

Sept. 18, 1928.

1,684,882

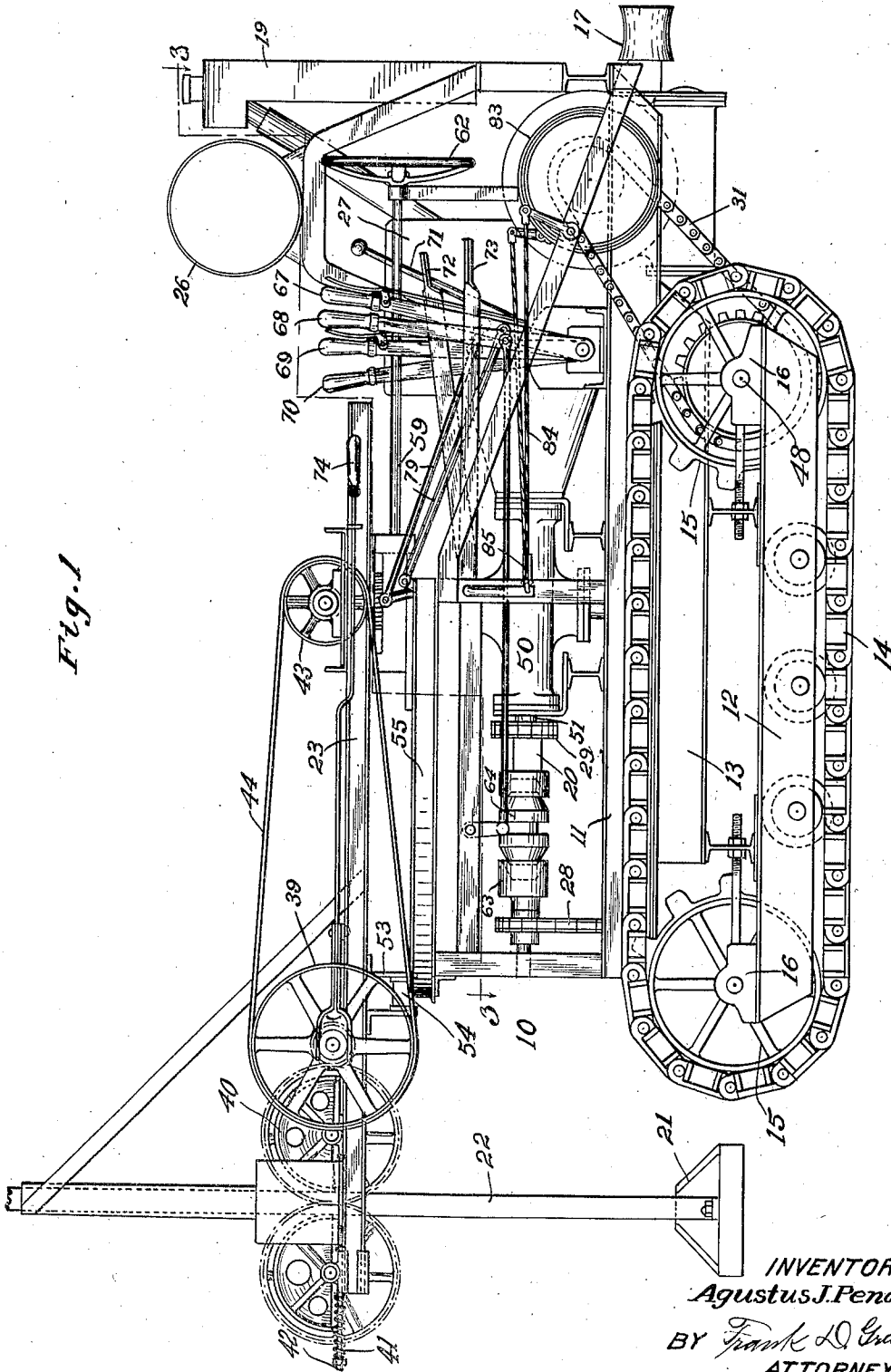
A. J. PENOTE

TAMPING MACHINE

Filed Oct. 30, 1924

4 Sheets-Sheet 1

Fig. 1



INVENTOR
Augustus J. Penote
BY Frank L. Gray
ATTORNEY

Sept. 18, 1928.

