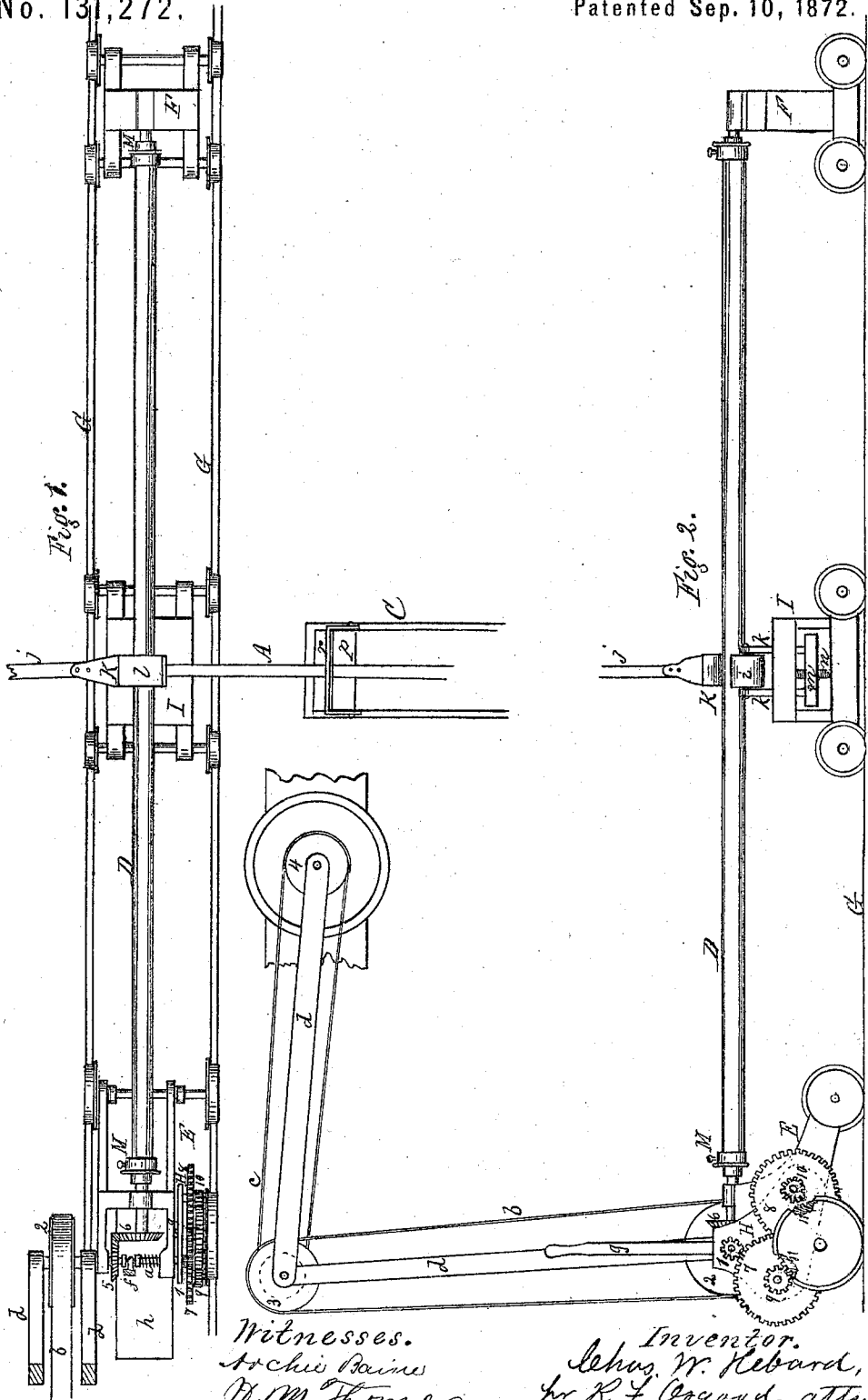


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for Water and Gas.

No. 131,272.

