

J. S. PATRIC.

Manufacture of Composition-Pipe

No. 149,603.

Patented April 14, 1874.

Fig 4.

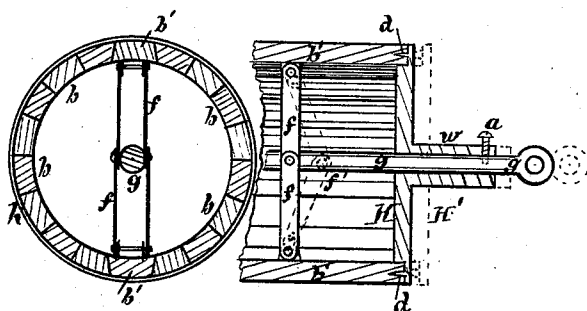


Fig 6.

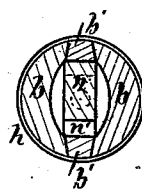


Fig 5.

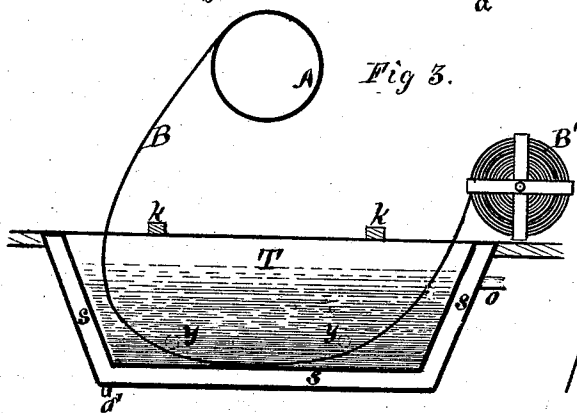


Fig 5.

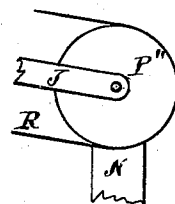
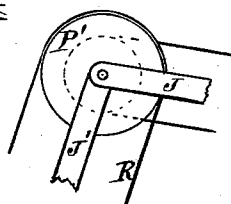
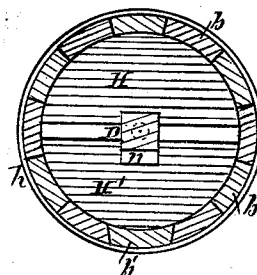


Fig 2.

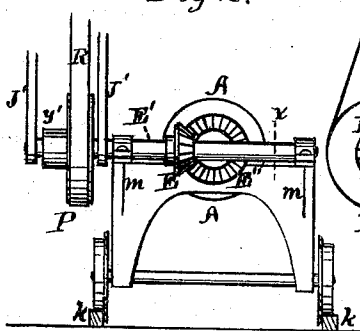
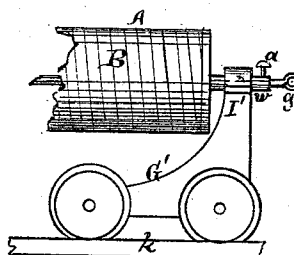
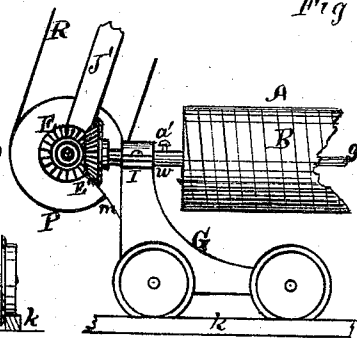


Fig 1.



Witnesses.

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JOHN S. PATRIC, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF COMPOSITION PIPE.

Specification forming part of Letters Patent No. **149,603**, dated April 14, 1874; application filed January 13, 1873.

CASE A.

To all whom it may concern:

Be it known that I, JOHN S. PATRIC, of the city of Rochester, county of Monroe and State of New York, have invented certain Improvements in the Manufacture of Composition or Laminated Pipe for water, gas, and other purposes, of which the following is a specification:

This invention has for its prime object the production of the laminated pipe formed of wooden splints spirally wound, invented by and patented to me September 18, 1865. It consists, mainly, in the employment of a peculiarly collapsible core or mandrel, upon which the splints are wound, after passing through suitable cement, to form the complete composition pipe. It further consists in the construction and arrangement of such machinery and mechanical appliances as will permit of the production of said pipe in a rapid manner and perfect condition, the character of the pipe so produced, however, not being essentially changed from the original.

