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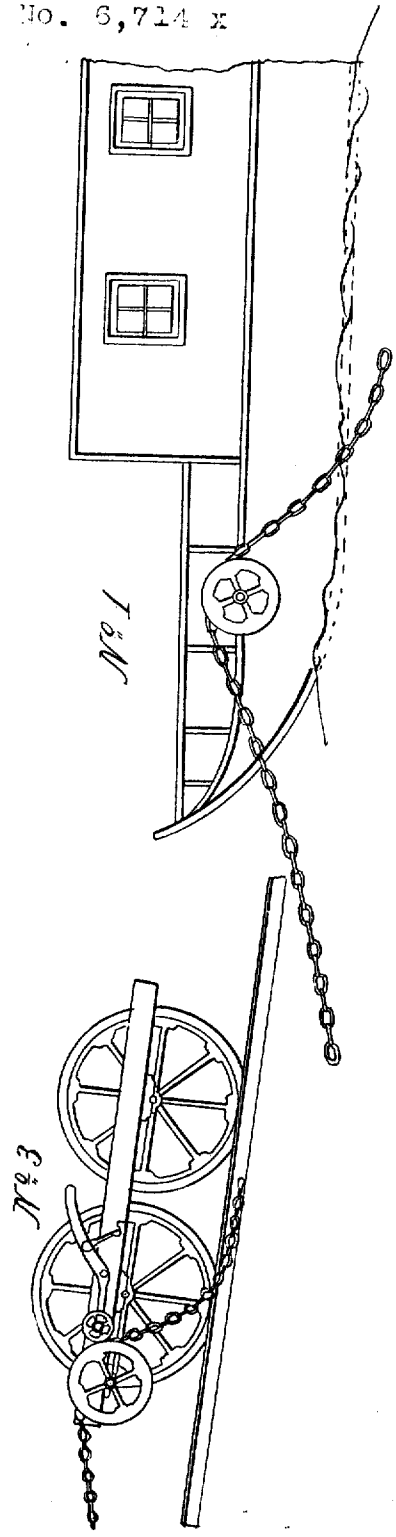
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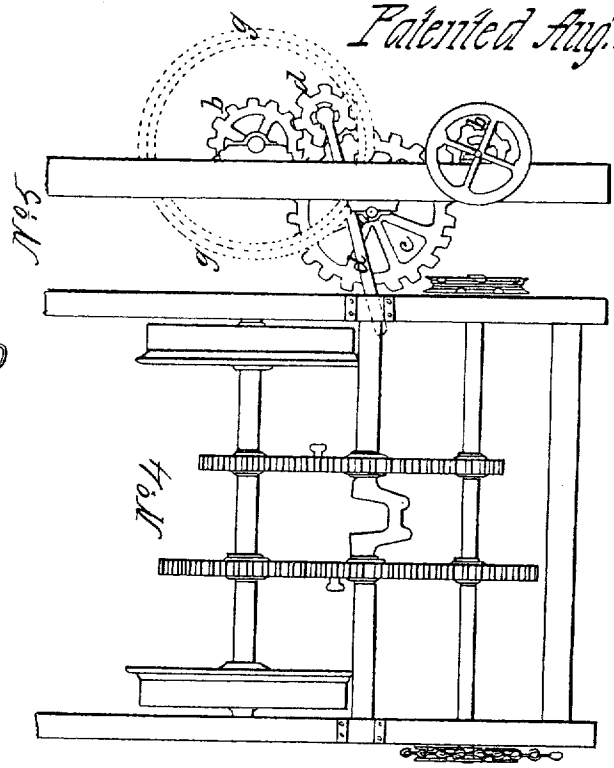
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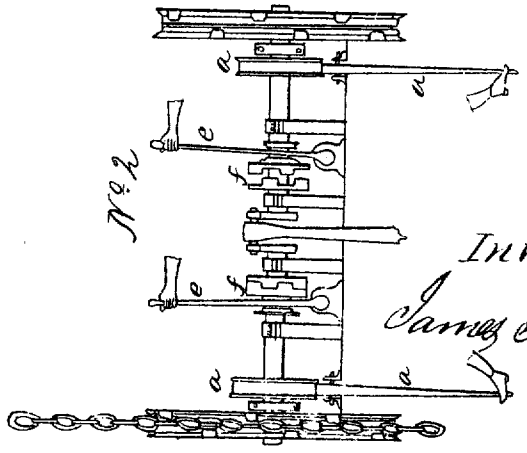
Towing Vessels

No. 6,714 X

Patented Aug. 23. 1831.







