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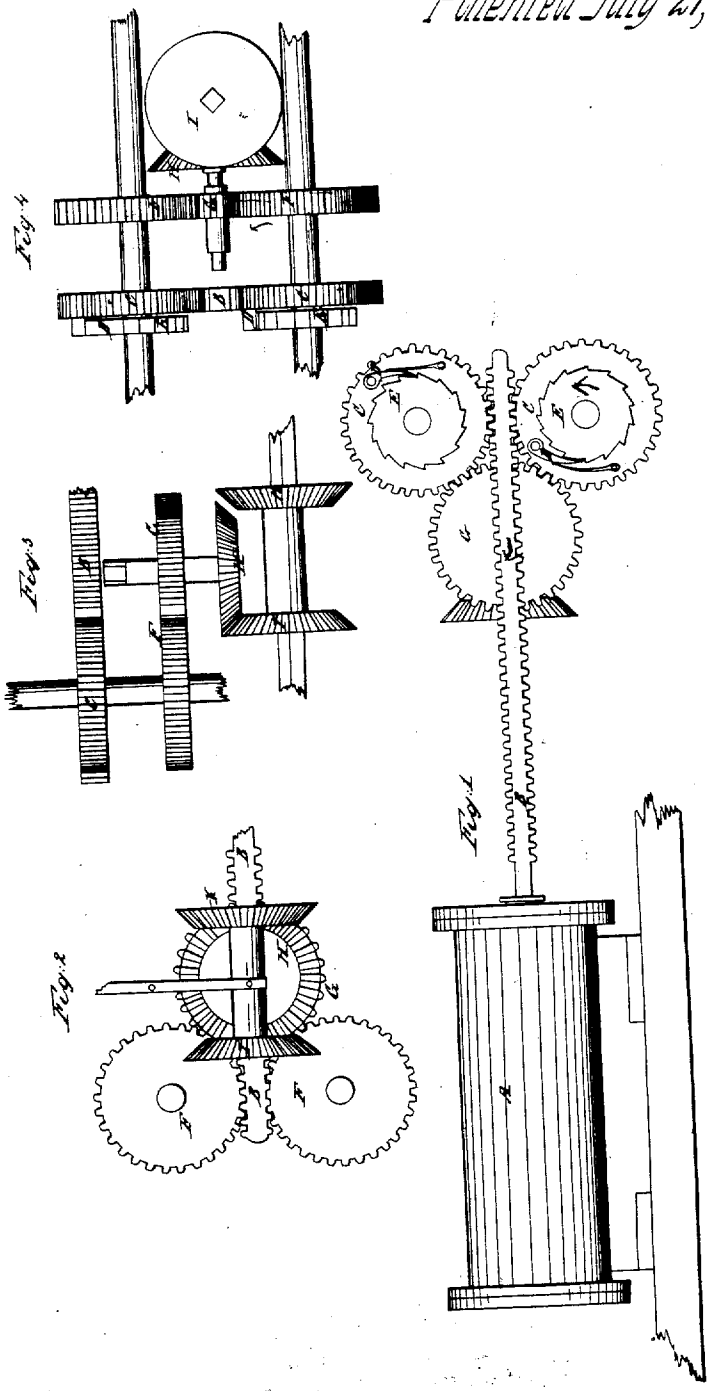
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order by name & date

E. Bates,

Converting Motion.

Patented July 27, 1833.



AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS)

No. 12.

July 27, 1833 2/5.

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Elisha Bates.

Letters Patent.

The Schedule referred to in these Letters Patent, & making part of the same, containing a description in the words of the said Elisha Bates himself of his improvement in the application of Steam power.—

This improvement consists chiefly in the application of the movement & impulse given to the piston of a steam engine, to a wheel instead of a crank.— The motion may be communicated from the piston rod, to a wheel or wheels, either by that rod operating directly on the wheel, or wheels, or by being connected with one or more bars, with, or without cogs, of any description, or with teeth, or ratchets, or by pressure with or without the intervention of one or more levers.

The modes of application are various & numerous, but the principle is the same.— It is the application of the power of steam from a cylinder and its necessary appendages & fixtures to a wheel instead of a crank, or to so much of a wheel as shall keep the propelling power at, or about an equal distance, from the center of rotary motion.— I shall mention several of these modes of application, observing that I do not consider it necessary to describe all the modifications of machinery, by which the principle can be applied.— Thus for example— If the cylinder of the engine be in a horizontal position, let the piston rod be extended & formed into a bar (or a bar be attached to it) of suitable length & dimensions, furnished with a sufficient range of cogs or teeth on each side, and supported by one or more rubs, or friction wheels, & suitably secured to move in a steady & proper direction.— Let it turn between two cog wheels, of suitable dimensions, of the same size & same number of cogs, tho' the Machine might possibly be made to operate, if these wheels

were

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were different in their proportions.— They should be fixed on their respective spindles or shafts, not fast, but movably as the wheel of a carriage on its axle; yet so that its movements shall be steady. Let there be by each of these wheels, on the same shaft or spindle immovably attached to its shaft, a rag wheel, into which one or more clicks or catches, attached to the cog wheel, shall fall, by their own weight or by springs; the teeth of the two rag wheels being so set, that one rag wheel shall be propelled without the stroke of the piston rod or cog bar, & the other rag wheel by the other, or recessed stroke of the rod, or bar.— On each of these shafts or spindles, at the opposite ends from the first cog wheels & rag wheels, let there be a cog wheel immovably attached to it, both being of the same size & having the same number of cogs or teeth, & geared into another cog wheel of the same size & number of cogs or teeth.— These three wheels may be placed with their centers in a right line, or in a triangular position; taking care in the latter case, that the two outside wheels do not touch each other.—

