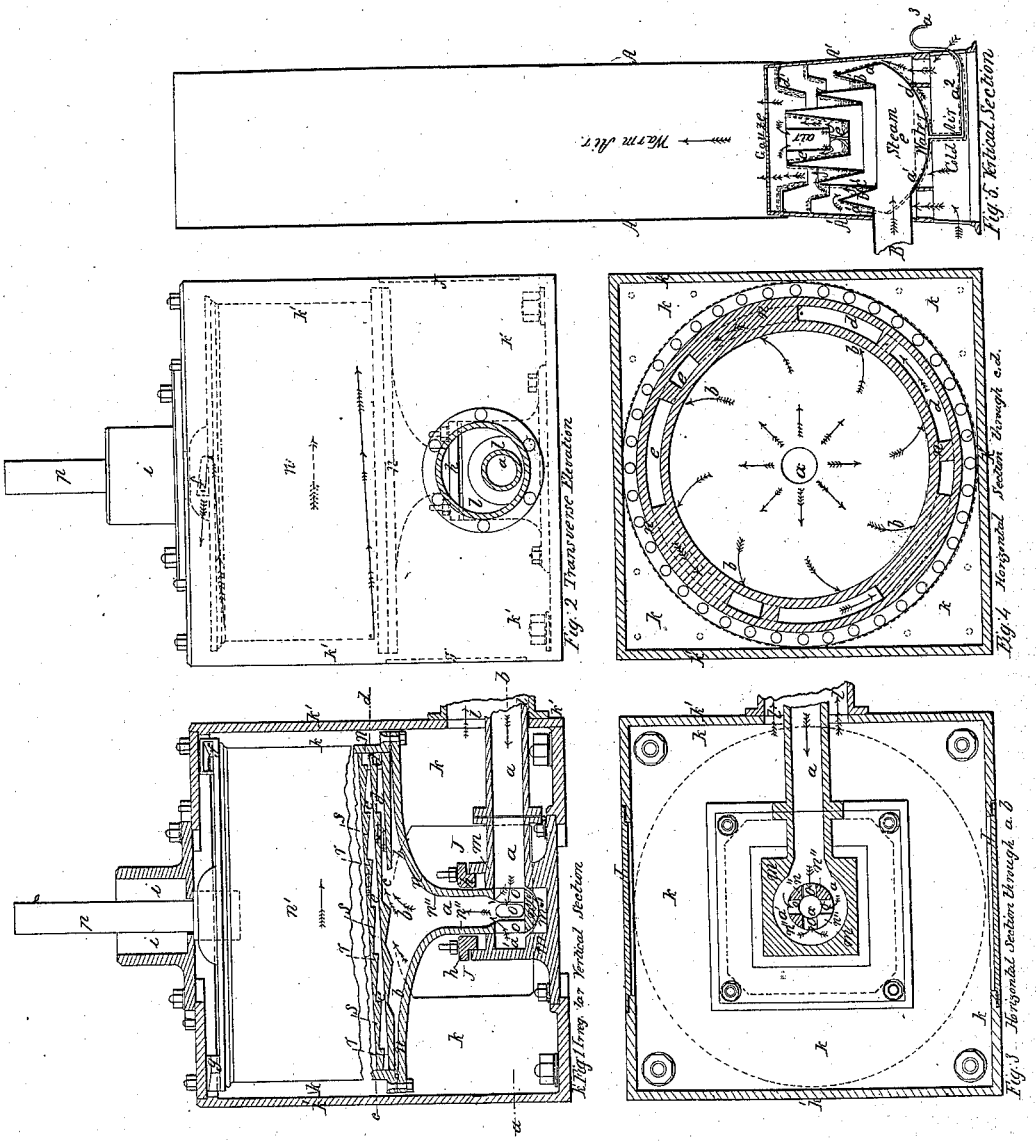
H. Pratt,

Water Wheel,

No. 2,517. Patented Mar. 28, 1842.



UNITED STATES PATENT OFFICE.

HENRY PRATT, OF GREAT BRITAIN.

