fig. 2 is a plan view of the main cylinder with the valve chest removed, showing the steam passages and valve ports of the engine.

M is the cylinder, having steam passages, F and G, exhaust passage, C, and valve, B, as in ordinary engines. N is the steam chest, which is accurately bored out, having two pistons, A and A′, accurately fitted to the same. W and O are two collars on the rod which connects the two pistons, A A′, which form a yoke for the slide valve, B. D is a passage which communicates with the interior of the main cylinder. At the right hand this passage communicates with the small cylinder at K. F is a passage communicating with the main cylinder and with the left hand end of the small cylinder at L. I is one of a number of grooves cut in the main piston between the parts marked P P′. The number of these grooves is such that one or more will always be in communication with the passages, D or E, corresponding with the end of the stroke at which the piston, P P′, may be. H is a passage communicating with the interior of the main cylinder, and terminating in an annulus or ring opening in the middle of the exhaust, C. With the parts in the position shown in the engraving, steam is admitted into the steam chest, N, and will pass through the passage, F, and force the piston, P P′, from left to right, until the part, P, passes the passage, D; and then the steam will pass through D to K, and force the valve piston, A A′, from right to left, carrying with it the slide valve, B. Before the piston, A A′, moves from right to left, the left hand end of the small cylinder, at L, is full of steam, which has a tendency to resist the movement of the piston in that direction. The escape of this steam is through the passage, L E, and groove, I, in the main piston, to passage, H. The slide valve, B, will open the passage, G, communicating with the steam chest, and also open the passage, F, with the exhaust, C. The passage, H, terminates in an annulus in the center of the exhaust, C, as before stated. Now, the high tension of the exhaust steam will induce a draft or current through H, which will assist the exhausting of the steam from either end of the pistons, A A′. When this is effected the parts will be in a position to move from right to left in a similar manner.

Fig. 1.

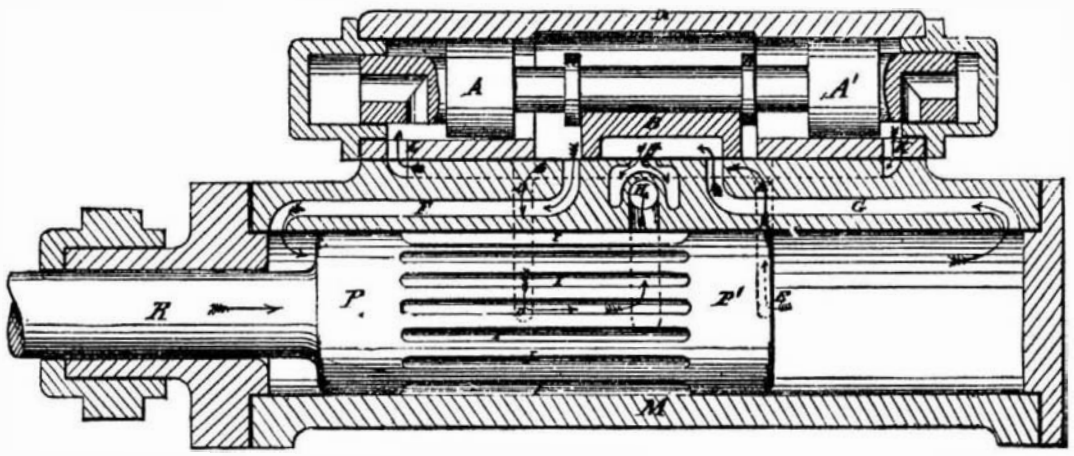
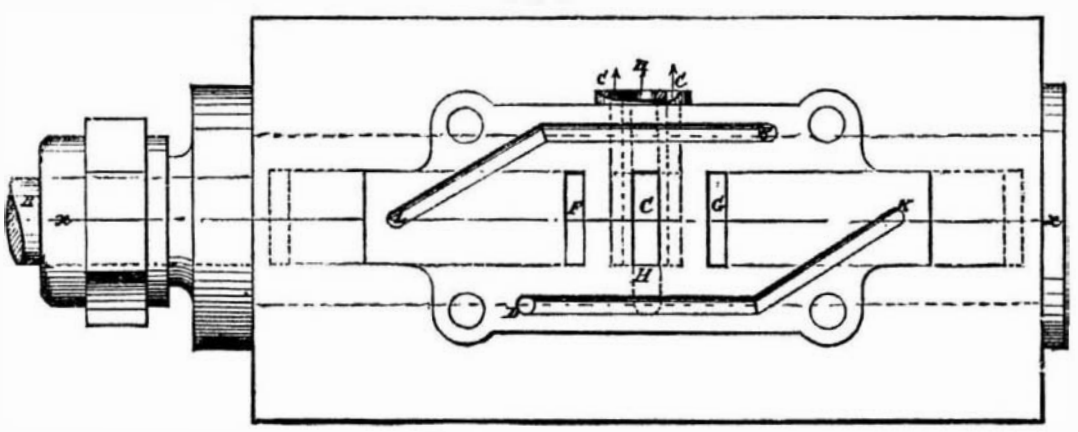


