(No Model.) 3 Sheets—Sheet 1.

J. P. CULVER.

MACHINE FOR MAKING ASPHALTED SHEET METAL PIPE.

No. 472,984. Patented Apr. 19, 1892.

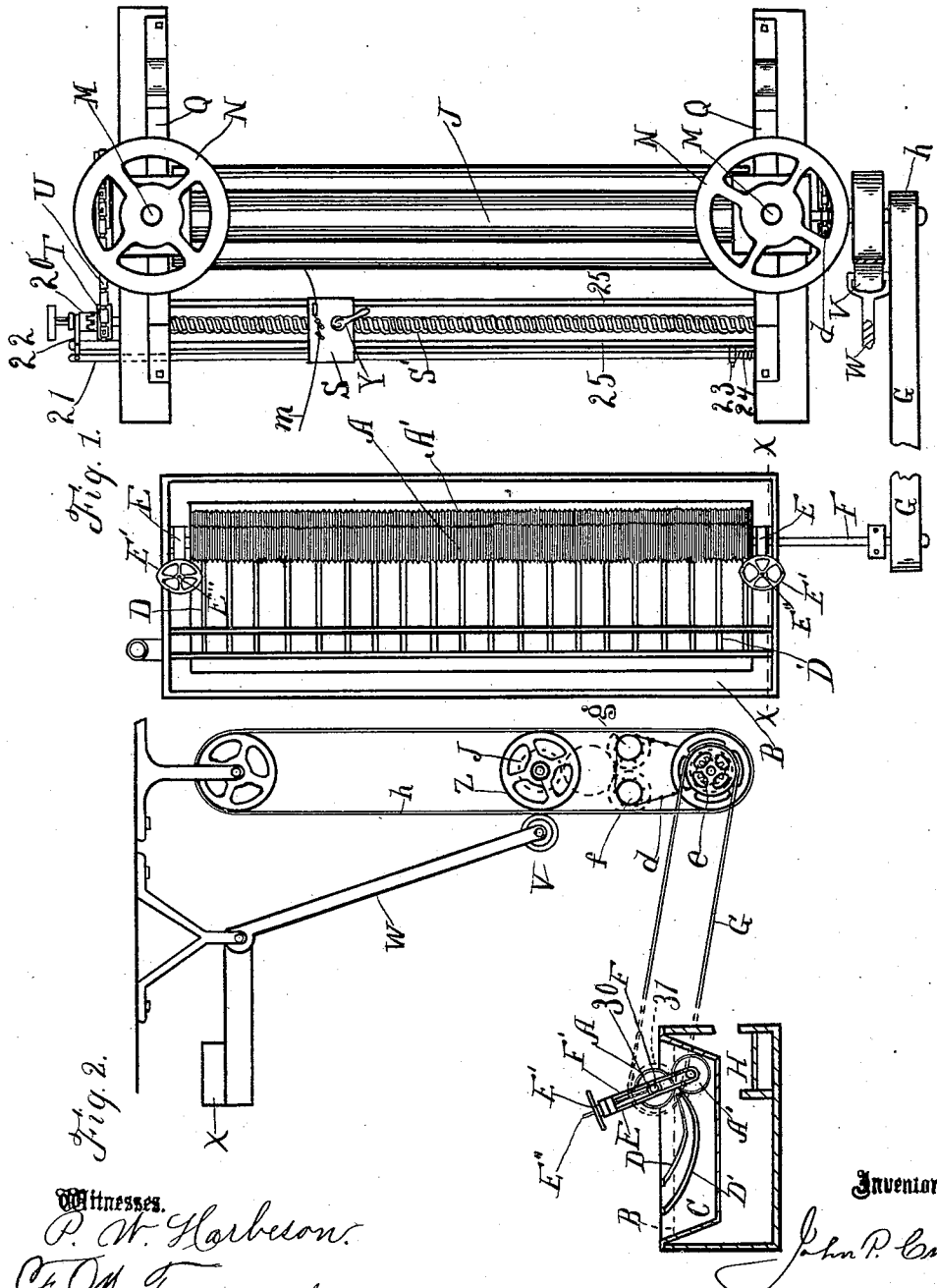

Fig. 1.

Fig. 2.

Witnesses.
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(No Model.) 3 Sheets—Sheet 2.

J. P. CULVER.

MACHINE FOR MAKING ASPHALTED SHEET METAL PIPE.