Inventor
James Stimpson

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

X0006714

Aug. 23 1831

James Stimpson
Letter Patent

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said James Stimpson himself of his improvement in the mode of ascending and descending Rivers and Canals on inclined planes using such Steam Engines or other locomotive power on board or within the the vessels or vehicles to be moved as may be found necessary for their ascent or descent

To all whom these Presents shall come

Be it known, that I James Stimpson of the City and County of Baltimore and State of Maryland have invented a new and useful improvement in the mode of ascending and descending Rivers and Canals on inclined planes on which locomotive engines using other kind of power steam, or animal may be used on board or within the vessels or vehicles thereon and that the following is a full and exact description of the said invention or improvement & manner & process by which I Firstly as to the mode of passing over inclined planes, when the nature of the country over which it is intended to build Rail Roads is such that a resort must be had to inclined planes, to surmount elevations over which they must pass, and that is to adapt a manner that the power of locomotive Engines, or other powers, or the adhesion of the wheels to the rail plate on which they run would be inadequate to enable them to surmount said elevations, more especially when it is encumbered with snow, frost, ice or water, I propose to use chains of any kind, which may be found most convenient, such as chains used for ships' cables, or any other that may be preferred, in the following manner, take one or more such chains, stretch them somewhat tight, and make them fast at both ends to something that is firmly fixed in the earth near the foot and top of the inclines; and so place & that the said chains may lay their whole length upon the ground, or upon such other supports as may be provided; and on one or both sides of the tracks or in its center as may be preferred; the links of the said chains should be uniform in length and width, or very nearly so. Also I propose to have for carriages which are used as towing carriages or when passing only by themselves, when they have the power of motion within themselves, a wheel, or change gear, that the operative power may be changed from the immedi-

etc

als contact with the road wheels of said carriages, to that of a pulley shaft or any other application designed for the same object, which pulley shaft may be placed either under the cars in front of the road wheels, or between them or any where else that may be found the most convenient for it which shaft may have several sets of pulleys side by side upon it, at each end, or if the chains are laid in the centre of the trucks, and sufficient room can be had beneath the bottom of the car, or over it for it to work in that place or situation, the pulleys may then be fastened upon said shaft in the middle or centre, which pulleys may be of as many and various sizes as there may be variations of speeds in the different inclines to be passed over; and be all made fast to said shaft side by side of each other, the like number upon each end of said shaft if for two chains, but if for one chain only, and that in the middle, then one set of pulleys will be sufficient; said pulleys should only occupy as much room with the ways, as is necessary for their proper strength; and to receive the chains in the centre of their periphieries, having a thin flange between each and on each side of them to serve as a guide to the chains, said pulleys should be made of cast iron or other metals, and be cast in two pieces flat ways, each separate in their centres with the flange upon the side opposite to that which is to join when put together. The form and size of one half of the chain which may be used, must be indented and accurately cast upon the edge of the periphieries of said pullies between the flanges so that when two of said pullies shall be put together upon the shaft, with the flanges and the periphieries of said pullies between the flanges, will then have cavities or wells of the form and size just right to receive the links of said chains; and link lying flatways in a well can be nearly or quite its whole depth more or less, below the surface of the periphieries of said pullies, the next link perpendicularly, the next flat again, and so on alternately throughout their whole surface. Also propose to have a set of small pullies centred upon one end of a lever that they may be raised or depressed at pleasure by the means of said lever, and to be placed immediately over and bear upon the first named pullies, but only so thick upon their periphieries as to nearly cover the space between the flanges of those first described; the last mentioned pullies must have a groove or channel in the centre of them, all round, which channel must be of sufficient width and depth to receive the links of the chains which may lay in the under pullies edge ways, or up and down, the surface of the periphieries on each side of said channel should run upon the links which lay flat ways.

