

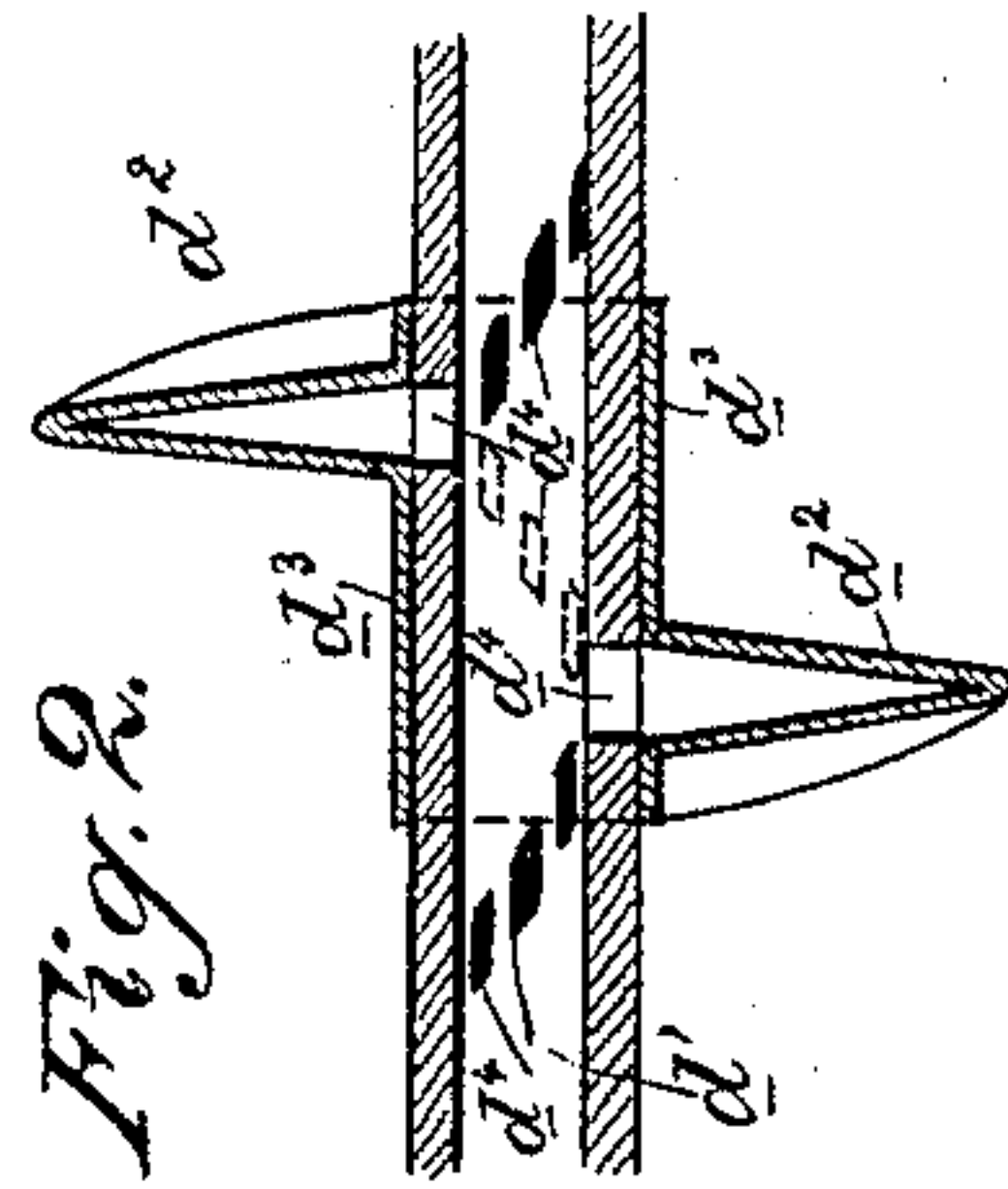
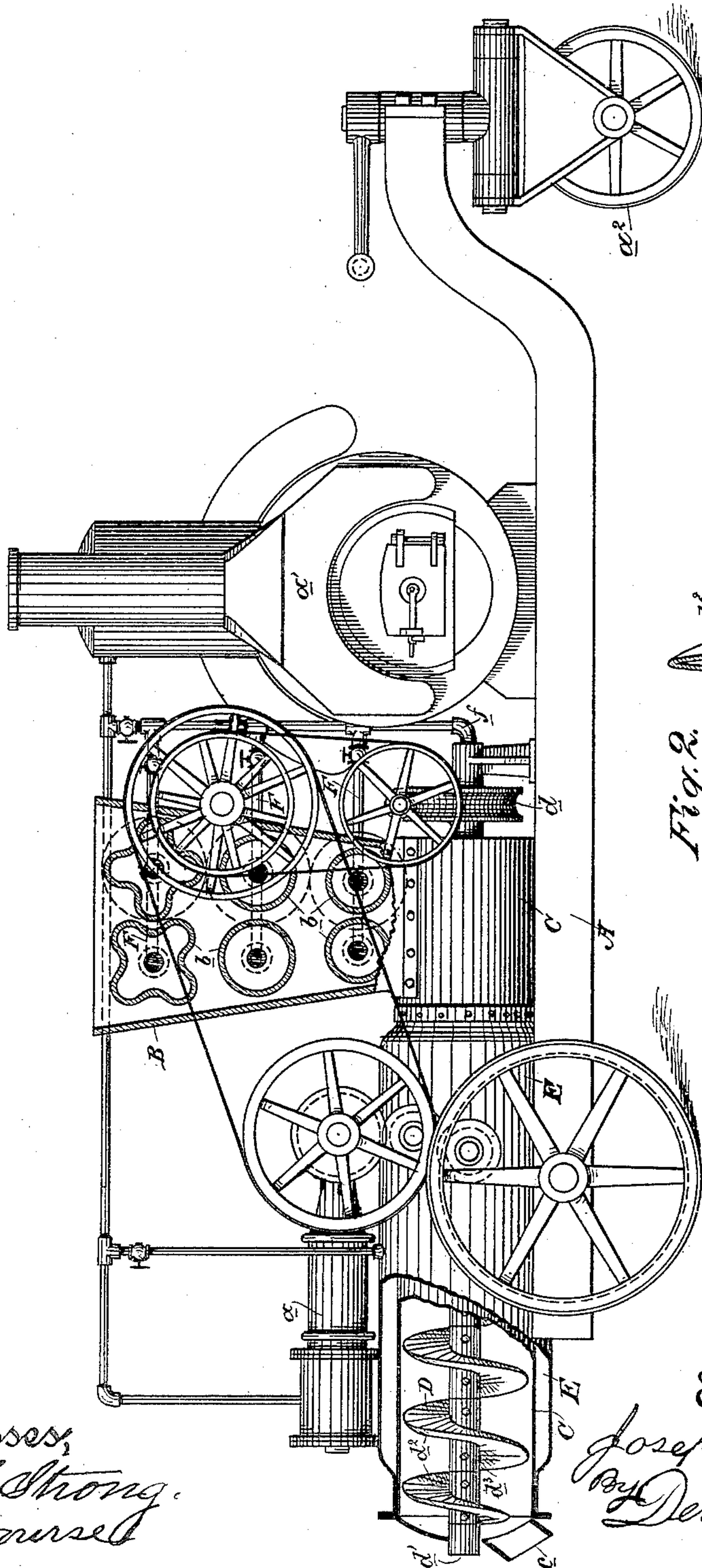
(No Model.)