IMPROVEMENT IN THE MANNER OF CONSTRUCTING A ROTARY MACHINE OR ENGINE TO BE DRIVEN BY THE POWER OF STEAM, WATER, &c., AND IN THE CONSTRUCTION OF A CONDENSER TO BE EMPLOYED WITH THE SAME WHEN OPERATED BY STEAM.

Specification forming part of Letters Patent No. **2,517**, dated March 28, 1842.

To all whom it may concern:

Be it known that I, HENRY PRATT, of the Kingdom of Great Britain, but at present residing in the United States of North America, have invented a new and useful machine for applying the power which may be derived from the elastic force of steam or of gases, or from the pressure of water, to the driving of machinery for the grinding of and the manufacturing of bread from grain, and also for applying such power to other purposes for which it may be rendered available, and likewise for combining therewith, when steam is used, a new and improved condenser, which is to operate, by the agency of a current of cold air, in effecting the condensation of the steam; and I do hereby declare that the following is a full and exact description thereof.

In the accompanying drawings, Figures 1, 2, 3, and 4 are four different views of my power-machine, in describing which I shall suppose it to be actuated by high steam, its construction being the same, whether steam, gases, or water is used, excepting that in the former case the condenser may be added thereto. Fig. 1 is a vertical section through the middle of the machine, excepting at the part *n'*, which shows a portion of the exterior of the revolving body of the machine. Fig. 2 is a transverse elevation of it; Fig. 3, a horizontal section thereof through the line *a b* of Fig. 1, and Fig. 4 a horizontal section through the line *c d* of the same figure.

In Fig. 1, *n n n* is a circular revolving body, which is best made cylindrical, into which steam may be admitted at its lower part, and after passing through channels of a peculiar form within its periphery escapes through openings on its upper side. The part *n''* of this revolving body forms a cylindrical or slightly-tapered hollow shaft, which fits closely into a socket made in the center of a stationary block or bed-piece, *m m*, within which it revolves. The lower end, *n'''*, of the shaft *n* has its step at *m'*, and toward its upper end it is surrounded by a stuffing-box, as at *h*, to prevent the escape of steam, water, &c.

a a is the induction-passage, through which steam may be admitted from any suitable generator.

o o o are openings for admitting the steam to the interior of the revolving body *n*, and which are to afford it a free passage. The openings *o o* are surrounded by an annular steam-space, *a' a'*, in the block *m*, insuring a free passage to the openings *o o*.

The steam passes through *a a* into what I denominate the "feed-chamber" *b b*, and thence into one, two, or more helical passages, which, commencing at the feed-chamber *b b*, make several convolutions within the periphery of the revolving body *n n'*, ascending gradually from the bottom to the top thereof. One of these entrances is shown at *c*, leading into the passage *d d*, and there is a similar entrance into the passage *e e*, and so of any number of passages. In Fig. 4 these passages are shown at *d d e e* in horizontal section. The upper or the lower side of each of these passages is formed into steps or offsets in the manner shown at *r s r s*, Fig. 1. The intention of the formation of these offsets is that the steam or other fluid passing through these helical passages shall be subjected to a greatly-increased friction against the respective portions *s s* throughout its whole course, and shall, in consequence of such friction, carry the revolving body *n n'* with great force in the direction of the arrows. The respective helices are, as above stated, continued around the revolving body until they arrive at its upper end, where the steam is to be discharged from them; but before it arrives at the point of discharge the direction of the channel or channels is reversed, so as to cause the discharge to take place in such reversed direction. This is represented by the dotted lines and the arrows at *f* in Fig. 2.

When it is desired to form the machine in such a manner as that its motion may be reversed I construct a second series of convoluted channels within those above described as being directly within the periphery of the revolving body. This second series have helices running in a direction the reverse of those first named. The induction part of the instrument must then be so arranged as to admit the steam to a feed-chamber connected with the interior convolutions, and to cut it off from the exterior. As devices of this kind are well known and may be differently modified, every competent engineer will, without special instruction, be able to effect this in his own way.

I inclose the whole apparatus within a box

or case, k' k', into which the steam escapes, filling the space k k and keeping the machine at a temperature which prevents the condensation of the steam within it. On the upper part of the revolving body there is a shaft or gudgeon, p, from which motion may be communicated to a stone for grinding grain, or to other machinery.

i i is a stuffing-box, through which the gudgeon p passes, and in which it revolves steam-tight.