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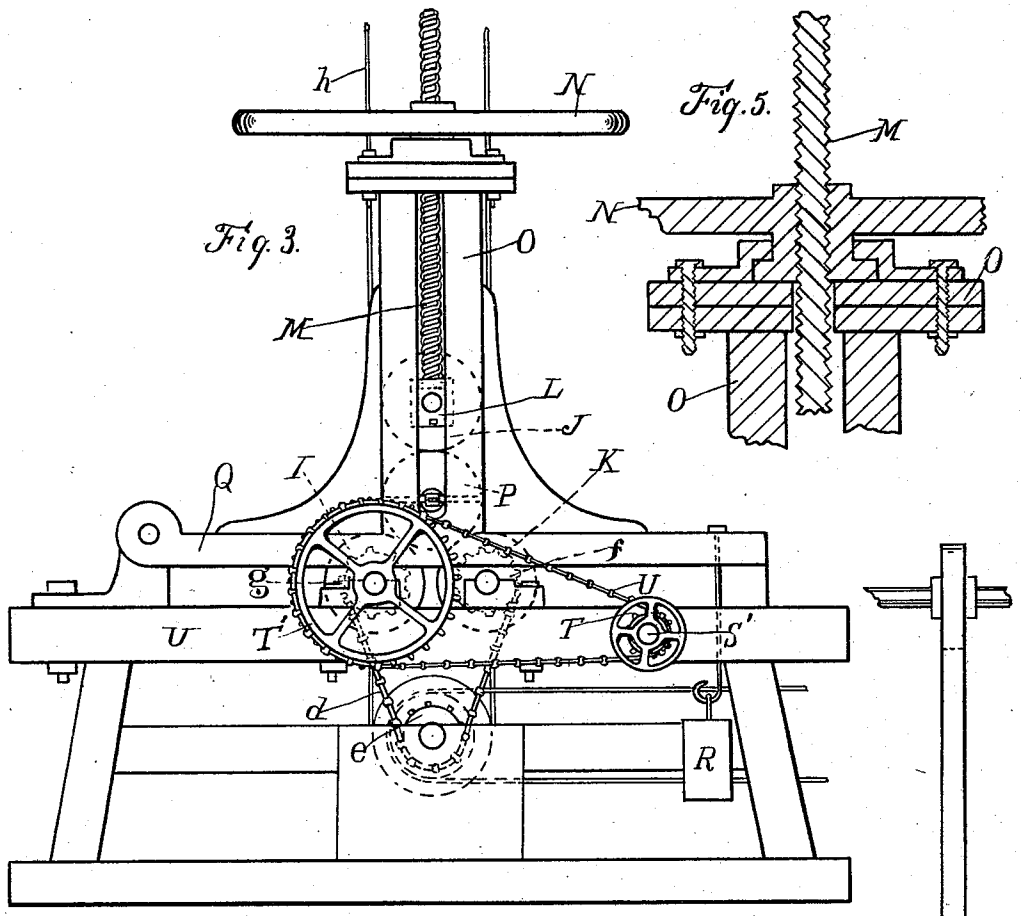

Fig. 3.

Fig. 5.

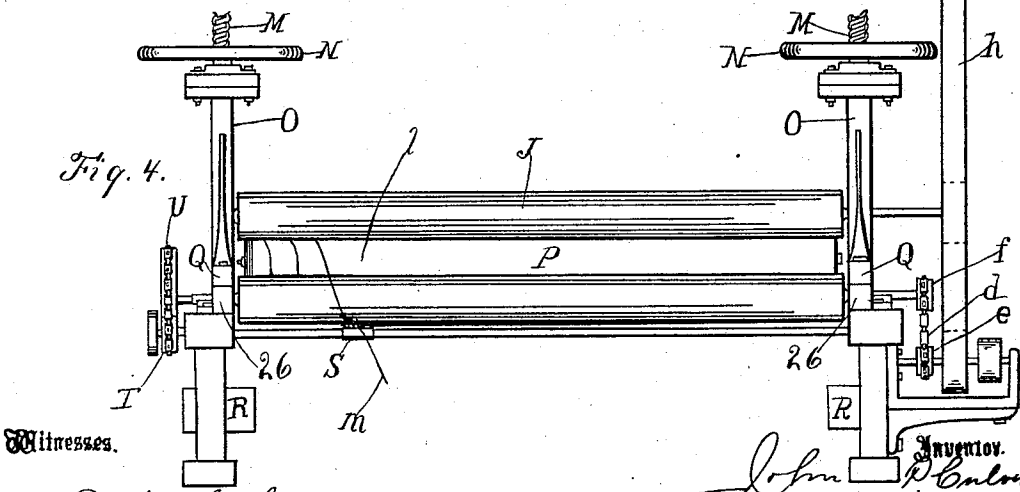

Fig. 4.

