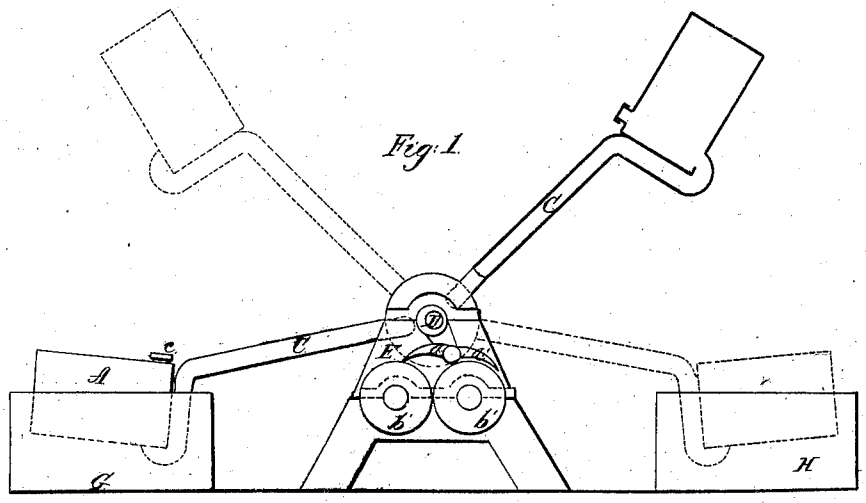
No. 50,151. PATENTED SEPT. 26, 1865.

C. MONSON.

PRESSURE AND GRAVITATION MACHINE.

2 SHEETS—SHEET 1.

Fig. 1.



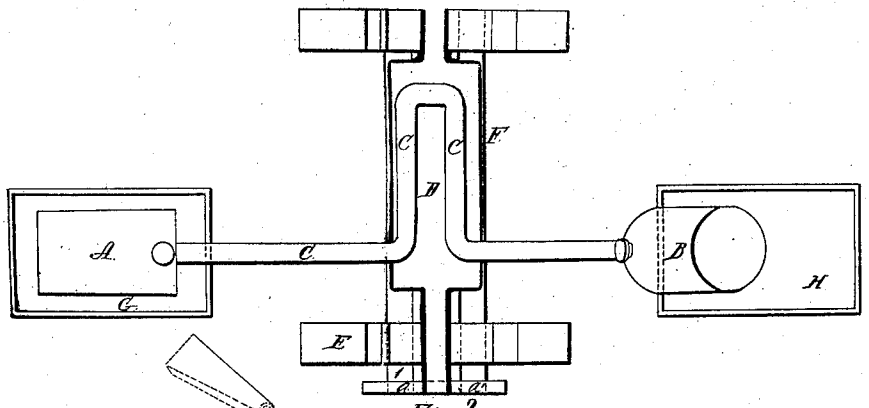


Fig. 2.

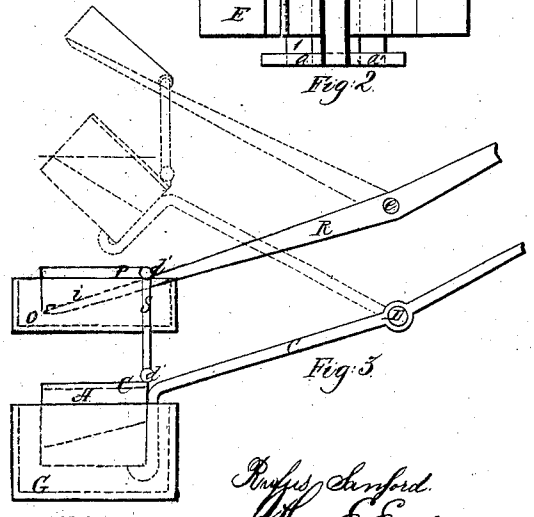


Fig. 3.

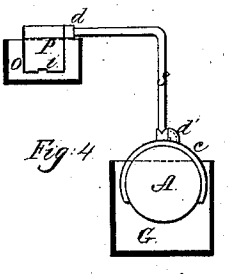


Fig. 4.

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PATENTED SEPT. 26, 1865

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PRESSURE AND GRAVITATION MACHINE.