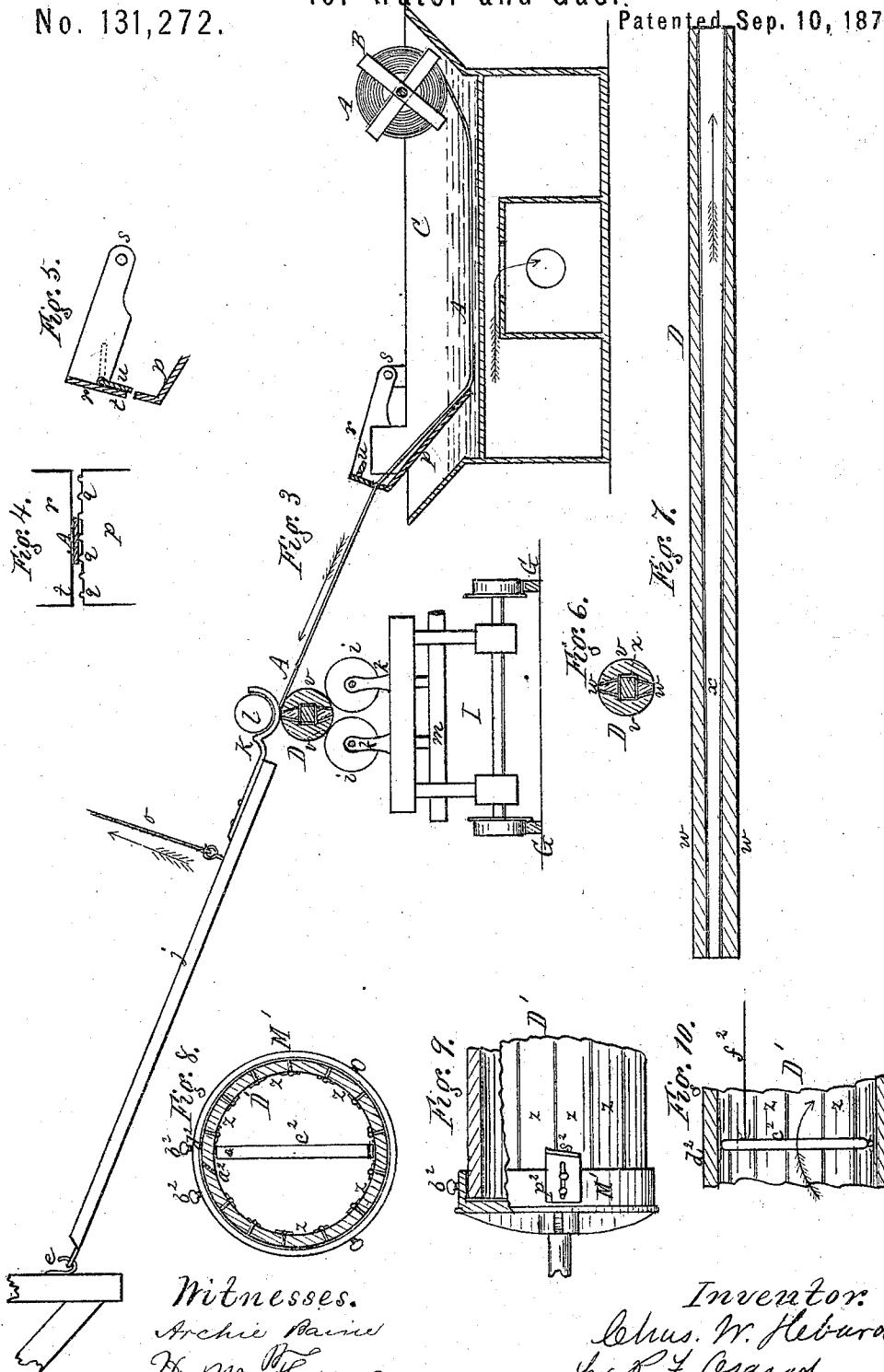
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Witnesses.
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Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES W. HEBARD, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF COMPOSITION PIPES FOR WATER AND GAS.

Specification forming part of Letters Patent No. 131,272, dated September 10, 1872.

Specification describing a certain Improvement in Water, Gas, and other Pipes, and in the apparatus for manufacturing the same, invented by CHARLES W. HEBARD, of the city of Rochester, in the county of Monroe and State of New York.

Nature of the Invention.

This pipe is made of wood splints or strips wound spirally upon a "form" or core, and is similar in its nature to that patented by John S. Patric, antedated September 18, 1865. The invention consists in the method of winding and "building up" the successive layers in bitumen, asphaltum, coal-tar, or any of their compounds, in a solid mass; and also in the machinery and appliances hereinafter described, whereby the work is done automatically and in a better manner than heretofore done.