Witnesses.

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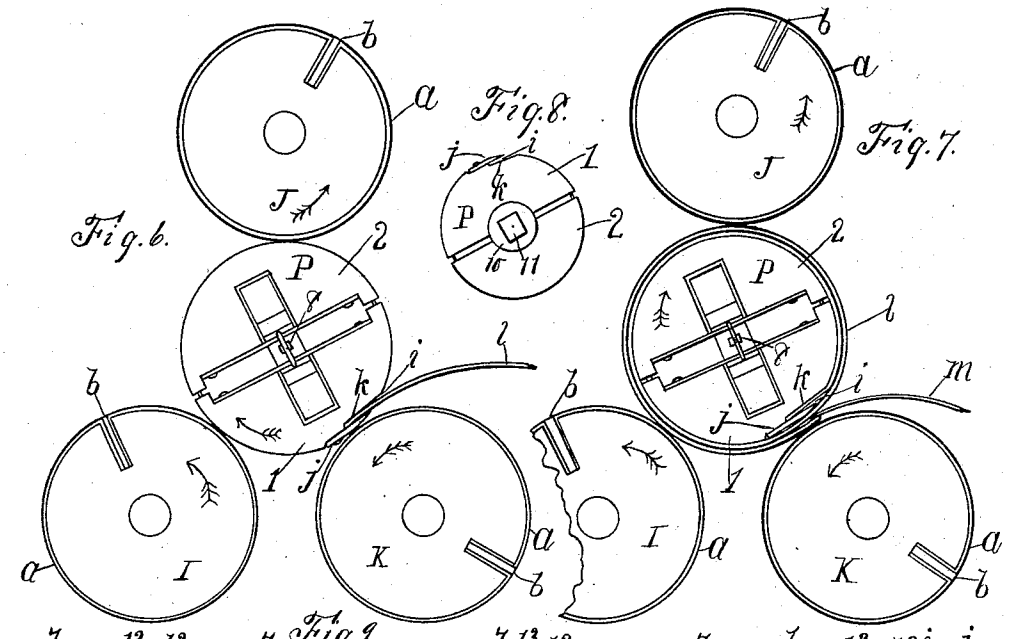
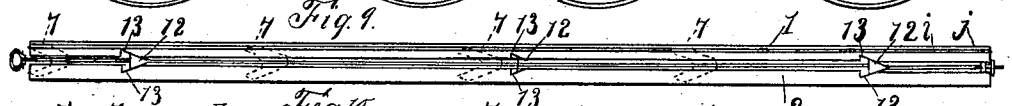
(No Model.) 3 Sheets—Sheet 3.

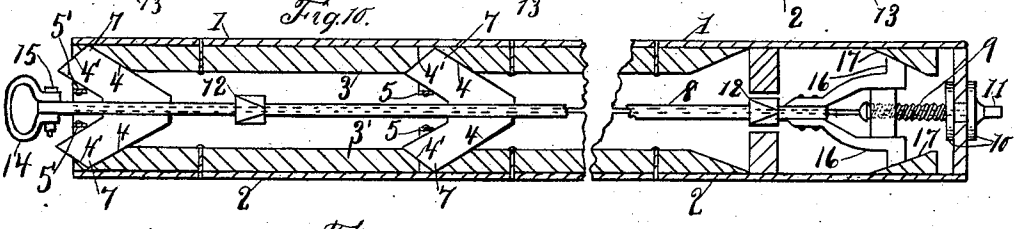
J. P. CULVER.

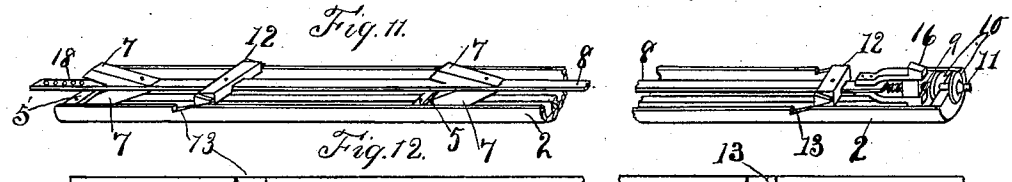
MACHINE FOR MAKING ASPHALTED SHEET METAL PIPE.