2 SHEETS—SHEET 2

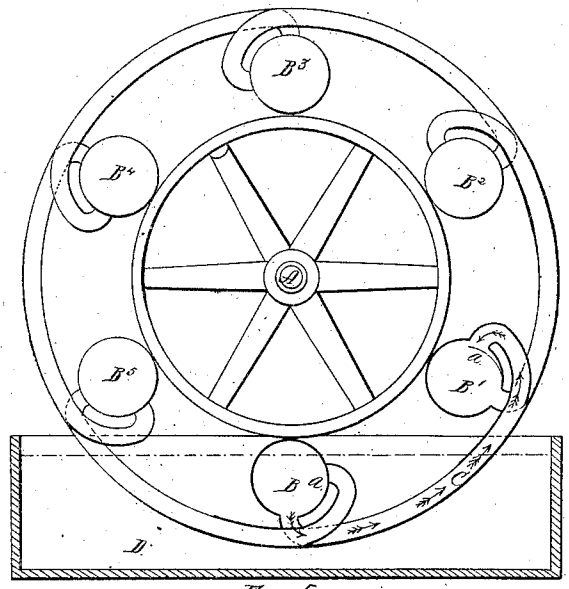


Fig. 5

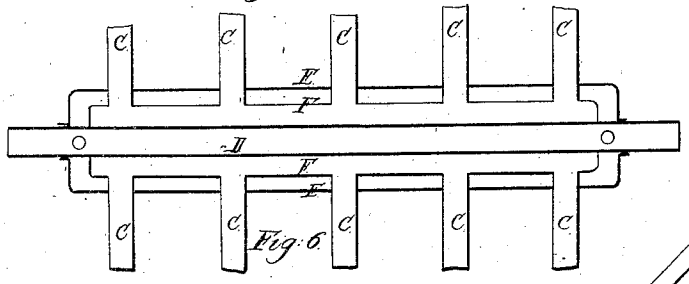


Fig. 6

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IMPROVEMENT IN PRESSURE AND GRAVITATION MACHINE.

Specification forming part of Letters Patent No. **50,151**, dated September 26, 1865; antedated September 15, 1865.

To all whom it may concern:

Be it known that I, CHARLES MONSON, of the city and county of New Haven and State of Connecticut, have invented a new and useful Improvement, which I style a "Pressure and Gravitation Machine; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a sectional side view; Fig. 2, a plan of the same; Figs. 3 and 4, to illustrate a different mechanism to aid in the result to be accomplished in Figs. 1 and 2; Fig. 5, the same principle as applied to rotary motion; and Fig. 6, to illustrate a multiplication of power and a different cooling device. Fig. 7 illustrates a still different construction to accomplish the same results.

I style my invention a "gravitation-engine."

It consists in employing two vessels of similar construction joined together by a conduit-connection, and exhausting the air therefrom; then partially filling one of the said vessels with fluid; then by generating steam within the said one vessel the steam will, by its pressure upon the surface of the fluid, cause the said fluid to flow from the said one vessel through the conduit-connection into the second vessel, and employing the weight of the said fluid by such change from vessel to vessel, or from a second back to the first, to produce a power which may be utilized for the various purposes for which other motors are now used.

To enable others skilled to make and use my invention, and to more fully illustrate its principles and workings, I will proceed to describe its construction and operation.

In the accompanying drawings, I refer first to the plan illustrated in Figs. 1 and 2. A and B are two vessels or chambers of about equal capacity. They may be of various forms. I construct the said vessels of metal as thin as may be and withstand the pressure required in the operation, so that heat or cold, as required, may act more readily on their contents for the purpose of expansion by heat or condensation by cold, as more fully shown hereinafter. C is a tube or conduit uniting the two chambers or vessels A and B, and through which is a passage opening into each at or near its lowest point. D is a hollow axle, to which is attached the said tube C, and the said axle, when suspended in a supporting-frame, E, becomes the center of motion around or from which the said vessels A and B may vibrate. At or near this center of motion I extend the tube C, by coiling or extending the tube, as shown in Fig. 2. I surround the axle with a cylinder, F, or enlarge the hollow of the axle to inclose the coil or extension of the tube. G and H are two baths of water placed so that in the vibration or ascent and descent of the said vessels they will alternately, in their descent, plunge into the said baths. I is a shaft, to which power is to be communicated from the action or movement of the vessels A and B through the pawls *a* and *a'* and cog-wheels *b* and *b'*.