J. B. JARDINE.  
APPARATUS FOR REDUCING, LAYING, AND ROLLING BITUMINOUS  
ROCK, ASPHALT, &c.

No. 442,441.

Patented Dec. 9, 1890.

Fig. 1.



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# UNITED STATES PATENT OFFICE.

JOSEPH B. JARDINE, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR REDUCING, LAYING, AND ROLLING BITUMINOUS ROCK, ASPHALT, &c.

SPECIFICATION forming part of Letters Patent No. 442,441, dated December 9, 1890.

Application filed April 9, 1890. Serial No. 347,246. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH B. JARDINE, a citizen of Great Britain, residing in the city and county of San Francisco, State of California, have invented an Improvement in Apparatus for Reducing, Laying, and Rolling Bituminous Rock, Asphaltum, &c.; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of apparatus for reducing bituminous rock, asphaltum, and similar substances to the proper plastic condition for use in paving, roofing, &c., and laying and rolling it.

My invention consists in the novel construction and arrangement of the apparatus, hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide a simple and effective apparatus for this purpose.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of my apparatus, the hopper being in section, and a part of the rear end of the conveyer, casing, or shell being broken away to show the conveyer. Fig. 2 is a longitudinal section of the conveyer.

A represents generally a wheeled vehicle, preferably of the self-propelling type, having an engine *a* and boiler *a'*, constituting it a traction-engine. I use this frame for convenience in mounting and transporting my apparatus, and for laying the material and rolling it by roller *a*<sup>2</sup>.

B is a supply-hopper carried by frame A. Within it are the crushing-rolls *b*. These are in vertical series, in horizontal pairs, as shown. The space between the members of each pair is graduated in width from the uppermost to the lowermost pair, being greatest between the former and least between the latter. These rolls may be of any suitable shape in cross-section, the uppermost pair being here shown as corrugated or fluted and the succeeding ones plain-surfaced.