This triangular arangument will be necessary on no other principle than to save room, or reduce the distance between the two first wheels, that the cog bar may not be too wide.

The middle or 3d in wheel, transfers a rotary motion to all the rest of the Machinery, in a manner so simple & obvious as not to need description.—

But for the purposes of steam boats, or any other place where a rotated movement of the machinery is necessary, a wheel may be fixed on the end of the shaft of which I have called the 3d wheel, to work in either of — two wheels or pinions or trundle rowns connected together by a collar, rather longer than the diameter of the wheel that is to propel them, & made movable endwise on the shaft they are to drive, but not to turn on it as a carriage wheel does on its axle.— Which movement endwise may be given when necessary by a lever, or otherwise, so as to throw one of these double connected wheels out of gear,

with

with the wheel just mentioned & put the other in gear. These double wheels bear some resemblance to a shoe-car, which, thread we is wound — by pulling one of these wheels out of gear & the other in, the movement of the shaft on which they are fixed will be reversed. Bevel gears will be preferable for these three wheels. The circumference of the two first wheels on which are driven by the cog bar, may bear any proportion desired to the length of the stroke of the piston. And the stroke of the piston may be regulated or restrained by stops to the rod or bar, or by a crank with or without a balance wheel, or by the admission of the steam into the cylinder, & the manner of cutting it off.

I have mentioned the horizontal position of the cylinder, merely for the sake of perspicuity. But the wheels & other parts of the machinery, may all be arranged to suit any position of the cylinder; or an engine, on either the high or low pressure principle. In the latter case the cog bar may be attached to one end of the great lever & moving in perpendicular direction. To the application of this principle there may be an almost endless variety. The wheels may be moved by cogs or teeth, or by catches, or by the simple pressure of the bar upon their circumferences. They may be made to revolve once or more with each stroke, or only part of a revolution, in which case they need not be entire wheels, but so much only as is necessary to come in contact with the propelling bar and communicate the force to their shafts. The cog wheels too may be not full wheels, if the clicks or catches are fixed to them, and made to fall into suitable stops in the cog wheels. Or instead of a cog wheel, there might be a single arm or bar, to that end at the farther may measure that each of these first wheels, or part of wheels, may run loose on its shaft with one stroke of the piston and with the next communicate its rotary motion to its shaft and that this communication of power to the shafts shall be as respects the two first wheels, alternate, and not both at

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at the same time, or rather that the impulses shall not counteract each other, or a lever may be used in case of engines on the low pressure principle. To this lever or one similar, may be fixed two bars, one on each side of the center of motion, to which bars, cogs, teeth, or catches may be attached either fixed or movable to operate alternately on two wheels on one shaft, the bars being both on the same side of the shaft.

The wheels are to move freely, as in the first described method, in one direction, by means of ratchet wheels, or any other convenient mode, and communicate a rotary motion in one direction to the shaft. On this shaft may be a cog-wheel, to give motion to any machinery required. But if a reversed motion is necessary, as in steam boats, the last mentioned wheel may be made to operate, on either of two wheels, connected by a collar & movable endwise on the shaft of the water wheel, as already described.

Or the movement can be given to a single wheel, or part of a wheel, by connecting the piston rod with an oblong frame, wide enough to admit the wheel, or part of a wheel between its sides: which sides on their inner edges are to be furnished with cogs, or teeth, or catches their being on the circumference of the wheels no more cogs than will permit the cogs on one side of the frames exactly to run out & become free and clear when those on the other side enter or take hold.

There must however be one movable cog on each side of the frame to take hold of the wheel at the entering point like a click or catch in a ratchet wheel, & one at the delivering point that shall be unlatched out of its hold, by means of a suitable guide, at the moment the last permanent cog lets go— that the frame may freely & constantly move back with the reversed motion of the piston.

I prefer the two first mentioned methods of applying steam power, to the last, and rather favor the

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the Opinion, that it will be more advantageous to make the two first wheels which are propelled by the piston rod, or cog bar so small as to revolve once, by each stroke of the piston ..... And possibly they might be made to revolve to advantage even more than once to a stroke

It will save machinery, power and expence to have them small (but not too small, & the velocity of the last wheels or moving parts of the machinery can be regulated or fixed by gearing

Mount pleasant Jefferson County Ohio 5th Aug 23d 1833

Witnesses
Ezekiel Harris
Allen Bales

Elisha Bales

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