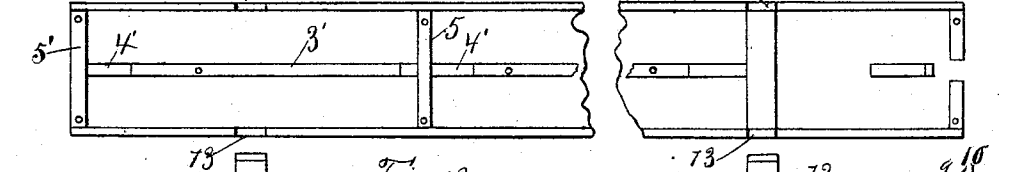
No. 472,984. Patented Apr. 19, 1892.











Witnesses.

P. W. Harbeson.

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UNITED STATES PATENT OFFICE.

JOHN P. CULVER, OF LOS ANGELES, CALIFORNIA.

MACHINE FOR MAKING ASPHALTED SHEET-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 472,984, dated April 19, 1892.

Application filed August 17, 1891. Serial No. 402,795. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. CULVER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Machine for Manufacturing Asphalted Sheet-Metal Pipe, of which the following is a specification.

My invention is specially designed for the manufacture of asphalted or otherwise cemented sheet-metal pipe; but it comprises mechanism for forming convolute sheet-metal tubes, whether cemented with asphaltum or any other suitable material or wholly uncemented.

The ultimate object of my invention is to produce a machine with which to manufacture pipe, consisting of an asphalted sheet of metal formed into a tube and wrapped with wire or bands to strengthen it and secure the lap.

My invention comprises an entire and complete organization of parts, whereby the flat sheet of metal is coated with asphaltum and is then rolled into the desired tubular form and wrapped with wire, secured against lateral displacement at the same time by being embedded in the outer asphalt coating.

It also comprises various parts and combinations of parts embraced in said machine, and hereinafter described and claimed.

The said pipe is made by a continuous operation, consisting of first passing the sheet through melted asphaltum, then wrapping the sheet firmly about a mandrel, and then wrapping wire or bands around it, after which the mandrel is withdrawn.

The accompanying drawings illustrate my invention.

Figure 1 is a plan view of the machine. Fig. 2 is an end elevation of the same, the frame of the machine not being shown and the asphaltum coating device being shown in section on line *x x*, Fig. 1. Fig. 3 is a plan elevation of the end of the rolling and wiring or banding portion of the machine opposite that shown in Fig. 2. Fig. 4 is a front view of the rolling and wiring part of the machine. Fig. 5 is a sectional detail of a portion of one of the pressure-controlling devices which is arranged at the sides of the machine. Fig. 6 is an end view of the rollers and mandrel arranged in position to receive a sheet and roll it to form a joint of pipe. None of the actuating mechanism is shown in this or the two succeeding figures; but a fragment of a sheet of metal is shown introduced into the notch of the mandrel in Fig 6. Fig. 7 is an end view of the rollers and mandrel with a sheet of metal wrapped upon the mandrel and a wire having its end introduced into the flap of the sheet ready to be wound about the mandrel by its further rotation. Fig. 8 is a view of the other end of the mandrel. Fig. 9 is a side view of the mandrel expanded. Fig. 10 is a vertical longitudinal mid-section of the same on an enlarged scale, the expanding and contracting rod not being in section. Fig. 11 is a perspective view of the mandrel with one-half of the shell removed. Fig. 12 is a plan view of the half of the shell not shown in Fig. 11. Fig. 13 is a view of the expanding and contracting rod, looking down on the top of Fig. 10.

In order to manufacture the asphalted sheet-metal pipe herein referred to, it is desirable that the sheet be first evenly coated on both sides with a thick coating of asphaltum. Figs. 1 and 2 illustrate the means whereby this is accomplished.

The principal feature of the part of my improved pipe-machine which thus coats the sheets of metal consists of a pair of circumferentially grooved, ribbed, or threaded rollers A A′, arranged parallel to each other in the asphaltum-vat B, with their contiguous faces a little above the line of the melted asphaltum C within the vat. This device may be useful in various other manufactures where it is desirable to evenly coat a sheet of material upon one or both sides with a thick coat of wax or gum or like substance. The two rollers act together to conduct the sheet from the vat, but the operation would be substantially the same were one of the rollers smooth; but in such case only one side of the sheet would be thickly coated.