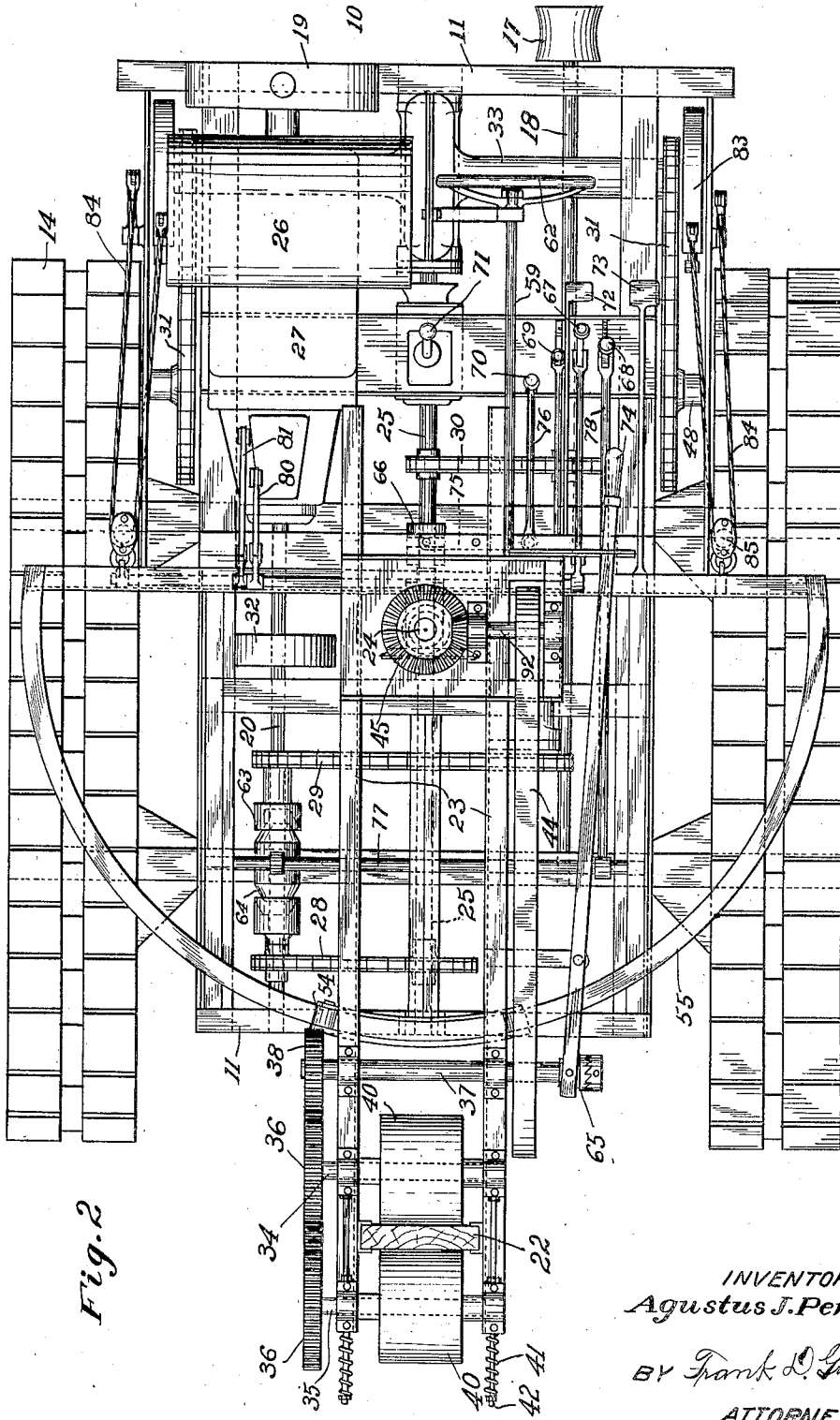
1,684,882

A. J. PENOTE

TAMPING MACHINE

Filed Oct. 30, 1924

4 Sheets-Sheet 2



INVENTOR
Agustus J. Penote

BY Frank D. Gray
ATTORNEY

Sept. 18, 1928.