General Description.

In the drawing, Figure 1 is a plan of the apparatus; Fig. 2, a side elevation; Fig. 3, a cross-section of the form or core, and an elevation of the presser, the tank, and the supporting-truck; Figs. 4 and 5, views of the distributing-jaws of the tank; Figs. 6 and 7, views of the "form" or core for making small-sized pipes; Figs. 8, 9, and 10, views of the "form" or core for making large-sized pipes.

The splints or hoops A, from which the pipe is wound, are cut in lengths from suitable timber in any desired manner, and the ends are sewed or otherwise attached so as to form a continuous length. They are then coiled upon a reel, B, which is hung upon the outer end of the tank C, or otherwise placed, so that the splint will pass bodily through the tank and become covered with the cement or composition therein contained on all sides before passing to the "form" to be wound.

I find it necessary to use two different kinds of "forms" or cores for winding the stuff—one for small pipes and one for large pipes. This "form" D or D' is made of the proper length for a single section of pipe, and is hung at opposite ends to cars or trucks E F, which run on a railway, G. The "form" is given motion on its own axis to wind up the stuff, and the trucks or cars are given an end motion upon the rail-track, which is just proportioned to

the take-up of the splint in winding, so that the edges of the latter fit closely together on the pipe in the proper spiral form. When one layer is fully wound to the end of the "form" the splint is cut off and tacked or nailed in place, and the next layer is wound back, crossing the first in an angular direction by simply reversing the machine, so as to run the cars in the opposite direction. In this manner the successive layers are wound till the requisite thickness of pipe is attained, the whole being embedded in the cement filling by the covering of the splints on all sides as they pass through the tank. To produce this automatic movement forward and back of the "form" or core, any desired arrangement of machinery may be employed, but I prefer the following: With the head car E is connected a shaft, *a*, on one end of which is a pinion, 1, and on the other a pulley, 2. A band, *b*, from 2, connects with another pulley, 3, and a band, *c*, from another pulley on the same shaft as 3, connects with a stationary pulley or drum, 4. The shafts of these several pulleys are connected by outside jointed arms *d d*, and the whole is so arranged that the pulleys and arms turn around pulley 4, where the initial power is applied. By means of this jointed arrangement of pulleys and bands moving free around the pulley 4, it will be seen that the car E may move forward or back without impediment and still receive power from shaft *a* to operate any gearing connected therewith. On the shaft *a* is a miter-wheel, 5, which meshes with a similar wheel, 6, on the end of the "form" or core, by which means the latter receives its rotary motion.

These gears are disengaged at any time by an end movement of shaft *a*, produced by clutch-lever *f*, Fig. 1. The pinion 1, before described, engages permanently with a spur-gear, 7, which has a fellow gear, 8, engaging with it. These two gears are hung in a rock-plate, H, which turns upon the center 1; and the rock plate is operated by a hand-lever, *g*, which stands within the reach of the operator standing on platform *h* of the car. The gears 7 and 8 have side pinions 9 and 10, which engage alternately with a gear, 11, attached to or forming part of one of the rear wheels of the car E. These pinions are so arranged that when one is in gear with the gear of the car-wheel the other is thrown out, as shown in