My invention embraces the device for evenly applying a thick coating of waxy material upon a suitable surface, consisting of a circumferentially-threaded roller arranged to engage such surface, as set forth, after it

has been coated with such material. A guide-rack D D′ is arranged to conduct the sheet down through the asphaltum and introduce its edge between the rollers. The upper roller is provided with an axle F, journaled in suitable boxes 30, arranged to move up and down in suitable guideways E and extending out over the wall of the vat and there provided with a pulley 31, which is driven by band G, which is connected with the rest of the machine, and is driven by the power which drives the rest of the machine. The up-and-down movement of the upper roller is very slight and does not interfere with the operation of the band. Suitable means—such as the wheel and screw E′ E″—are provided for raising and lowering the upper roller to accommodate sheets of different thicknesses.

In practice the asphaltum is kept semi-fluid by heat from the furnace H, and the sheets are passed between the members D D′ of the rack and between the two rollers A A′, thus passing through the melted asphaltum, which is forcibly applied thereto by the rollers. The outer faces of the asphaltum coats, however, are ridged when they first leave the rollers and the warm asphaltum ridges flatten and fall together, thus forming a thicker coat of the material than can be applied evenly by rollers not provided with the circumferential ribs or threads. When thus prepared, the sheet is passed directly to the bending and wiring part of the machine.

The essential feature of the bending and wiring part of the machine comprises the combination of a detached mandrel provided with means for clutching one edge of a sheet of metal and thereby retaining it, two base or supporting rollers arranged to sustain the mandrel in the trough formed between such rollers, a pressure-roller arranged to press the mandrel into such trough, and means for rotating the rollers. The means provided for controlling the pressure-roller also forms an important feature of my invention, and consists of the combination of a movable frame having the pressure-roller adjustably mounted in such frame, yielding means for forcing the frame in the direction the pressure is to be applied, and adjusting means for moving the roller toward and from the point at which the pressure is to be applied. In describing this part of the machine I will first refer to the arrangement of parts shown in Figs. 6 and 7.

The rollers I J K are each covered with a suitable canvas jacket *a*, secured thereto by a lath or strip *b*. The canvas constitutes a firm cushion to press the asphaltum-coated sheet into proper cylindrical form about the mandrel. In practice this canvas is kept moist to prevent the asphaltum from adhering to the rollers.

The base or sustaining rollers I K are arranged close enough together to sustain the mandrel in the trough between them, and the upper movable pressure-roller J is arranged parallel with such rollers in a plane vertical to the plane of the axes of the lower rollers to press upon the pipe-mandrel when it is in place upon the base-rollers. These rollers are connected with power by suitable means for their rotation, such as the sprocket chain and wheels *d e f g* and the belt *h*. (See Figs. 1 and 3.) The arrows in Figs. 6 and 7 indicate the direction of rotation of the rollers and mandrel. The upper or pressure roller J is arranged upon and carried by the screw-controlled vertically-movable journals or boxes L, which are fixed to the screws M, which are controlled by the screw hand-wheels N, journaled to the standards O of the frame to revolve to force the screw up and down and thereby raise and lower the top roller.

In Fig. 2 is shown a device for connecting the upper roller with the driving-belt.

V is an idler-wheel mounted upon an arm W, actuated by suitable means—such as the weight X—to press against the belt *h* opposite or nearly opposite the point of contact between the belt and a pulley Z, fixed upon the shaft of the pressure-roller J. This holds the belt against the pulley Z with sufficient pressure to cause the rotation of the roller J and yet allows the roller J to move freely up and down.