1,684,882

A. J. PENOTE
TAMPING MACHINE

Filed Oct. 30, 1924

4 Sheets-Sheet 3

Fig. 3

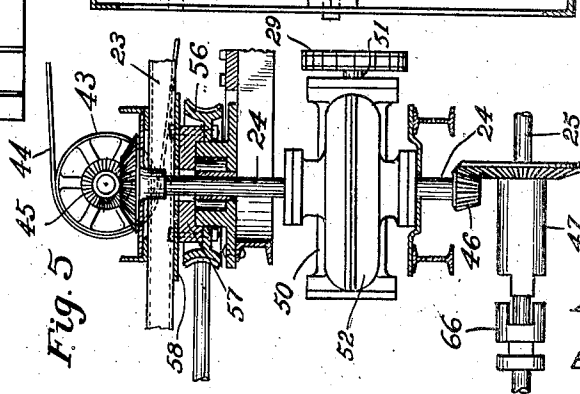
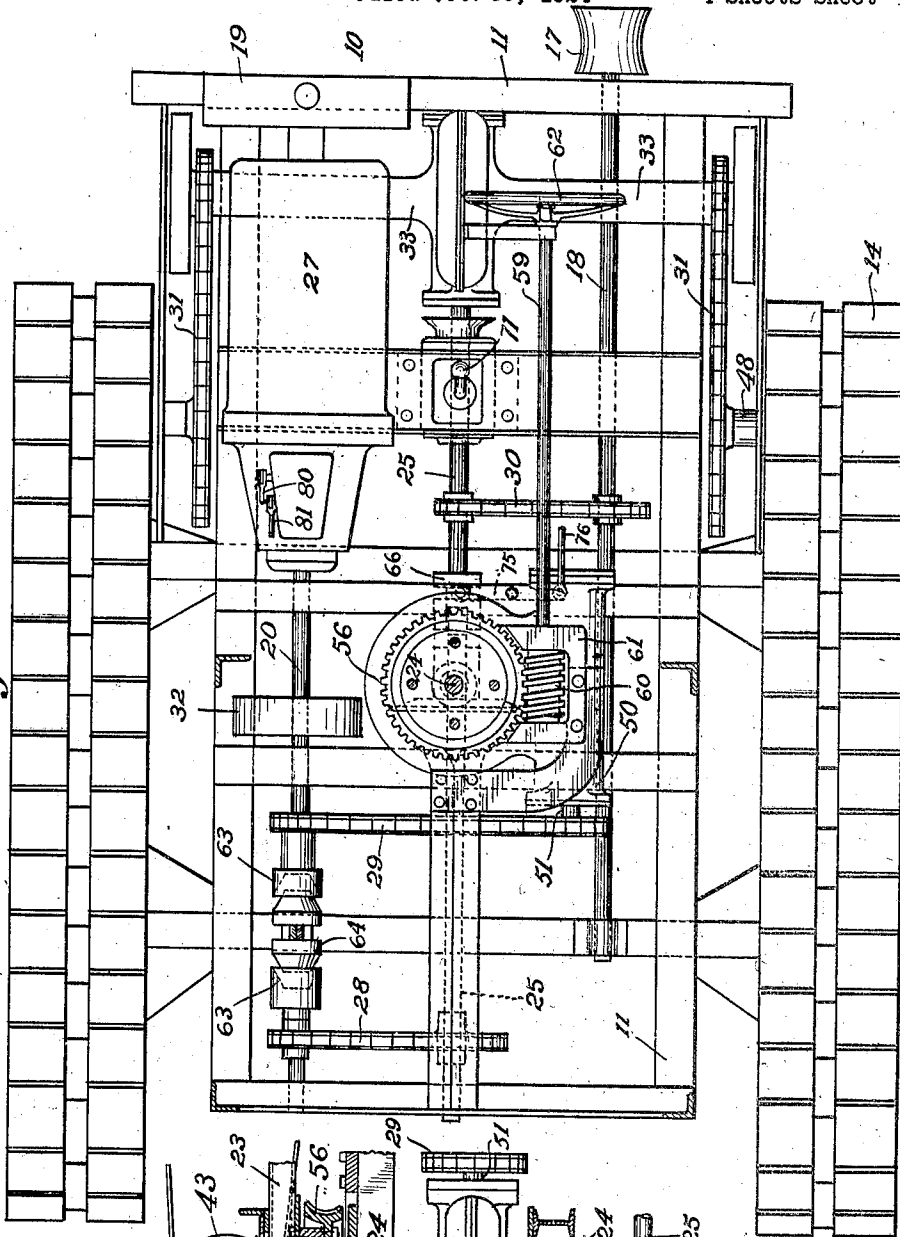


Fig. 5

INVENTOR
Agustus J. Penote
BY Frank D. Gray
ATTORNEY

Sept. 18, 1928.