My machine being now ready for operation, I fill or partially fill one of the vessels—say A—through an opening, *c*, made for the purpose, with a fluid, preferring that which boils at a less degree of heat than water, or it may be water, for the boiling-point of water under such circumstances—that is, in vacuum—is very much reduced. The air which now remains in the two vessels and connecting-tube I exhaust through the same opening *c*, in any convenient manner, to form as nearly as possible a vacuum in the vessels. I then close the opening *c*. The two baths G and H, as before stated, are filled with water. The vessel A, in which is the fluid, being heavier than the vessel B by so much as the weight of the fluid it contains, will rest in the bath G, as shown in black, Fig. 1. I now apply heat to the said bath, and when the temperature is raised to a degree to cause generation of steam from the fluid in the vessel, this temperature need only be increased as more rapid generation may be desired. Thus heated, and steam generating in the vessel, from which it cannot escape, it will create a pressure upon the surface of the fluid and force that to ascend through the tube C into the vessel B. Through the hollow axle D, I introduce a cold current of water or air onto and around the coil or tube C, for the purpose of cooling the fluid on its passage to the up vessel, that the fluid, being thus slightly reduced in temperature, shall condense whatever steam, if any, it may meet in the up vessel. When a sufficient quantity of the fluid shall have passed into the up vessel to overbalance that remaining in the

lower vessel, and also the resistance by the power required to move the shaft I, the upper and now heavier vessel will descend until it plunges into the other bath, H. In this descent the pawl *a* catches into the cogs of the wheel *b* and turns the wheel which is fixed to the shaft I, and consequently gives a partial revolution to the said shaft proportionate to the distance traversed by the vessel B in its descent. When the vessel B has fallen into the bath, as described, the vessel A becomes the up vessel, and their positions are reversed, as shown in red, Fig. 1. The heated water in the bath H now generates steam in the vessel B, in like manner as in vessel A from bath G, as described, and from like causes the fluid now in the vessel B retraverses the tube C to the now up vessel A until in like manner, as before described, the vessel A becomes sufficiently heavy to overcome the resistance offered to the vessel B in its descent. It (the vessel A) will descend and plunge into the bath G, as before. In this descent a second pawl, *a'*, turns a second cog-wheel, *b'*, which meshes into the cog-wheel *b* fixed to the shaft I. This operation will turn the shaft in the same direction and a corresponding portion of a revolution as that given in the descent of the vessel B. Again the vessel A will be heated as before, and so the two vessels will continue a reciprocating motion, alternately imparting their power to the shaft I, as described, from which it may be taken as from driving-shafts of any of the common motors. This would evidently produce an intermittent motion of the shaft, and for that reason would, in most cases, be objectionable; but to obviate that objection I employ so many pairs of the said vessels, each pair acting independent of the others, as shall give a constant motion to the said shaft—that is, that one of the number shall be descending during an entire revolution of the shaft.

For a multiplication of power I increase the size of the vessels; but if a power be required greater than it is desirable to make a single vessel large enough for, I unite two or more, as in Fig. 6, fixed to the same axle, and acting together, as more fully described hereinafter.

It may be advantageous to use two fluids within the vessels—one a heavier, (as mercury,) the other a lighter fluid, employing the lighter for the purpose of rapid generation of steam to force the heavier fluid into the up vessel to act as the weight. This would require no change in the construction described, but simply supplying the two fluids, in the manner described, for the one fluid; and this use of two fluids I believe to be much better than one, as I am enabled thereby to employ smaller vessels for the same weight, and of course less fluid, comparatively, to heat and condense.

Another mode of construction involving the same principles I illustrate in Figs. 3 and 4, the difference being chiefly in the manner of cooling the fluid or condensing. A is a vessel similar in its construction to and connection with another vessel through the tube C and hollow axle D. The other vessel, answering to B, in Figs. 1 and 2, is not shown in this figure, as the two vessels are not required to describe the method of cooling illustrated in these Figs. 3 and 4. G is a bath for the same purpose as the baths shown in Figs. 1 and 2. Thus far the construction and operation may be the same as that before described and illustrated in Figs. 1 and 2; but to afford a more rapid and certain cooling or condensing process, I introduce in these Figs. 3 and 4 what I term "cooling-buckets." I surround the upper part of the vessels with a casing, *c*, (see Fig. 4,) closed upon its edges and at the inner or lower end, the outer end being left open to the atmosphere. The edges are inclined, (see Fig. 3,) so that as the vessel rises from the bath none of the heated water will remain therein. O is a bath constantly supplied with cold water. P is a bucket fixed to a beam, R, which vibrates from a center or bearing, *e*. In the bottom of this said bucket I insert a valve, *i*, which opens inward. I connect this bucket by means of a tube, S, with the space inclosed by the casing *c*. Said tube opens into both the said space and the said bucket, and is jointed at *d* and *d'*, to allow the vessel and bucket both to rise, and by this connection cause them to rise simultaneously. The bucket P resting in the cold-water bath O, as represented in black, the water will, of its own gravitation, flow through the valve *i* and fill the bucket to a level with the water in the bath. Thus the quantity of cold water to be taken is governed by the quantity in the bath or the depth to which the bucket is allowed to plunge, and as the bucket is raised from the water the valve will close from the pressure of the water in the bucket upon it, and consequently carry from the bath the water contained therein.