J J are covers affixed to the case k' k' and removable at pleasure, being arranged in the manner of the covers and openings to manholes.

l l is an eduction-opening for the escape of steam; but this opening may be made in any part of the case k' k' which may be preferred. From this the steam may be conducted to my improved cold-air condenser, to be now described.

Fig. 5 is a vertical section of my condenser, which may be made of thin sheet-iron, or of other metal. A A′ is its exterior or outside case, which may be cylindrical. Into the lower part of this the steam is to be admitted through an opening, B. Within the lower part of the case A′, I place a vessel, a' a', into the body C of which the opening B leads. The lower part of this vessel may be concave, and is to form a receptacle for the water produced by the condensation of the steam. This water is to be allowed to discharge through a tube, a^2, bent at its extremity a^3, so as to keep the water at a given height in the vessel a' a'. This vessel is not to be in contact with the case A′, there being an annular space between them for the ascent of atmospheric air. The sides of the vessel a' a' are conical, inclining inward at the upper edge. Upon this rests a second conical frustum of sheet metal, b' b', which is open at both ends, and has a flange turned outward at top, by which to sustain it, and another turned inward at its lower edge. Upon this flange rests another conical frustum, c' c', but smaller than b', and inclined in a reversed direction. Upon this another is placed in all respects similar to b', excepting in size, and on this another similar to c'. A vessel, e', furnished with a bottom, rests upon the last of the series of conical rims, of which there may be any desired number. The air which is to pass up on the outsides of these conical frustums I obstruct in its ascent by means of the descending rims d' d', attached to the interior of the body A A′. To increase the extent of the surfaces of the respective conical frustums I cover them on their exteriors with wire-gauze, which, by increasing the points of contact, causes the air to act upon them much more efficiently. The descending rims d' d' may in like manner be covered with wire-gauze, as may also the part A′ A′ of the external case.

In using this condenser the cooling influence of atmospheric air is the only agent in effecting the condensation, and this is admitted at its lower end, between the external case and the vessel a' a', while the steam is admitted to the interior of said vessel. The steam coming into contact with the respective conical rims will be condensed by the action of the air on their outer surfaces, and will fall down, in the form of heated water, into the vessel a' a', and may be used for the supplying of a boiler or generator. The air, which will have its temperature elevated, may be conducted into any apartment which it may be desired to heat, and, being charged with a considerable portion of watery vapor, will be entirely free from that dryness which is the most common objection to heated air when used for that purpose.

Having thus fully described the nature of the apparatus used by me for applying the elastic power of steam or of gases, or of the pressure of a column of water, to the propelling of machinery, and having likewise set forth the manner in which I construct my condenser when steam is employed, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The forming of one, two, or more helical passages within the periphery of a cylindrical revolving body, which passages are to ascend gradually from the lower to the upper part of said body, and said passages having one of their sides formed into steps or offsets, in the manner set forth, for the producing of a powerful friction and resistance to the passage of a fluid through them, in the manner and for the purpose set forth.

2. The reversing of the direction of these channels just before the fluid escapes therefrom, as shown at f in the accompanying drawings.

3. The within-described manner of constructing and arranging the respective parts of my cold-air condenser, said condenser consisting of a series of conical frustums of sheet metal placed within a vertical metallic case, said conical frustums being formed and operating in the manner set forth, and being combined with the vertical case, and with the lower vessel, substantially in the manner described.

4. The coating or covering of the exterior of the several conical frustums and other parts, as described, for the purpose of increasing the surface upon which the air may operate.

I have spoken of the revolving body in my power-machine as placed vertically; but it may be placed horizontally; or the operating-fluid may descend instead of ascending through the convoluted channels, and other variations may be made in matters of detail. I do not therefore intend to limit myself to the precise form and arrangement herein given, but to vary these as I may think proper, while the principle of action and the effects produced remain substantially the same.

HENRY PRATT.

Witnesses:

THOS. P. JONES,

ALEXANDER CONNESON.