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Sawing and Planing Machines.

Perhaps no class of machinery remained longer unimproved, after the American Revolution, than the saw mills. They were, until a comparatively late period, operated almost exclusively by water, and speed seemed to be scarcely thought of, not to speak of labor-saving appliances. Then "the old saw mill," as an inseparable appendage to the old-fashioned "grist mill," was the exact embodiment of that conservatism which glories in doing thus and so, because "father did it this way," and religiously believes in "letting well-enough alone." But saw mills have not escaped the late spirit of improvement, which is applying the mere vapor of the water, instead of the water itself, as a motor, and daily pointing out various other changes.

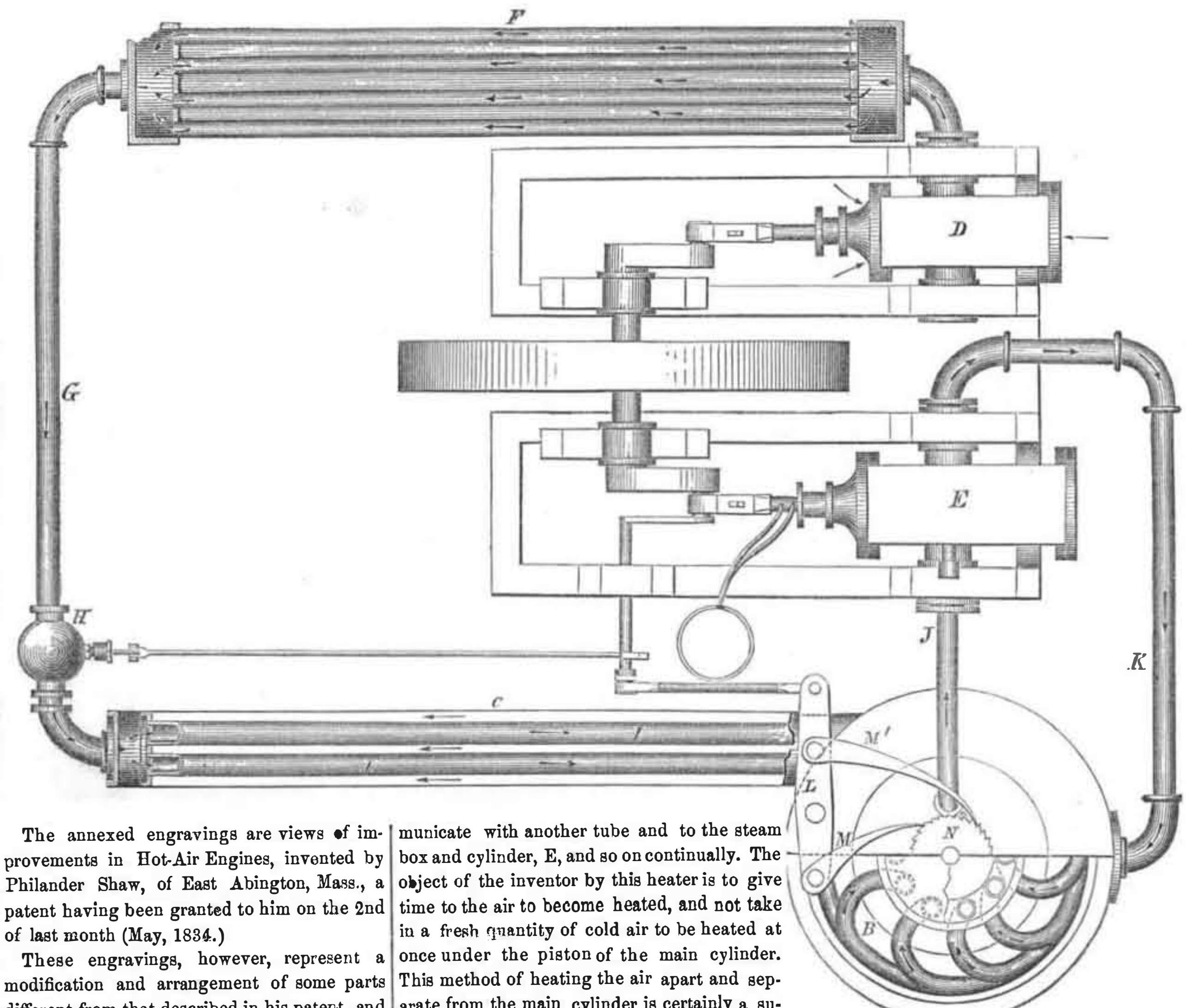
We have before us the specifications of two recent inventions of this class, one of which is put forth as both a sawing and planing machine, while the other claims to be intended for sawing alone. The inventor of the first named is Benjamin Fulghum, of Richmond, Ind., a vicinity which bids fair to become quite noted for its inventors in this and similar lines; he has applied for a patent on what he claims to be "a new machine for sawing and planing timber." Its peculiarity consists in arranging a saw, or a cylinder of cutters, within a carriage which is attached to a jointed frame. Thus the piece of timber operated upon is kept perfectly stationary, while the saw or cutters accomplish their allotted work.

The other invention referred to is claimed by Joseph Immel, of Urbana, Ohio, and consists of a peculiarity in the arrangement of the saw, and also in operating the carriage. Mr. I.'s machine is well adapted, we should think, for the preparation of cord wood and other similar work.

Improved Compensating Balance.