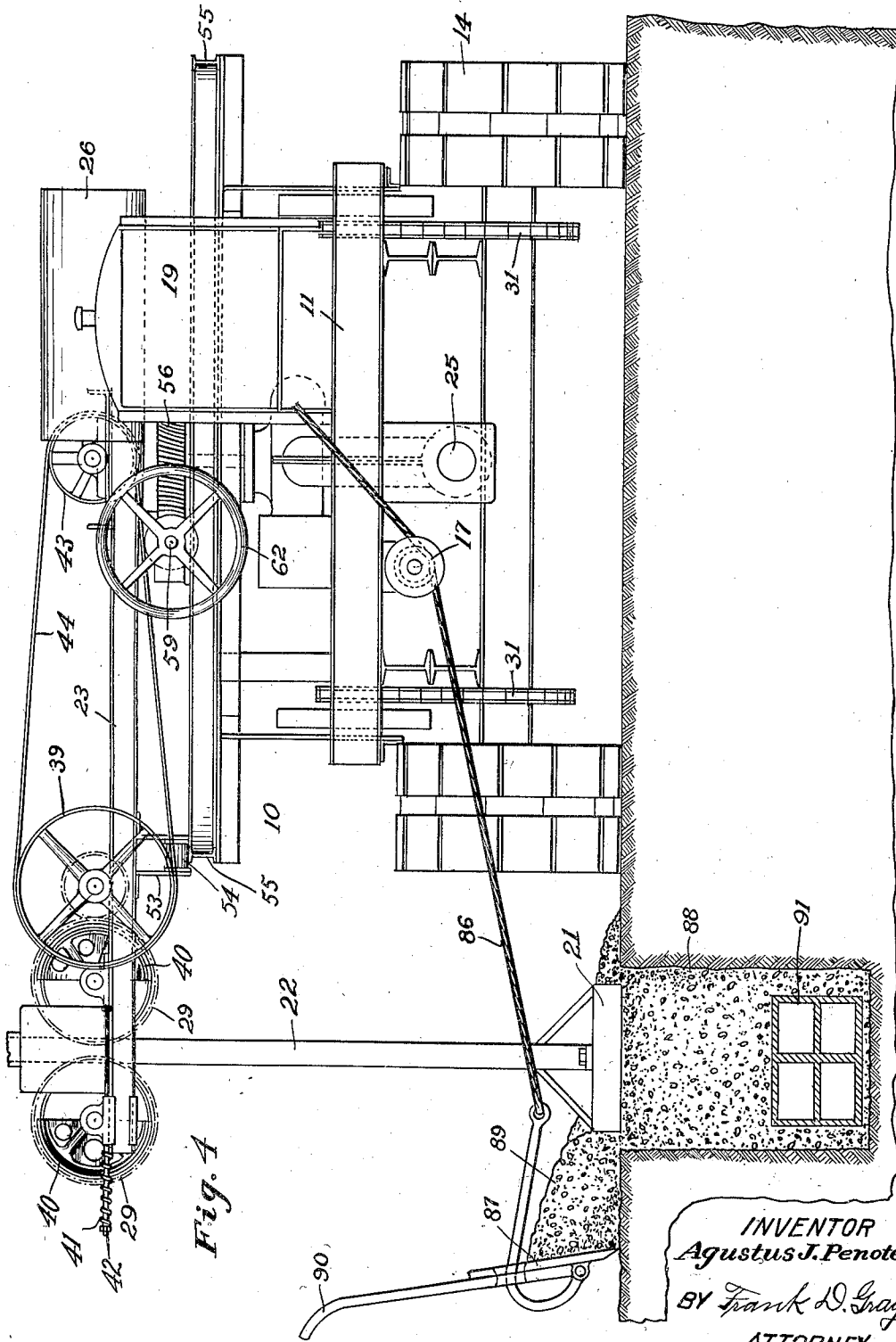
1,684,882

A. J. PENOTE

TAMPING MACHINE

Filed Oct. 30, 1924

4 Sheets-Sheet 4



INVENTOR
Agustus J. Penote
BY Frank D. Gray
ATTORNEY

UNITED STATES PATENT OFFICE.

AUGUSTUS J. PENOTE, OF CLEVELAND, OHIO.

TAMPING MACHINE.

Application filed October 30, 1924. Serial No. 746,785.

This invention relates to improvements in mechanism for tamping blocks, dirt, or similar materials, as in making roads, filling in trenches, etc.

While my invention in its preferred embodiment is particularly adapted for making solid the surface of the material above a trench which has just been filled, it may be used for various other purposes such as ramming pavements, breaking up hard surface material such as asphaltum and compacting rough surfaces.

