

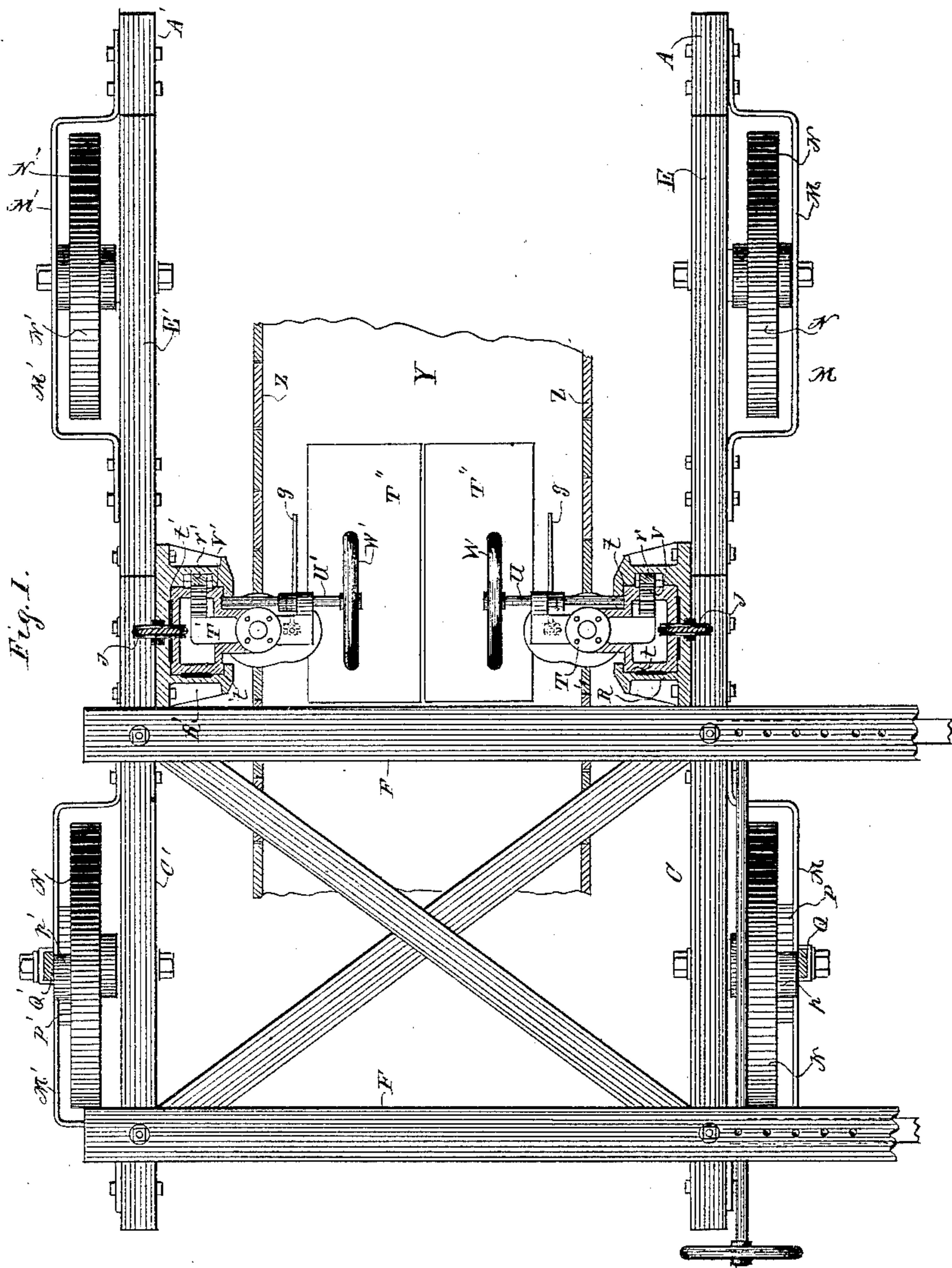
(No Model.)

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N. E. GREEN.  
SEWER SHEATHING DRIVER.

No. 424,708.

Patented Apr. 1, 1890.