The inventive genius of our Trans-Hudsonic suburb, Jersey City, appears to be commendably awake. William H. Horton, of that place, has taken measures to secure a patent for an improvement of the compensating balances of chronometers of all classes, including clocks and watches. It consists in attaching the curb pins, whereby the action of the hair-spring is controlled, to a lever which is denominated a "curb lever," and which fits loosely around the staff of the balance. He connects this curb lever with the regulating index, or with some other fixed point near the balance, by means of a curved piece of metal called a "compensating curve." By the expansion and contraction of the metal of this compensating curve, pins are made to move upon the hair-spring. Thus a compensation for the expansion and contraction of the latter is obtained. Mr. Horton asserts that, with this advantage gained, and a careful adjustment of the hair-spring, a perfectly regular oscillation of the balance will be secured, together with a certainty of correct measurement of time by any chronometrical instrument to which his improvement may be applied.

SHAW'S HOT-AIR ENGINE.---Figure 1.



The annexed engravings are views of improvements in Hot-Air Engines, invented by Philander Shaw, of East Abington, Mass., a patent having been granted to him on the 2nd of last month (May, 1834.)

These engravings, however, represent a modification and arrangement of some parts different from that described in his patent, and believed to be improvements, while he has retained all the principal features claimed in the patent.

Figure 1 is a top view of the whole apparatus (the cylinder being an oscillating horizontal one) showing the air-compressing chamber, the entrance heating tubes, and the final heating tubes in section. Fig. 2 is an elevation, partly in section, of the air heater. (See next page.) The same letters refer to like parts on both figs.

A is the furnace; the heated products of combustion pass up on the outside of the final air-heating tubes, B, through the tubes in B', and then through the smoke pipe, C, in which are the entrance air-heating tubes, I. D is the feed air pump, and E is the main cylinder, in which is the working piston operated by the hot-air. The air pump, D, takes in air from the atmosphere, and forces it into the compresser, F, where it is maintained at 60 lbs. on the square inch. From the compresser, F, it is admitted into the tubes, I, in the smoke-pipe through the pipe, G. There is a valve in the pipe at H, which cuts off and lets in the air to the tubes, I. The heater, B, is composed of a series of tubes, forming a coil, which are connected with a perforated rotating top-plate moved round by the vibrating beam, L, which operates the ratchets, M M', which take into the teeth of the ratchet wheel, N, secured on the cap of the rotating heater coil, B. The air fed into the tubes in the smoke-pipe, takes up some heat from the escaping gases, and is admitted by rotation into the several pipes of the main heater furthest from the fire, while each tube in the coil which receives the concentrated heat of the fire, contains the exact quantity of air to be admitted into the main cylinder each stroke; then for the next stroke the top plate is moved one notch, and brought to communicate with another tube and to the steam box and cylinder, E, and so on continually. The object of the inventor by this heater is to give time to the air to become heated, and not take in a fresh quantity of cold air to be heated at once under the piston of the main cylinder. This method of heating the air apart and separate from the main cylinder is certainly a superior plan, and the means for giving the air a long heating circuit from the time it enters the smoke-pipe tubes to its final admission into E, is very ingenious. It will be observed that the hot air, after acting upon the piston, is employed to feed the fire. It is exhausted through the pipe, K, and passes up through the grate, as shown in fig. 2. This is a good idea and must effect a considerable saving of fuel.

The piston is kept cool, and the packing preserved from being burned out by a stream of water admitted through the hollow piston rod by tubes, as shown, and which circulates through the piston which is also hollow. The higher the air becomes elevated in temperature its pressure increases, therefore as it receives its concentrated heat of the fire in the coil heater, B, its pressure is far higher there than where it is injected into the entrance heating tubes, I. The advantage of this arrangement is, that it relieves the engine from working against the highest back pressure in feeding in the cold air, as it is fed into the feeding apparatus, where the temperature is comparatively low, while it is taken into the main cylinder, E, at its very highest temperature and pressure. The heads of the coiled pipes of the heater, B, are inserted close to the top plate, this latter acting the part of a rotating disk valve. It is intended to have a stream of cold water circulating through the compresser, F, so as to carry off the heat of the air developed by compression, and thus have the air in as condensed a state as possible when it enters the heater.

We cannot see the advantage to be derived from thus reducing the temperature of the air when that same temperature has to be given to it again—first cooling and then heating the air before it is used.

The main cylinder is 2006 inches area, and that of the pump 1209, area; the stroke of both is two feet. The power of this engine will be according to the quantity of air heated in a given time, and the temperature to which it is raised,—in other words, the pressure and velocity. The heat applied imparts the quality of expansion to the air. Expansion is the force of hot air and it is measurable in quantity, the same as the force of gravity,—the quantity of water which falls in a given time through or down a certain length of space. Thus 491 volumes of air will expand to 982—double the volume—when it becomes heated to 491° Fah., and at this temperature will exert a pressure of 15 lbs. on the square inch. This degree of heat is too high to be used in an engine, it would be impossible to keep the piston lubricated while exposed to such a temperature. The main cylinder, E, contains 27·85 cubic feet of air, and the feed pump, D, has a capacity of 16·79 cubic feet.

To make the calculation easier, but not the less plain, let us assume that the capacity of E is 28 cubic feet, and that of D 16—the difference being 12 or three-sevenths in favor of E, against the feed pump, D. As the large cylinder can only receive one pump full from D every stroke, however much it may condense the air in F, it follows that the average pressure in E, during the stroke, if the air is heated to 491°, will be 15—6 3-7=8 4-7 lbs. on the square inch during the stroke. If the air could be heated to give 50 strokes per minute, the power of the engine, would be 2006 × 8 4-7 × 100 ÷ 33,000 = 52·10 horse power. But then to do this the heater must be able to heat 600 cubic feet of air to 491° above its atmospheric temperature every minute. The "Ericsson" engines made only 19 strokes (semi-