The mandrel P, upon which the sheet is rolled to form the pipe, is detached from the rest of the machine and provision for its insertion or removal is made at will by simply raising the top roller J by turning hand-wheels N N until the mandrel can be inserted into or withdrawn from the space between the rollers. When the mandrel is in place, as suggested in Fig. 6, the edge of the asphaltum-coated sheet of metal *l* is introduced into the longitudinally-arranged grip-notch *i*, which is arranged to retain the edge of the sheet, and the machine is then started to rotate the bottom rollers, which by friction upon the mandrel rotate the mandrel and also assist in rotating the top roller J, thus rolling the sheet tightly about the mandrel. The notch *i* is formed by a longitudinal bit *j*, secured to the mandrel and extending from end to end thereof along the offset *k*. The standards O O of the movable frame, which carries the screw-controlled top or pressure roller J, is fixed to the weight-controlled hinged levers Q Q, which form the base or platform of the movable frame, which holds the top roller J down with a force regulated by the weights R, which is about five hundred pounds in the manufacture of ordinary pipe. A spring may be made to take the place of the weight, if desired. When the sheet has been fully bent to form the pipe, the rollers are stopped and one end of a strand of wire *m* is inserted in the space left between the flap-edge *n* of the sheet *l* and the main body of the pipe.

S is the wire carrying and tension carriage, operated by the carriage-driving screw S′, extending across the machine parallel with the

rollers. The carriage S is arranged to clutch upon and to be disconnected from the threaded portion of the screw at the will of the operator.

The clutch is not illustrated in detail for the reason that clutches to accomplish this purpose are well known and form no part of my invention.

The means for connecting the screw S with the rollers by which it is driven consists of a sprocket-wheel T, connected by sprocket-chain U with a sprocket-wheel T′ upon one of the power-driven base-rollers, so that when the wire-carriage is driven by the screw it moves along in front of the revolving mandrel to carry the wire to allow it to wind in a spiral upon the pipe from end to end thereof. The sprocket-wheel T is journaled to revolve upon the shaft of the screw, except when clutched thereto.

20 represents a clutch arranged to connect or clutch the screw-driving sprocket-wheel T with the screw S′ to rotate it.

21 is the clutch-actuating rod, connected with the clutch 20 by the pivoted lever 22. The rod is provided with a stop 23, fixed thereupon and arranged in the path of the wire-carriage S, and when the carriage strikes the stop it forces the rod 21 back against the pressure of the rod-operating spring 24 and operates the lever 22 to withdraw the clutch 20 from the revolving sprocket-wheel T, thus allowing the screw S′ and the carriage to stop while the mandrel is revolving. The wire is thereby allowed to be wound around the pipe closely together to allow to be soldered together.

Y represents the handle of the screw-engaging clutch. When it is desired to return the carriage to the other end of the screw, the handle Y is turned to release the screw, and the carriage can then be moved freely along the screw.

25 25 represent the carriage-supporting rails.

It is to be understood that when the wire is first applied to the pipe the carriage is left unclutched from the screw until a sufficient number of turns have been taken with the wire close together for soldering, and then the screw-clutch is thrown into engagement to drive the carriage, so as to wind the wire in a wider spiral. When the wrapping has been completed, the hand-wheels N N are turned to raise the pressure-roller in the frame O O. At first the effect of this is to allow the front part of the hinged levers Q Q to lower until they rest upon their supports 26 26, and then the further rotation of the wheels raises the roller free from the mandrel and its surrounding pipe and allows the mandrel to be withdrawn from between the rollers. Extra mandrels are provided, so that as soon as the one having the completed pipe upon it is removed another one may be inserted between the rollers and the operation just described be repeated.

The collapsible mandrel P comprises the combination of two semi-cylindrical members 1 2 and internal mechanism arranged between such members to force the two members 1 and 2 apart and draw them together. Figs. 9, 10, 11, 12, and 13 illustrate this portion of my invention. The two shells or members 1 and 2 are hollow and are provided with longitudinal strengthening-strips 3 3′, and are provided at intervals with inclined contact-faces 4 4′ and with cross ties or bars 5 5′, with a space between the bars and the contact-faces to receive the inclines or fingers 7, which are fixed to and project from the spreading and collapsing bar 8 and respectively extend into the spaces between the cross-ties and the inclined faces of the shells to hold the shells together and press them apart. The bar 8 is arranged to extend between the cross-ties of the two shells and to move back and forth longitudinally within the space between the shells of the mandrel. The means for moving the bar consists of a screw 9, journaled in one end of the mandrel shells or members 1 and 2 and provided with thrust-collars 10 10 to hold it in place. It is provided with a suitable stem 11, which affords attachment for a wrench, by which the screw can be turned to screw it through the cross-head 16 to move the bar back and forth longitudinally. The bar 8 is also provided with beveled cross spreader-bars 12, arranged transverse to the plane of the inclines 7 to extend between the edges of the members 1 2 into incline-faced notches 13, arranged to receive them.