Fig. 2.



ENGINE VALVE MOTION.

Patented November 17, 1874, through the Scientific American Patent Agency, to James Brandon and Albert W. Trankle, New York city.

Amateurs or others who use hand lathes will find that the chattering of the hand tool may be stopped by placing a piece of leather between the tool and the rest.

Collodion.

The physical properties of films of collodion (such as one obtains after pouring collodion on clean glass and letting it dry) having been recently studied by M. Gripon (*Comptes Rendus*). The separated membrane reflects light like glass, and polarizes it both by reflection and by transmission. The index of refraction is 1·5108, a little less than that of crown glass; and with a thickness of 0·00039 inch, the membrane allows the passage of a considerable proportion of radiant heat; but it is less diathermanous the lower the temperature of the source. One may make polarizing piles of collodion (serving for either heat or light). They are much more transparent than the piles of mica which are usually employed in study of heat; and, if more fragile, are easily renewed.

Enlarging of Photo Negatives.

Among the various methods of enlarging, either suggested or carried into practical operation, that explained by Mr. V. Blanchard, at a recent meeting of the London Photographic Society, is received with much favor.

For a small negative an enlarged transparency on glass is obtained by the collodion process in the usual manner. The enlarged transparency is to be fully exposed, so as to possess every bit of detail existing in the small negative; and it must be a strong one, to permit its being used as a *cliché* in the printing frame. If there be any spots or defects, the pencil or brush may be used freely in removing them.

Here, then, we have obtained an enlarged, intense transparency. The next step is to place this in the printing frame in contact with a sheet of ordinary sensitized paper, either plain or albumenized. A paper very slightly albumenized is found to give the most pleasing results. When this is exposed to the light, the image printed upon the paper is not a positive but a negative, owing to a transparency being used as the *cliché*.

The printing must be carried very deep; this is of importance both as serving to secure all the detail, and also because of the lowering of the image by the subsequent operations. Fixing in hyposulphite of soda follows, the toning being omitted for obvious reasons.

The paper negative, which is the result of these operations, possesses a fine red color, which is very non-actinic and favorable to the production of bold, vigorous prints. But as paper is dense and stops much light, it is desirable, if not necessary, to impart to it some degree of translucence, for which purpose the negative is laid upon a hot plate or other surface, and is rubbed with white wax, which melts, fills up the pores of, and renders translucent, the negative thus treated the superfluous wax being removed by blotting paper.

A negative prepared in this manner is now ready to be used in the printing frame for the production of positive proofs. and from the fact that this new negative is upon paper, the opportunity is afforded to those so inclined to touch or work it up in a much easier way than could be effected upon a glass negative. Proofs printed from a paper negative of this kind possess the qualities characteristic of the fine calotypes.