Upon frame A is a horizontal casing or shell C, projecting rearwardly beyond the frame and having a discharge-chute *c* at its rear end. Its forward end has a top opening

directly under the open bottom of the hopper. Within this shell is the conveyer D, in the shape of an auger or screw, and so mounted as to be axially rotated by power transmitted from the engine through suitable belts and pulleys to a worm-shaft and a worm-gear *d* on its inner end. About the shell is a steam-jacket E. The general operation of these parts is plain. The material is broken by the rolls in the hopper, delivered to the conveyer, and by it carried to and discharged from the rear end; but to reduce the material to a plastic condition something more is needed, and consequently these parts are constructed as follows: All the rolls *b* are made hollow, and with their chambers or cavities is connected a steam pipe or pipes in any suitable manner, whereby they may be kept constantly supplied with steam. This keeps them heated, so that they partially or wholly reduce the material as it passes between them and is broken. The connection is made with the boiler by pipes F, which communicate with their hollow centers in any proper manner; but the chief novelty lies in the conveyer. It consists of a hollow or tubular rotary shaft *d'*, with which a steam-connection is made, say by a pipe *f*. The flanges or blades or wings *d*<sup>2</sup> are cast or formed hollow with closed outer ends, as shown in Fig. 2, and they are secured by their hubs *d*<sup>3</sup> to shaft *d'*, a proper steam-tight joint being made between their meeting ends. In the tubular shaft *d'*, under each hollow flange or wing, are made holes *d*<sup>4</sup>, whereby the steam supplied to said shaft passes into the hollow flanges or wings. The whole conveyer is thus kept hot, and the material in passing through it is thoroughly reduced to and kept in a plastic condition. In operation the traction-engine is caused to travel when the material begins to flow from the rear end of the conveyer. It is thus laid on the road and may be suitably spread. Then the engine is reversed and the roller *a*<sup>2</sup> passes over the spread material, and thus makes a firm and compact pavement, reducing the expense and facilitating the work.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for reducing bituminous rock, asphaltum, &c., the hopper having with-



in it the vertical series of crushing and heating rolls, said rolls being hollow and having a steam-connection whereby their cavities are supplied with steam, in combination with a  
 5 hollow screw conveyer communicating with the outlet of the hopper and advancing the material in a heated condition to the point of discharge, substantially as herein described.

2. In an apparatus for reducing bituminous  
 10 rock, asphaltum, &c., the hollow screw conveyer having a steam-connection, whereby it is supplied with steam and provided with hollow blades or wings having closed outer ends to prevent the escape of the steam, substantially  
 15 as herein described.

3. In an apparatus for reducing bituminous rock, asphaltum, &c., the screw conveyer consisting of a tubular or hollow shaft having a steam-connection, and perforated, as described, and the hollow flanges or wings secured to said shaft, having closed outer ends and open inner ends, and their cavities communicating with the hollow shaft through its perforations, substantially as herein described.  
 25

4. In an apparatus for reducing bituminous rock, asphaltum, &c., the screw conveyer consisting of a hollow or tubular shaft, perforated as described, and having a steam-connection, and the hollow flanges or wings secured to and communicating with the hollow perforated shaft, said flanges or wings having their outer ends closed and their inner ends open, whereby they are supplied with steam,  
 35 in combination with the casing in which the conveyer is seated, a hopper communicating with one end of the casing, and a series of heating and crushing rolls in the hopper, whereby the material is supplied to the conveyer, and  
 40 a discharge-chute at its other end, substantially as herein described.

5. In an apparatus for reducing bituminous rock, asphaltum, &c., the combination of the hollow steam-connected screw conveyer having  
 45 hollow flanges or wings provided with closed outer ends and open inner ends, and the steam-jacketed casing or shell in which

said conveyer operates, substantially as herein described.

6. In an apparatus for reducing bituminous  
 50 rock, asphaltum, &c., the combination of the casing or shell, the hollow steam-connected screw conveyer therein, the hopper, and the hollow steam-connected crushing and heating  
 55 rolls in the hopper, substantially as herein described.

7. An apparatus for reducing bituminous rock, asphaltum, &c., comprising a steam-jacketed shell or casing having a discharge-chute at one end, a hopper communicating  
 60 with its other end, a vertical series of hollow steam-connected rolls within the hopper, and a screw conveyer in the shell or casing, consisting of a hollow perforated shaft having a steam-connection, and hollow flanges or wings  
 65 secured to said shaft and receiving steam therefrom, substantially as herein described.

8. An apparatus for laying plastic material in a heated condition, comprising a traveling traction-engine having a roller, a hopper supported upon the engine-frame and provided  
 70 with heated crushing-rolls for reducing the material, a discharge-chute communicating with the hopper, and a heated screw conveyer for advancing the material to the point of  
 75 discharge, so that it may be operated upon by the roller of the traction-engine, substantially as herein described.

9. The reducing, laying, and rolling apparatus consisting of a traction-engine having  
 80 a roller, the hopper carried by the engine having the hollow steam-heated rolls, and the hollow steam-heated screw conveyer on the traction-engine, receiving the material from the hopper and delivering it upon the road  
 85 in a plastic condition, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOSEPH B. JARDINE.

Witnesses:

S. H. NOURSE,  
 H. C. LEE.