In the drawings, Figure 1 is a sectional elevation of my invention. Fig. 2 is an end view of the same. Fig. 3 is a vertical sectional view of the cement-heating tank T. Fig. 4 is a transverse and a longitudinal sectional view of a forming-mandrel or core. Figs. 5 and 6 are transverse sections of different-sized cores.

My earliest experiments developed the necessity of providing not only a collapsible core, but also a differently-constructed core or forming-mandrel for making large pipe from that used in making small pipe. That shown in Fig. 4 I prefer for the larger sizes of pipe, and it consists of a series of staves, *b* and *b'*, formed of plank of a suitable thickness to afford sufficient strength. These staves are jointed together as seen in Fig. 4, and are supported in position by means of a suitable head, *H*, at each end. They may be provided with dowels *d*, or equivalent device, to catch and temporarily secure the ends of the staves upon the shoulders formed upon the inner face of the heads. Instead of the dowels a flange may be made on the heads, or a light hoop may be applied to hold the staves in position until the winding is commenced. The staves *b'* are

prevented from being forced inward by the pressure of the winding by means of the lazy-tongs or toggle-jointed links *f*, which are pivoted to the said staves and to the adjusting-rod *g*. The latter is held in the position shown in full lines by the pin or clamping-screw *a* in the hollow arbor *w*, and these staves *b'* act as "king-staves" or keys by being placed with the broadest side inward, as shown. The staves forming the core should be made of such a length as may be desired to make the lengths of pipe to be formed thereon. The core is mounted upon suitable trucks or cars *G* and *G'*, Figs. 1 and 2, the arbor of one head having a fixed bearing on truck *G*, at *I*, and the other on truck *G'*, at *I'*, and after the core is "set up" the rod *g* is pushed in and the pins or screws *a* and *a'* are inserted. After the length of pipe is completed by winding on several layers or lamina of splints, as herein-after more fully set forth, the core has to be contracted or collapsed radially, which is done by removing the screw *a*, which permits the head *H* to be slid to the right upon its hollow arbor *w*, to the position indicated by the dotted lines *H'* in Fig. 4, and by removing screw *a'* from the other end the rod may be drawn outward, as shown, the toggle-jointed links *f* assuming the position of the dotted lines *f'*, thereby drawing the two key-staves inward and allowing all of the others to be withdrawn from the pipe and set up for the formation of another length. Another construction of core, suitable for large or medium sized pipe, is shown in Fig. 5. This is sustained upon a square shaft, *D*. The staves are held outward against the clamping-hoop *h* by means of the two half-heads *H* and *H'* and the wedge-key *n* at each end. Only one king-stave, *b*, is necessary in this construction of the mandrel or core. In the manufacture of smaller pipe it is necessary to use a core made substantially like that shown in cross-section in Fig. 6. It consists of two somewhat crescent-shaped staves, *b*, which fill the main portion of the circle, and two king-staves, *b'*. The latter are forced outward by the double wedge (longitudinally) *n* and *n'*, which are inserted with the apex of one to the large end or base of the

other, and when driven in snugly cause the staves *b*, which are wedge-shaped laterally, to force the staves *b* outward or apart. The arbor at one end of this core is formed upon the large end of one key or wedge, *n*, and at the other on that of *n'*. It is made to collapse by withdrawing the wedge-keys *n* and *n'*, which releases the staves *b'*, allowing them to drop in centrally and be withdrawn, after which staves *b* may be removed. It is desirable to mount either the cement-heating tank and splint-reel, or the pipe-core upon a suitable carriage or trucks for convenience in the winding process. I prefer to mount the core or forming-mandrel upon two cars or trucks, *G* and *G'*, Figs. 1 and 2, the latter moving upon tracks *k*. Truck *G* is provided with a transverse shaft, *E'*, sustained in suitable pillow-blocks *m*, and provided with a bevel-pinion, *E*, that gears into bevel-wheel *E''* upon the arbor *w* of the core. The latter is caused to rotate upon the axis by power communicated through pulleys *P*, *P'*, and *P''*, and belts *R*. The shaft of pulley *P''* is hung to the post *N* or otherwise. The arms *J* at one end are pivoted to the same shaft, and at the other to the axial shaft of pulley *P'*, and the upper ends of arms *J'* are pivoted to the latter shaft, and the lower ends to the shaft *E'*.