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Emma F. Elmore,

Inventor

Nelson E. Green

By his Attorney  
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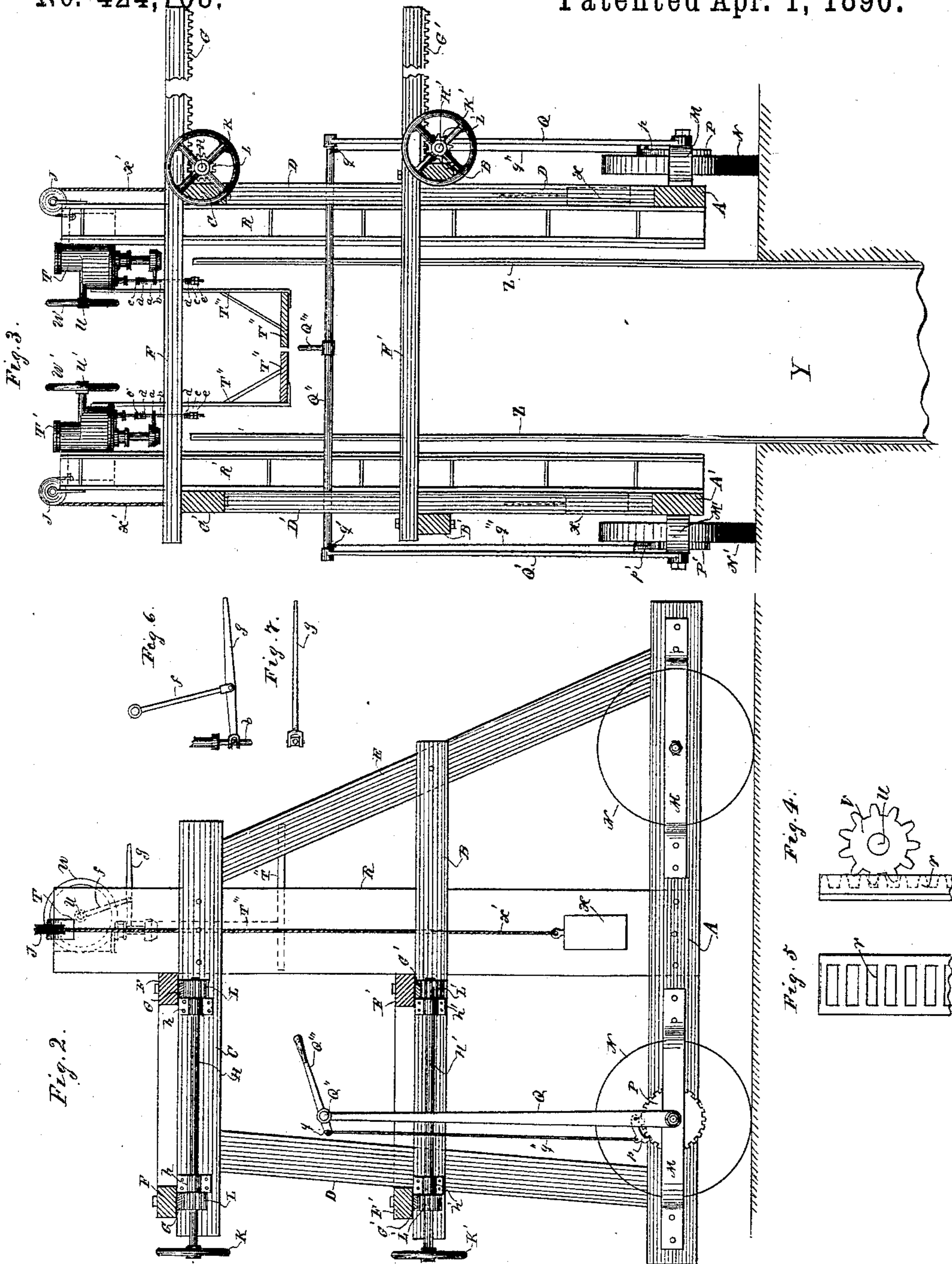
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# UNITED STATES PATENT OFFICE.

NELSON E. GREEN, OF MINNEAPOLIS, MINNESOTA.

## SEWER-SHEATHING DRIVER.

SPECIFICATION forming part of Letters Patent No. 424,708, dated April 1, 1890.

Application filed June 28, 1889. Serial No. 315,917. (No model.)

*To all whom it may concern:*

Be it known that I, NELSON E. GREEN, a citizen of the United States, and a resident of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented a certain new and useful Sewer-Sheathing Driver, of which the following is a specification, reference being had to the accompanying drawings.