The fingers, cross-bars, and inclined faces are so arranged with relation to each other that upon the movement of the bar 8 in one direction they will operate together to force the members 1 and 2 apart and upon the reverse movement of the bar 8 the members 1 2 will be drawn together.

14 represents a handle, which is fastened by a bolt 15 to the end of the bar 8 opposite that provided with the screw 11. The handle is arranged to engage the cross-bars 5′ before the inclines or fingers 7 are fully withdrawn from between the cross-bars 5 5′ and the strengthening-strips 3 3, so that the members 1 2 are held together and cannot be taken apart until the handle is removed to allow the bar 8 to be further withdrawn. Gage-holes 18 are provided to allow the handle to be set to stop the bar at different points thus to gage the size of the mandrel when expanded. The bolt and holes afford adjustable means for securing the handle to the bar to serve as a gage-stop; but other means can be employed, and I do not limit myself to those shown. The screw-receiving cross-head 16 16 is beveled to engage the beveled faces 17 17 of the members 1 2 in the same manner as the inclines 7 engage the faces 4.

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

1. The device for evenly applying a thick coating of waxy material upon a suitable sur-

face, consisting of the combination, as set forth, of suitable means for applying a coating of the waxy material to said surface, a circumferentially-threaded roller arranged to engage such surface after it has been coated with such material, and means for rotating such roller upon such coated surface.

2. In a machine for manufacturing asphalted sheet-metal pipe, the combination of the pair of circumferentially-threaded rollers arranged in an asphaltum-vat, with their contiguous faces above the line of the melted asphaltum within the vat, suitable guides arranged to conduct the sheet down through the asphaltum and introduce its edge between the rollers, and means for revolving such rollers.

3. The combination of the asphaltum-vat, the threaded rollers arranged within the vat, with their contiguous faces above the line of the asphaltum, the upper roller being provided with an axle journaled in suitable boxes arranged to move up and down in suitable guideways and extending out over the wall of the vat and there provided with a pulley, such boxes and guideways and the driving-band arranged to drive the pulley.

4. In a machine of the class set forth, the combination of a movable frame, a pressure-roller adjustably mounted in such frame, yielding means for forcing the frame in the direction the pressure is to be applied, and adjusting means for moving the roller toward and from the point at which the pressure is to be applied.

5. In a machine of the class described, the combination of the base-rollers arranged to support a mandrel, the hinged frame, means for forcing the frame toward the base-rollers, the pressure-roller journaled in the vertically-movable boxes, the screws fixed to such boxes, the screw hand-wheels journaled to the movable frame and arranged to move the screws up and down, and the supports 26 26.

6. The combination of the rollers, the mandrel, the carriage-driving screw, screw-rotating means connecting the screw and rollers, and the wire-carriage arranged to be clutched upon and disconnected from the screw.

7. The combination of the rollers, the mandrel, the carriage-driving screw, the sprocket-wheel journaled upon the screw, the sprocket-chain connecting the rollers with the journaled sprocket-wheel, a clutch arranged to connect the screw and journaled sprocket-wheel, the clutch-actuating rod and lever pivoted thereto, the wire-carriage arranged to clutch upon the threaded portion of the screw, and the stop fixed upon the clutch-actuating rod and arranged in the path of the wire-carriage.

8. The combination of the two semi-cylindrical shells provided with the inclined contact-faces and with cross-ties, and the spreading and collapsing bar arranged to extend between the cross-ties of the two shells and to move longitudinally within the space between the shells and provided with the inclines 7, arranged to extend between and engage the cross-ties and inclined faces to hold the shells together and force them apart, as set forth, and means for moving the bar longitudinally.

9. The combination of the two semi-cylindrical shells provided with the inclined contact-faces, the incline-faced notches, and the cross-ties, the spreading and collapsing bar arranged to extend between the cross-ties of the two shells and to move longitudinally within the space between such shells and provided with the beveled spreader cross-bars arranged to extend into the notches in the edges of the shells, and the inclines arranged, respectively, to extend between and engage the cross-ties and the inclined faces of the shells to hold the shells together and press them apart, and means for operating the bar longitudinally.

10. In a collapsible mandrel such as set forth, the combination of the shells, the spreader-bar provided at one end with the cross-head, the screw journaled in the end of the shell and provided with the thrust-collars and arranged to screw into the cross-head, the movable handle, and adjustable means for securing it to the bar.

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