said

lever on which the pulleys runn should be centred at a proper distance from said pulleys, upon a fixture attached to the carriage, so that said lever having a handle with a catch or fall attached to it may when the aforesaid chain is to be placed upon the aforesaid under pulleys be raised up to allow said chain to pass in between them and then forced down again close upon the chain and be held by the aforesaid catch or fall. Now the peripheries of the upper pulleys runn upon the chain and lean upon their own shaft and swivels by contact merely with the chain holding it down in the cells in the under pulleys, to prevent its rising, slipping or rendering, or the aforesaid under pulleys may have teeth or any other contrivance whereby to take fast hold of said chains. These pulleys should lay as near to the ground as may be with safety. To use this improvement when you arrive with a rear of the foot of an inclined plane, you will stop and place the chains between the pulleys, change the power from the road wheels to that of the pulleys shafts: and supposing that the road wheels are three feet diameter, and the inclination of the inclined plane about to be ascended is such that the opposition to motion by gravity is just equal to all the friction, or what the opposition to motion was upon the plain or level road, or in other words, if the gravity added to the friction is such as to require just double the power it did to travel the level road, then put the chain upon a pulley of eighteen inches diameter, that being half the size of the road wheels, the same engine or power used upon the planes will enable you to ascend the incline, as there is no loss of power or increase of friction in any degree, the chain being merely raised in front and swept again behind as fast as the engine runs upon the roads, it is in perfect balance over the pulleys with it's full all the while, and as there is no rendering movement of the chain upon the ground to be overcome, there can be no loss of power, but the speed in this case will be diminished one half during its ascent; when you have arrived at the summit of the incline or a little beyond, cast off the chain upon the ground, change the power back again to the road wheels, and go on as usual. Again suppose there should be three sets of inclines all necessarily differing one from the other in the angles of their inclination, and that it would be desirable to pass the whole of them with the same engine, then have three sets of pulleys side by side permanently fixed upon the same shafts as before described, each of a size proper for the different inclines to be passed over. Thus the whole length of the road may be travelled with the same power, and that also

independent of the adhesion of the wheels to the rails. Any fraction degree of power, independent of the size of the pulleys to that of the road wheels may be acquired by placing a large pulley upon the pulley shaft and a small one on the crank shaft which last is to drive the first named. The necessary change of the power from the road wheels to the pulley shaft on board the locomotive engines, or any other kinds of carriages, may be accomplished in various ways but the following may suffice as one, which will answer, and which shall propose. Where roads are rocky and much speed is desired it will be necessary to use gears, hence five gear shafts and wheels will be already provided for our purpose, another upon the aforesaid pulley shaft. All that will be necessary provided the crank shaft that receives the power from the engine or other power is so constructed that it can be made to slide easily to change the contact of the cogs or teeth of the wheel on the crank shaft from the pinion or wheel on the road wheel shaft to that of the aforesaid pulley shaft whereby the object will be accomplished, and as the necessary movement required is but about five and a half inches, it can be done with safety, by levers or screws, or any other way which may be desired, the boxes or pillow blocks in which the crank shafts revolve may be connected to long wide iron plates sliding close down upon permanent rails or fixtures, which plates we will call slide plates, and we shall so describe them from collateral movements we will have slots or ears projecting from the permanent rail close to the outer edges on both sides and within about six inches of each end of said slide plates, there should be two covers wide enough at the place where centred to cover said slide plates, the handles ends splicing by each other to a convenient length, said covers to be centred in or upon the aforesaid slots or ears, with a wedge form down from the wider side and at the end of said covers, which wedge is to pass down between said plates and a permanent slot or fixture to the permanent rails, said wedge to be thick enough to make the necessary movement for the change of the gears, the same at both ends of said plate, there must also be a slot within the centre of said cover, underneath, extending the whole width and three inches more or less, within its ends, the object of which is that when said cover handle is thrust down sufficient to raise the aforesaid wedge to allow said slide plate to move its proper distance, and then immediately after the aforesaid slot underneath the cover is to slide down form and hold fast that