By the generation of steam in the vessel A, in the manner as before described, and illustrated in Figs. 1 and 2, the fluid therein contained will rise into the opposite vessel through the tube C in like manner as before described, and from the same cause as in the first illustration the vessel A will rise and carry with it the bucket of cold water in consequence of the connection-tube S before described; and when in its ascent the bucket P shall have inclined toward its center of motion sufficiently to allow it, the cold water therein contained will flow from the bucket through the tube S into the space inclosed by the casing *c*. This may take place sooner or later as the mouth of the tube opening into the bucket is lower or higher. But the vessel must have risen high enough so that the cold water thus flowing in cannot escape at the open end of the casing, and when at its full height, as shown in red, Fig. 3, all or nearly all of the cold water will have passed into the said space and serve to cool the vessel and condense what steam there may be therein, for the purpose of diminishing the resistance which might otherwise be offered to

the rising fluid from the opposite vessel. This same apparatus I apply to the other vessel, or as many of them as may be in use. In the descent of the vessel A the cold water in the casing *c*, will, by the declination of the vessel, flow from the casing and fall over the bath; or, if advantageous, it might be conducted into the bath to supply the waste of water in the bath occasioned by evaporation or otherwise. The cold water may be supplied through pipes and valves without the use of the bucket, but I believe this to be a simple method and easy of government.

In Fig. 5 I illustrate the same principles as applied to rotary motion instead of reciprocating. I fix upon the periphery of a wheel, at points equidistant from each other and from a common center or axle, A, vessels B B′ B², &c., not unlike the vessels before described. I unite one, B, with the next, B′, by means of a tube, C, open into one—say B—and in the next, B′, closed by a valve, *a*, opening inward, and thus all are connected from one to the next. D is a bath similar to those before described. I fill or partially fill one of the vessels B with fluid, as before described, and exhaust the air from all. The lower one, B, being the heaviest, will be immersed in the bath D, which is heated till steam is generated as in the first-described illustration. As the valve *a* in this vessel B opens inward the fluid cannot escape thence, but will be forced through the open tube C into the second vessel, B′, through the valve *a*, until that vessel becomes heavy enough to overcome the resistance required to revolve the shaft and the remaining fluid in the lower vessel. Then it will descend into the bath, in the course of which decent the remaining fluid in B will all, or nearly so, have passed into B′, which being now in the bath in the position previously occupied by the vessel B, the same process of generation will be gone through with, and the fluid forced into the third vessel, B², which in its turn descends, and so on, continuing around in the same direction as long as steam is generated in the lowest vessel. If other condensation or cooling is requiste than that imparted by the vessel itself, cooled by passing through the air, the tubes may pass up through the center part of the wheel in similar manner to the plan first described, and illustrated in Figs. 1 and 2. For an increase of the power of this rotary plan I fill two or more—say B and B′—with fluid, unite the first, B, with the third, B², the second, B′, with the fourth, B³, and so on in like manner as from first to second last described; or for still more constant movement I place two or more of the wheels or sets of vessels so as to act upon the same driving-shaft, but to act between those of another wheel—that is, so that one of the sets may be always moving.

In Fig. 6 I illustrate a still different but equivalent manner of cooling or condensing, as also the application of several vessels to act simultaneously for an increase of power. C C are tubes, to each of which may be attached a vessel in like manner and operating substantially as before described, and illustrated in Figs. 1 and 2. A central tube or hollow shaft, D, is incased by a cylinder, E. Within this outer cylinder, E, and surrounding the hollow shaft D, I introduce a second cylinder, F, into which the tubes C open. This said cylinder F must, of course, be air-tight. A supply of cold water is passed through the hollow shaft D, and into the outer casing and around the cylinder F, for the purpose of cooling the fluid in its passage from one vessel to the other through the tubes C. To cause an equal distribution of the fluid into the several vessels which may be thus connected together, I connect all the vessels on either side by a tube, through which the fluid will flow until the same level is maintained in all the vessels on the same side. If still greater amount of cooling-surface is desirable, I make the hollow axle longer and place one set of the vessels at one end and the other set at the opposite end, causing the fluid to traverse the length of the axle before it can pass into the up vessels. I have used the expression "cooling" to mean simply a slight reducing of the temperature, as this is all that is required to bring steam back into a liquid state. I have also named "water bath" as a means of heating for its great convenience, but can employ any other means for generating the steam.