In the construction of sewers it is necessary, as is well known, to put down sheathing to retain the walls of the ditch until the masonry is placed in position. Usually the separate pieces of sheathing have been driven into place by hand. This is by far the most laborious labor connected with the construction of sewers, requiring a large number of men and consuming much time.

The object of my invention is to do this work by machinery, thereby effecting a great saving both in time and in labor. To this end I provide a suitable supporting-frame mounted on trucks adapted to be moved along one or both sides of the sewer-trench, and on this frame I mount one or more vertically-movable steam-hammers in proper position to be lined with the sheathing, adapted to deliver strokes on the same in rapid succession from its starting to its final position. I preferably construct the frame in such form that it will straddle the trench, supporting the same from independent sets of trucks on the opposite banks, and equip the frame with a pair of hammers, one on each side. This frame is also preferably made laterally adjustable to adapt the machine to sewers of different width, and is so constructed as to have a clear space between all its opposite parts which are in advance of the hammers. This clear central space permits the sheathing-timbers to be set in their starting position ahead of the machine without interference with its forward movement. For effecting their vertical adjustment the steam-hammers are provided with pinions, and are mounted in upright guides having fixed racks with which the pinions engage. These pinions are on shafts having hand-wheels or other means for the application of power. The lateral adjustment of the frame may be effected by fixed ratchets on the cross-ties and ratchet-wheels on one side of the upright frame-work.

In the drawings, like letters of reference referring to like parts throughout, Figure 1 is a plan view of my machine. Fig. 2 is a side elevation; Fig. 3, a rear end elevation, and Figs. 4, 5, 6, and 7 are details.

A, B, and C represent horizontal bars of unequal length, and D and E inclined bars connecting the same, making up the upright frame on the right side of the machine; and A', B', C', D', and E' represent the corresponding bars making up the upright frame on the left side. The longest horizontal bars are placed at the bottom and the shortest at the top, and their inclined connecting-bars spread at their base, this arrangement affording greater strength.

F and F' represent, respectively, upper and lower cross-ties uniting the opposite sides of the machine. Each set of cross-ties is composed of a pair of parallel bars connected by diagonal braces.

G G' are sets of ratchet-plates on the under surfaces of the right ends of the cross-ties.

H H' are shafts mounted in bearings *h h'* on the right side frame, which are provided with hand-wheels K K' or other means for the application of power.

L L' are sets of pinions on the shafts H and H', respectively engaging with the ratchets G G'. At their left ends the cross-ties are permanently secured to the left side frame by bolts and nuts, or otherwise, and when the frame is adjusted for a given trench the ties may also be secured in a similar manner to the right side frame.

M M' are bracket-shaped angle-irons secured to and projecting from the outer faces of the lower horizontal bars A A'.

N N' are the sets of independent wheels journaled in the bars A A' and angle-irons M M'. The faces of the rear wheels are provided with ratchet-wheels P P', and to the faces of the angle-irons M M' are pivoted levers Q Q', provided with spring-pawls *p p'*, adapted to engage with the ratchets P P'. The levers Q Q' extend above the lower set of cross-ties F, and are connected at their upper end by a cross-rod Q'', journaled therein. *q q'* are cranks on the opposite ends of this cross-rod Q'', and *q'' q'''* are connections therefrom to the pawls *p p'*. At some con-

venient point the rod  $Q''$  is provided with a small crank-arm  $Q'''$  for turning the same in its bearings to raise the pawls. This ratchet-wheel and lever mechanism enables the operator to propel the machine forward as required.

$R R'$  are the upright hammer-guides, preferably formed of metal and rigidly secured to the side frames in front of the cross-ties  $F F'$ , and are provided with the racks  $r r'$ .

$T T'$  are the steam-hammers, the cylinders of which are provided with projecting bracket-like beds  $t t'$ , adapted to fit and work in the guides.

$U U'$  are shafts journaled in the cylinder-beds, provided with pinions  $V V'$ , engaging with the racks  $r r'$ , and with hand-wheels  $W W'$  for operating the same.

The hammer-actuating engine may be of any suitable construction, having a hammer-head on the outer end of its piston. A detailed description of the form shown is not deemed necessary beyond merely noting the mechanism for actuating the valves. For this purpose the pistons of the engines are provided with laterally-projecting lugs  $a$ , and the valve-stems  $b$  with pairs of stop-collars  $c$ , adapted to be engaged thereby. Coiled springs  $d$  encircle the stems, and are secured to the stops for cushioning the stroke on the valve-stem. The piston is thus made to actuate the valve at the opposite ends of its stroke. The stop-collars  $c$  are made adjustable on the valve-stems, and are secured in the desired positions by jam-nuts  $e$ .