It will be seen that, by this arrangement of pulleys, belts, &c., the mandrel or core bearing trucks may travel back and forth, as may be necessary, to accommodate the winding on of the splints. These splints or hoops *B*, which form the body of the pipe *A*, are cut in strips, of any desired length, width, or thickness, from suitable timber, and the ends sewed or otherwise secured together so as to form a continuous splint. These latter are coiled upon reels. One of such filled reels is arranged as shown at *B'*, Fig. 3, or at such other convenient position with relation to the asphaltum or cement tank *T* as to permit the splint to pass from the reel into the tank and become more or less thoroughly saturated and coated with the hot cement, and thence to be wound upon the revolving core or forming-mandrel, arranged relatively at *A*, Fig. 3. The said tank, in this case, is shown to be arranged below the track *k* of the trucks, and the drawing represents a double-walled tank, made of sheet metal or other suitable material, to be heated by steam, which may be introduced into the space *s* between the walls through a pipe at *o*, and a drip-pipe may be applied at *o'*. There may be rollers arranged within the tank, indicated by dotted circles at *y*, for the splints to pass under to insure their constant submersion in the hot asphaltum or cement.

It is obvious that a common heating-stove may be used as a heater, and an ordinary sheet-metal pan for a cement-tank; but I prefer the construction and arrangement above described. It is also obvious that asphaltum, gas-tar, or rosin, or any of the various compounds formed of either of them with other

ingredients, may be used, or any other suitable cement for saturating and coating the splints while being wound upon the form or core.

The proper direction or lead may be given to the splint when commencing the winding by any suitable gage, either fixed or adjustably attached to the head or to the periphery of the form.

Pipe may be made in this manner of any desired size, from two or three inches in diameter to several feet, and in length as long as may be convenient to handle. The splints may be laid with the lamina leading alternately right hand and then left; or two successive layers may be applied in the same direction, but overlapping or breaking joints, and the next two reversed in direction of lead, but also overlapping or breaking joints with each other, as indicated at *i* in Fig. 6. This would prevent the possibility of any pressure—which is common in water-pipe, for instance—forcing an opening through between the edges of the splints, which is liable to occur where the lines between the edges of one layer cross those of another, when each alternate-layer is reversed in lead.

The couplings for this pipe are formed of short sections, cut from the same kind of pipe of a larger size. They may be provided with circumferential grooves or channels inside to be filled with cement when they are applied to the ends of the pipe.

When the small mandrel or core is used it is desirable to provide a center rest, with or without rollers, similar to those used for a like purpose in turning-lathes.

This plan or process of forming or building up of the pipe is one of the various general plans I originally contemplated for making the pipe invented and patented by me in 1865, before referred to, more or less modified and perfected in some of its details, whereby the pipe should be produced cheaply, and at the same time so as to be thoroughly impervious to, and therefore a perfect conductor of, air, gas, or water, &c., and also to afford the greatest possible strength.

A smaller pulley, *y'*, may be used on the shaft *E'* to increase the speed of the forming-mandrel when a small-sized one is employed.

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

1. The process, herein described, of forming pipe by a continuous winding of wooden splints upon a forming mandrel or core, when such splints pass from a tank of suitable cement, with which they are more or less thoroughly saturated and coated, for the purposes set forth.

2. In an apparatus for winding wooden splints in the production of pipe, a core capable of receiving an alternate reciprocating movement, in combination with the splint-reel having a fixed position, or vice versa, substantially as described, for the purpose of

compensating for the gain or lead of said winding.

3. In combination with the car G, the self-adjusting or swinging pulleys P and P', belts R, and hangers or pivoted arms J and J', arranged to operate as and for the purposes described.

4. The collapsible winding core or mandrel for making spirally-wound laminated pipe, in combination with the winding mechanism and the splint-reel, for the purposes set forth.

5. In an apparatus for making pipe from wooden splints wound spirally, the forming

core or mandrel composed of staves *b b'* and heads H, combined and arranged substantially as herein shown and described, for the purposes set forth.

6. In combination with the staves and heads constituting the forming cylinder or core for making spirally-wound wooden pipe, the toggle-jointed bars *f* and rod *g*, or equivalent devices, for the purposes set forth.

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Witnesses:

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