Fig. 7 illustrates a somewhat different, and perhaps it may in some cases, if not in all, be deemed a more advantageous, method than those already described. It consists in generating the steam in separate vessels from those which contain the fluid for the weight. I lead the steam from the said separate or steam vessels, by means of a conducting-tube, into the said weight-vessels above the fluid, to act upon the said fluid and force it to another similar weight-vessel, as in the first illustration, where I have described the steam as being generated in the weight-vessel only. In this Fig. 7, A B are two vessels, which in their construction and connection with each other are like the vessels shown in Figs. 1 and 2 and first described. I fill one of these vessels—say A—up or about to the fluid-line 1 2 with fluid, which I propose to use as the weight. C D are two smaller or steam vessels, and are united to the axis E so as to vibrate at the same time with the vessels A B. A tube, F G, leads from each of the steam-vessels C D into the weight-vessels A B a little above the fluid line 1 2. H is a bath of water heated to the required temperature to generate steam in the vessels C D. The air must have been exhausted from all the vessels, as before specified. The relative positions and size of the steam-vessels and the weight-vessels are such that the steam-vessels shall be alternately wholly submerged in the bath H. Steam arising from the fluid in the vessel C passes through tube F into the vessel A above the fluid, and will, by its force upon the surface

of the fluid, cause the said fluid to flow from the vessel A through the tube I into the up vessel B in like manner as first described, and illustrated in Figs. 1 and 2, and then, in the same manner, the weight of the said fluid will cause the vessel B to descend and A to ascend, and with this change a corresponding change of the vessels C D takes place, and the before up steam-vessel D is now submerged in the bath H. In the ascent of the said vessel A a cock, *a*, is, by a mechanism, turned to close the pipe or tube F, to prevent an undue admission of steam from the vessel C, and in the descent the said stop-cock is opened by the same mechanism. The steam thus filling the vessel A will, as it condenses, add to the quantity of fluid in the said weight-vessel, and thus the steam-vessel might eventually become exhausted of its fluid, but that the fluid cannot rise much above the fluid-level in the vessel A before it escapes through the tube F and returns back into the vessel C, and thus the fluid-levels are maintained. When the positions of the vessels are reversed, as described—that is, B containing the weight and D in the bath—the same operation is performed as before, the fluid returning to the up vessel A, and so continues to vibrate as before described, and in like manner imparting motion to a driving-shaft.

Some of the advantages of this method of separate steam-vessels are, first, that I reduce the quantity of fluid necessary to be heated, and, second, I accomplish a perfect immersion of the generating-vessels in the heating-baths. These objects may, however, be accomplished in the manner first described without these extra vessels C D, provided mercury be used for the weight; but when the fluid for the steam and the fluid for the weight are of the same kind, the plan as illustrated by Fig. 7 has its superior advantages. There are other reasons why this plan last described, and illustrated in Fig. 7, may be preferable in any case, but it is not necessary here to mention them.

The weight-vessels in this plan, or the fluid therein, may be heated to a certain degree by separate baths, if desirable, to prevent an untimely condensation of the steam.

I have illustrated my invention as one result accomplished by several different methods without going into minute details of construction, &c., for the reason that I purpose making these several devices the subject of future application.

Having thus fully described and set forth my invention, I do not broadly claim, as of my own invention, the generation of steam from fluid which boils at a less degree of heat than water. Neither do I claim the mere movement of a fluid by means of steam generated therefrom, for this has been often illustrated in common philosophical toys, and which, I think, are suggestive of my invention. Neither do I confine myself to the several devices described by which the result is accomplished; but

What I do claim as new and useful, and desire to secure by Letters Patent, is—

1. The double utilization of the vapor and weight of the same fluid for the purpose and substantially in the manner as herein set forth.

2. The use of two fluids—a denser and a lighter—substantially in the manner and for the purpose described.

CHARLES MONSON.

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RUFUS SANFORD.