$f$  are links depending from the shafts  $U U'$ , and  $g$  are hand-levers pivoted intermediate their extremities each to one of the links  $f$ , and having one end attached to the valve-stems for starting and stopping the engine and controlling the stroke of the hammer.

$X$  are counter-weights attached to the engines by flexible connections  $X'$ , passing over sheaves  $J$  on the guides  $R$ .  $T''$  is an operator's platform connected to the engines by links  $T'''$ . The operator's weight on platform tends to force the engines down the guides. When the operator is off the platform, the counter-weights tend to return the engines to top of the guides. The platform is in two parts, one half being attached to each engine.

$Y$  represents the sewer-trench, and  $Z$  the sheathing-timbers.

The operation is evident. The machine being in position outside the ditch and properly adjusted, the hammer-engines are raised to the proper height and the sheathing-timbers set under the hammer. On then starting the engine their hammers will deliver short quick blows on the sheathing-timber, the operator moving the engines down the guides as required to keep them in their proper positions with reference to the sheathing. As one timber is driven to its final position, the machine is moved forward to the next. The strokes may be delivered either

directly on the head of the sheathing-timbers or to a driving-head (not shown) connected therewith. Water or air may be used as well as steam.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In an apparatus for driving sewer-sheathing, the combination of a frame adapted to be moved along the sewer-bank, a steam-hammer mounted in ways on said frame, and a platform attached to said steam-hammer for supporting the operator, substantially as and for the purpose specified.

2. In an apparatus for driving sewer-sheathing, the combination of a frame and means for adjusting the same to adapt it to cover sewer-trenches of different sizes, of a pair of guides secured to each side of said frame, a pair of vertically-movable steam-hammers mounted one in each of said guides, and a device secured to each hammer for supporting the operator, substantially as and for the purpose specified.

3. The combination, with the two parallel independent frames, each mounted on wheels, and a sheathing-driver fitted in each of said frames, of upper and lower cross-ties attached to one of said frames, and means carried by the other of said frames for engaging the cross-ties and adjusting the frames to the desired distance apart, substantially as set forth.

4. A frame for a machine for driving sewer-sheathing, consisting of independent side portions, in combination with cross-ties attached to one of said side portions and racks and pinions for adjusting the frames to the desired distance apart, substantially as set forth.

5. The combination, with a suitable supporting-frame adapted to be moved along the bank of a sewer-trench, of a vertical guide rigidly secured to said frame and provided with a rack, and a steam-hammer mounted in said guide and having a pinion engaging with said rack for effecting the vertical adjustment of the hammer, substantially as described.

6. The combination, with upright side frames mounted on trucks adapted to be moved along the opposite banks of a sewer-trench, of a shaft and pinion mounted in bearings on one of said frames and cross-ties secured at one end to one of said side frames and provided with rack-bars at their other ends adapted to be engaged by said pinions, substantially as described, whereby the upright side frames may be adjusted to and from each other for adapting the machine to different-sized sewers.

7. The combination, with the main frame adapted to straddle a sewer-trench, of independent supporting-wheels under its opposite sides, ratchets on the faces of one pair of opposite wheels, vibratory levers pivoted to the side frames and having pawls for engagement with said ratchets, and a transverse rod

connecting the free ends of said levers for operating the same in unison, substantially as described.

- 5 8. The combination, with a supporting-frame, of a vertically-adjustable hammer-engine mounted thereon, and a counter-weight for said engine adapted to restore the same to its normal position, substantially as described.
- 10 9. The combination, with a supporting-frame, of a vertically-adjustable hammer-engine mounted thereon, a counter-weight secured to said engine, adapted to raise the same to its highest position, and an operator's platform secured to the engine, adapted, when the operator is in position thereon, to overcome
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the counter-weight and force the engine downward, substantially as described.

10. The combination, with the straddling frame supported from the opposite banks of the sewer-trench, of the hammer-engine guides secured to the opposite sides thereof, the hammer-engines mounted therein, the counter-weights, one to each of said engines, and the half-platforms for the operator, attached one part to each of said engines in opposition to said counter-weight, substantially as described.
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NELSON E. GREEN.

In presence of—

DUFF D. GREEN,  
JAS. F. WILLIAMSON.