that end of said slide plate, the handle end of said lever may be sprung under a spring catch, whereby to hold it securely. It will now be seen, the handle end of this lever is down and binding said slide plate at that end, pressing upon the rail or its bed underneath and that the wedge is out, also it should be understood that the opposite lever at the opposite end of the aforesaid slide plate at the wedge, or its outer end is down and that this wedge is thrust down between the end of the slide plate and the permanent fixture upon the rail and at the same time the under edge of said lever just within the wedge, by a small slant or projection should come in contact with the upper surface of the aforesaid slide plate, and by a spring catch or prop underneath the handle end of said lever, bind down or hold fast said slide plate as before set forth at the opposite end. Thus it will be seen that by casting off the aforesaid spring catches or props, the levers become loose, and also the slide plate beneath them, except and except which until the levers are moved it should be held firm by the wedges, and that by lowering the handle end of the lever that wedge, it will raise the wedge at the opposite end and thereby permit the slide plate to move that way and by raising the handle end of the opposite lever it will thrust down its wedge and cause said slide plate to move the opposite way, and at the same time confine it permanently endways, and then by grasping the handles under the spring catches, &c it will be confined every way, while the aforesaid levers are made to move the aforesaid slide plates, whereby a change of gears is effected, and at the same time, serve as binders to hold said slide plates as secure as in any other ways. The same application as herein set forth or a separate one must be applied at the opposite end of the aforesaid crank shaft. The handle ends of the aforesaid levers which are at each other transversely of the carriage, may be connected by a bar which will afford the means of moving the slide plates on each side of the carriage simultaneously, or the aforesaid movement of the crank shaft by that of the aforesaid slide plates may be effected by wedges or keys to be acted upon as aforesaid by levers, or any other ways, these wedges or keys passing the outer ends of the boxes in which the journals of the shaft revolve through the cap and bed between which said boxes are confined and the pillar blocks omitting thereby the slide plates altogether. The chief objection to the aforesaid movement of sliding the crank shaft is that of its connection to the eccentric, the time which operates the steam

Hearn values which in this case must necessarily be supplied in another way, or performed upon some other shaft so placed as to admit of this change, or the case which may be remedied by the connecting rod, by its turning two centres away the rough Sake for these another mode, which may be effected as follows; viz. Let the wheels upon the crank shaft thick about the eye and loose upon said shaft, let studs or knobs be cast upon the insides of the arms of said wheels, then fix upon said shaft between said wheels a slide coupling so made that it cannot turn upon said shaft without turning it, but can move side ways, said coupling may be in form of a blank wheel, with studs or knobs projecting each ways, which studs or knobs should be made so as to mesh in between the first named studs upon the insides of the arms of the two gear wheels having a groove in said slide coupling in which the end of a lever must be fitted whereby to move said coupling up to either of said wheels, the studs upon each will interlock each other, by this means this wheel becomes a fixture to said shaft and cannot turn round without said shaft turns with it, the coupling being of itself a fixture to said shaft, in which situation of said coupling it is wholly disengaged from the other wheel: And we will suppose, that this wheel now made fast as aforesaid is in contact with the wheel upon the before mentioned pulley shaft, and thereby puts that shaft in motion, the other wheel upon the crank shaft upon the opposite side of the slide coupling, is in contact always with the wheel upon the road wheel axles, but that being disengaged from the coupling is entirely free to turn loose upon the crank shaft which causes no other friction than simply its revolving upon said crank shaft the wheel still performing no operation at that time, all the work being performed by the pulley shaft when the other is loose, change the coupling to interlock the wheel in contact with that on the road wheel axle and the carriage will be moved by the revolving of the road wheels and their adhesion to the rail plates, and in this case the pulley shaft will stay still, the wheel on the crank shaft becoming or being of itself loose upon said shaft. The aforesaid change of gears, or the power from one shaft to the other, may be effected as follows; Place one gear wheel upon the road wheel axle, one upon the crank shaft, one upon the pulley shaft, all in range of each other, taking care that the wheels upon the crank shaft, do not touch either the one upon the pul