Fig. 2, and the change is produced by the changing of the rock-plate. This is for the purpose of changing the motion of the car at the end of each layer of winding, as before described. This arrangement of the gearing for alternately feeding the "form" forward and back constitutes one feature of my invention. In order to adapt the movement of the cars and the "form" to the different sizes of pipe being wound, I employ different sizes of pinions, 1, which may be applied to the shaft *a* by keying or otherwise, so as to be easily removable. When the small-sized "form" or core D is employed it is necessary to stay or hold up the length in the middle to prevent springing or bending. I employ for this purpose an intermediate car or truck, I, or, instead of this, a frame or block, which holds two rollers, *i i*, that embrace the "form" between them. This car or frame remains stationary while the "form" moves along, and it comes beneath the point where the splint winds upon the "form." To adapt it to the increasing size of the pipe as it is wound the bearings *k k* of the rollers pass down through the floor of the car or frame, and connect with a follower, *m*, that is raised or lowered by screws *n n*. Any equivalent adjusting arrangement for the rollers may be employed. In forming large pipe this car or frame is not required, as the "form" or core, owing to its size, has sufficient stiffness to preserve its form without bending. On top the "form," where the splint winds, is located a presser, K, which is made of such shape as to hold a removable weight, *l*. This weight is kept in a heated state, and the presser bearing on top the pipe as it is wound melts the asphaltum and spreads it evenly over the whole surface, so as to make it compact and unbroken. I prefer that the presser shall be stationary instead of in the form of a roller, as by its resistance and friction upon the splint it has a tendency to straighten and pack the splint closely in place, as well as to spread the asphaltum more evenly. But a roller might be used with a similar effect, and, instead of applying heated irons, the presser might be formed into a small furnace with a permanent fire therein. The presser is attached to some device by which it may be raised or lowered. I prefer an arm, *j*, which is hinged at *e* and elevated by a rope, *o*, Fig. 3. In the eduction end of the tank is an inclined discharge-board, *p*, which extends nearly to the bottom of the tank, the object of which is to direct the splint upward properly and prevent any catching of splinters and the consequent injury of the splint. At the upper end this board has a set of teeth or projections, *q q*, over which the splint passes to the "form." Above this board is located a hinged jaw, *r*, pivoted at *s*, and having a square edge, *t*, which projects down and coincides with the edge *q*, so as to embrace the splint between them. Inside the part *t* is hinged a supplementary jaw, *u*, with a series of teeth or projections on its lower

edge similar to *q*. When desired this supplementary jaw can be turned back out of the way, as indicated by the dotted lines, Fig. 5. The object of these jaws inclosing the splint between them is to clear off and scrape back any excess of the asphaltum or other cement that is carried over on the splint, and the object of the teeth *q* is simply to allow a larger quantity to remain on the under side, so as to cement firmly and compactly to the pipe as it winds. In passing through, between the teeth and the square edge, as indicated in Fig. 4, stripes or lines of the cement will remain on the under side of the splint, so as to adhere strongly to the pipe, while the upper surface will be comparatively clear to form a good surface for rewinding. In this case, the supplementary jaw *u* is turned back out of the way. In applying the final layer to the pipe the supplementary jaw is turned down, and thus an additional amount of the asphaltum or other cement is applied on the outside of the pipe to finish it. The tank is furnished with a suitable furnace, L, for keeping the cement in a melted state.

For making small pipes I employ the "form" or core shown in Figs. 6 and 7; it consists simply of two longitudinal segments, *v v*, which occupy the main portion of the circle, and two wedge-shaped bars, *w w*, at top and bottom, with a central key-wedge, *x*. The bars *w* are made with their narrow edges outward, so as to drop in or collapse easily when the central wedge is removed. The key-wedge is made wedging endwise, so as to expand the "form" when driven inward, and collapse it when drawn out. This "form" is mounted in bearings M M of the frame, and held by set-screws. When the pipe is completed upon it, the key-wedge is drawn out endwise, which releases or collapses the other parts of the "form" and allows them to be removed from the pipe. For pipes of but few inches in diameter this is the most convenient form I have tested; but for large pipes it is not so convenient.

For large pipes I employ the "form" shown in Figs. 8, 9, and 10, which is composed of hollow segments or staves *z z z z*, hinged together at the edges, so as to be extended into a full circle, as in Fig. 8, or to be folded or rolled up compactly. At one point, *a*², the joint between the staves is made angular, so that when released those parts can fall inward to collapse the "form." The two staves at this point are secured by screws *b*² *b*², which screw through the bearing-heads M¹ M¹. Similar screws may also be used at intervals around the circle to hold the "form" in cylinder shape. At intervals in the hollow of the "form" are located standards C² C², which are hinged at their lower ends to the staves, but are free at their upper ends, and, when extended, bear under the key-stave *a*², which is the first to fall in collapsing. These standards are operated by means of wires or rods *f*², which extend to the end of the "form," within reach of the operator. These standards stiffen the long tube thus

formed, and obviate the use of the supporting-car I, before described, or any other device for stiffening the center. To collapse this "form" I simply remove the set-screws which hold the staves to the heads $M^1 M^1$, force down the standards $C^2 C^2$, when the whole can be withdrawn from the pipe without difficulty.

In order to start the winding at the proper angle I use adjusting-plates p^2 , attached to the heads and secured by set-screws and slots, or other means by which they can be moved out and in. The edges s^2 of these plates are made inclined, for the purpose above stated. The adjustability is for adapting the device to different widths of the splints in winding.