ley

by the shaft, or that upon the road wheel axle at any time, and also that these be permanently fixed in their several places, then centre a fourth wheel upon the short end of lever, so placed as always to be in contact with the crank shaft gear, and by the mediation of the lever made to remain constantly with the gear upon the pulley shaft or that upon the road wheel axle, and thus by its change from one to the other, the pulley shaft and the road wheel axle may either of them be made to revolve at pleasure, or it may be done in any other way. Also suppose in the same way or by any other means to effect various speeds or powers from the same crank shaft, with gears, in a similar way, only varied in size, for instance, let there be two or three sized wheels placed fast upon the road wheels axle, the first with twenty teeth, the second with thirty, the third with forty, also place the same numbers of wheels upon the crank shaft loose, reversed in size to those on the road wheels axle, all meshing together at the same time and either of them fastened upon the crank shaft by the aforesaid slide coupling or bayonets or any other way, the speed of the carriage will correspond to the proportions of the variating between the driver and the driven, and thus when the smallest wheel upon the crank shaft is made fast to it by the coupling or bayonets, that wheel of course meshing into the largest upon the road wheel axle, they having the one say twenty, and the other forty teeth, it will require two revolutions of the crank shaft to produce one revolution of the road wheels, hence you may ascend inclines where the adhesion of the wheels are sufficient, but would otherwise lack power to move a load that the same power would draw upon perhaps a minute or twenty inches of the route on which we suppose there are no inclines, hence with this application a full load may be moved the whole length of a road which would be an immense gain in casting only a part of the speed from twentieths of the distance, and permitting one third or one half more to be drawn with the same power over the entire route, and during high adverse winds a constant motion may be kept up by using the variable powers or speeds aforesaid when without them you might be compelled to stop or abandon part of the load or greatly overtask the boiler. Thus by these variable gears powers, and speeds, and the application of the pulley shaft and chains, in lines of almost any description may be pro-

passing over with the utmost that ever can be felt for the engines upon the level road, which is finally accomplished with the least possible expence, all that has been done by locomotive and stationary power, at a cost of part of their power when passing inclines, which is comparing time with power as a guide, for in the former case, the locomotive power will be working constantly with its whole power in any or all situations, whereas the stationary power would necessarily be idle more or less of the time, although kept constantly ready for use at great expence and when used being encumbered with ropes or chains, which will have to draw over a long distance, thereby requiring a great power, notwithstanding said ropes or chains may be suspended by friction rollers, the whole length of the inclines an expensive arrangement which by the improvement I have proposed will be or may be dispensed with.

Secondly, In case I propose to apply the said improvement to steam boats, with chains and pulleys as aforesaid, for the use of towing boats or vessels of any kinds, in rivers and canals or elsewhere, by the means of machinery moved by steam or any other power, as applied to the said pulleys, and they acting upon the chains as aforesaid, said chains should be made fast at each end in such fixtures, and in such suitable places on the rivers, canals, bays, Harbours, and elsewhere, as shall be deemed most convenient or suitable, and to lay upon the bottom of said rivers, canals, bays, Harbours, &c under the waters or on any kinds of subport which may be preferred, there may be two chains one to draw by in one direction, and the other chain for the opposite direction, or one only may be used, with a general understanding that those passing in one direction, when meeting a vessel, shall let go the chain for a and take it up again, said chains may be made fast by hooks or other ways, to ring bolts in the abutments of locks or such other fixtures as shall be preferred, and in as many different lengths or places as shall be found necessary, in this case the power must be on board of the towing vessels and it should be applied direct to the aforesaid pulley wheels, no change of speed or power being required in inclines and inclines, or it may be in any other way. This application of power in tow boats or vessels acting upon the chains as aforesaid, will do away the necessity of the tow paths, thereby saving the banks of said canals, rivers &c. and allowing them to be reserved for exit roads and other purposes

as. The aforesaid pulley shaft may lay at the end of the vessel with pulley upon each end as before described, and of such size, as shall produce a speed compared with that of the animals, steam, or other power, as may be thought most useful, if animal power be used, it may be upon horizontal wheels, or moveable floors such as I use for my patent horse low carriages upon rail roads, or in any other way desired.

What I claim as my invention or improvement is the application of chains to ascend and descend upon rivers and canals, over inclined planes, or rail roads, or otherwise, said chains being made fast at both ends near the foot and top of the inclines, and resting upon the ground or other material or at suitable places in rivers or canals, the locomotive or other Engines, drawing themselves up or letting themselves down said inclines Rivers or Canals, by the power which is on board of themselves, by the agency of pulleys in contact with said chains as set forth in this Specification, or in any other ways, also the variable speeds, or powers herein set forth, or in any other ways. For locomotives or other self moving carriages upon Rail roads, not using the chain. I also claim the application of Machinery to change the moving power from the road wheels of Locomotives upon rail roads where the inclination is too much for the adhesion of the wheels to the rail plate to allow them to ascend or descend, without slipping, or sliding upon said rails, to a pulley shaft as aforesaid, or any other thing, whereby said power is used in a different manner than in immediate contact with the road wheels or their axles as set forth in this specification or in any other way,

Witnesses
William A Simpson
Geo L Fichelberger

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4245 words

(Aug. 23. 1831.)