The couplings for the pipe consist simply of sections cut from a pipe of larger size, made in the same way. These couplings may be formed with circumferential grooves on the inside, and when the ends of the main pipe are fitted therein the whole is filled with asphaltum or cement, which makes a tight joint.

Pipes made in this way may be formed of any size, from a few inches to several feet, in diameter, and as the strain is lengthwise of the grain, immense strength may be secured.

An important feature in this invention is the "building up" of layer after layer in a solid bed of asphaltum or equivalent cement, which can be done only by covering the whole surface of the splints with the liquid material at the moment they are wound, and before it can become cool. By this means a solid wall of pipe is secured, as impervious to water or gas as if built of asphaltum alone, while the pipe at the same time has all the strength of the same thickness of solid wood. Heretofore it has only been proposed to glue the edges of the splints as they are laid, and to coat the inside with paper covered with paint or coal-tar. This leaves the pores of the wood entirely open, and only a wooden shell which would be of little effect in holding water under a heavy head of pressure. My pipe being laid on all sides in cement, and the latter striking deep into the pores, the pipe becomes impervious under ordinary circumstances.

I would say that the novelty of this part of my invention does not consist merely of a pipe built up in cement, but in a particular method or process of making the pipe, viz.: passing the splints through a tank of heated cement to cover all sides, and then winding the same before the cement becomes cool, whereby the proper adhesion is made and the whole forms a compact and impervious body.

Prior to my invention I know of no method of forming this pipe except by winding by hand around a stationary "form." The mechanical means I have above described I find well adapted to the purpose, and am using it constantly in the manufacture of pipe. The automatic feeding of the "form" forward and back, while the splint winds upon it from a stationary point, is of the utmost importance,

and I can conceive of no other method of doing the work so well. This is apparent when it is considered that the splint must be wound while the cement is yet warm upon its surface; and it is inconvenient to move the tank with the winding up of the splint, though this might be done as an equivalent form while the position of the "form" or core remained stationary.

The cement used may be bitumen, asphaltum, coal-tar, or any of their compounds, or any other material which will answer the same purpose.

Claims.

What I claim and desire to secure by Letters Patent, is—

1. The process herein described of forming a wooden pipe by a continuous winding of the splints upon a "form" or core when said splints pass from a tank of cement, and are coated upon all sides, so that in the act of winding they build up the body of the pipe in a continuous bed of cement from inside to outside, substantially as herein described.

2. In an apparatus for winding wooden splints to form pipe, I claim giving to the "form" or core an alternate reciprocating movement to compensate for the winding, in combination with a stationary position of the splint, or vice versa, as herein described.

3. In combination with the "form" or core D, I claim the supporting car, frame, or block I, operating in the manner and for the purpose specified.

4. In combination with the "form" or core, I claim the presser K, operating in the manner and for the purpose specified.

5. I claim the combination of the inclined board p and hinged jaw r , arranged and operating as herein shown and described.

6. I claim the teeth or projections $q q$ on the board p and supplementary jaw u , either or both, when employed in the manner and for the purpose specified.

7. I claim, in combination with the car or truck E, the swinging gears 7 and 8, with engaging and disengaging pinions 9 and 10 and the changeable pinion 1, arranged to operate in the manner and for the purpose specified.

8. I claim, in combination with the car E, the swinging and adjusting pulleys 2 3, bands $b c$, and jointed arms $d d$, arranged and operating as herein described.

9. I claim the arrangement herein described for constructing spirally-wound wooden pipe, the "form" or core consisting either of the segments and wedge-bars and key, as shown in Figs. 6 and 7, or the hinged staves, as shown in Figs. 8, 9, and 10, the parts constituting the same being held to the bearing-heads by means of screws or equivalent, and are made collapsible, in the manner and for the purpose specified.

10. I claim, in combination with the "form" D, the standards c^2 c^2 , hinged at one end for operation, substantially as described.

11. I claim, in combination with the bearing-heads holding the form or core, the adjustable directing-plates p^2 , as herein specified.
In witness whereof I have hereunto signed

my name in the presence of two subscribing witnesses.

CHARLES W. HEBARD.

Witnesses:

R. F. OSGOOD,

ARCHIE BAINE.