Heretofore, it has been customary to do such tamping by means of hammers or rollers usually actuated either in front of or to the rear of a propelling force such as that of an engine, and such tampers have customarily been held in a particular position which had always to be maintained as it was first mounted. It is a special object of my invention to facilitate the operation of such tamping mechanism by mounting the tamping bar upon a swinging arm which may be moved about upon a vertical pivot to position the tamper at one end of a suitable carriage and to either side thereof, at the same time actuating the same in any of said positions.

It is a further object of my invention to provide in the same machine means for filling in an open trench with material lying on the surface adjacent thereto, and so arranging the relation between the two mechanisms, that the surface of the filled trench may be tamped down solid subsequent to filling.

The invention consists in the construction, arrangement and combination of parts as hereinafter particularly described, recited in the appended claims and illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a tamping machine embodying the invention;

Figure 2 is a plan view of the same;

Figure 3 is a horizontal section taken on the line 3—3 of Fig. 1;

Figure 4 is a front elevation of the machine in operation when filling a ditch and tamping the material down therein, and

Figure 5 is a fragmentary section in a vertical plane passing longitudinally through the central portion of the machine in Fig. 2, in the plane of the vertical shaft 24.

In the drawing, 10 represents a carriage having a frame 11 mounted on a subsidiary frame comprising a lower rail 12 and an upper rail 13 about which caterpillar tractors 14 revolve, as well as about sprocket wheels

15 mounted upon the adjustable blocks 16 at the end of the longer rail.

At the front of the machine is a reel 17 mounted upon a rotating shaft 18 extending lengthwise of the machine and a little to the right side thereof. 19 is the radiator of an internal combustion engine 27 whose main shaft 20 is parallel with 18. In the rear of the machine is mounted the vertical tamper 21 carried by a reciprocating bar 22 actuated by mechanism carried by frame arms 23 swinging upon and supported by a vertical shaft 24 near the center of the machine.

An intermediate shaft 25 is also positioned parallel with and between shafts 18 and 20 on about the longitudinal axis of the machine, and various gear mechanisms are provided connecting the shafts in various relations, as will later be explained, so that by the use of suitable clutches the engine may drive most of the mechanisms shown, selectively. Various control devices are also provided for manual actuation to operate the said clutches and determine the operation of the various functions, as will be later described in detail.

Upon the outer ends of the parallel arms or rails 23 are mounted spaced, cross shafts 34 and 35, rotatively connected together by pinions 36 at one side of the rails, and a third cross shaft 37 has one overhanging end provided with a pinion 38 in mesh with one of the pinions 36 while the other shaft end is provided with a belt pulley 39 by which the shafts and gears are driven in unison. Between the semicylindrical rails gripping pulleys 40 are mounted on the cross shafts 34 and 35, and these pulleys are of somewhat smaller radius than their corresponding gears 36, so that the flat tamper bar 22 may be actuated by the pulleys 40 without disengaging the gears 36, in the manner now to be explained. The said pulleys 40 are semi-cylindrical as shown quite clearly in Fig. 4 of the drawings. In Fig. 2 these gripping pulleys are shown in plan with their curved surfaces upward, the flat surfaces caused by the planes passing through their axes being on the lower sides as will be understood from Fig. 1, while such axial planes are shown vertical in Fig. 4. These gripping pulleys 40 are normally held pressed together by compression springs 41 mounted upon slidable rods 42 supported upon the ends of the rails 23. The force exerted by these springs tends to grip the bar 22 between the said pulleys, as the latter are carried upon slidable bosses, as will be under-

stood. The pulleys 40 are rotated in opposite directions by the gears 36 and grip the bar 22 until the flat surface of the members 40 face the bar, when the latter will fall to produce the desired tamping action. Upon rotation of the pulleys a half revolution, the curved surfaces of the gripping members will again engage the bar and again drop it, thus causing a continuous movement of the bar and its tamper block, raising them by mechanical actuation and permitting them to fall by gravitation.

Belt pulley 39 receives power from pulley 43 by means of the belt 44, and pulley 43 is driven from the vertical shaft 24 through the beveled gears 45. Since the parts 43, 44, and 39 serve to actuate the reciprocating tamper members, the drive means for the parts 43 and 44 is shown somewhat in detail in Fig. 5 of the drawings. The shaft 24 is driven through a worm and gear mechanism shown in the latter view as encased in housings 50 and 52, the end 51 of the worm shaft being shown as provided with a sprocket receiving power from the engine shaft 20 through the sprocket chain 29. See Fig. 3. The lower end of the shaft 24 is provided with a small beveled gear 46 meshing with such a gear of larger size mounted upon a sleeve 47 adapted to be clutched to the longitudinal shaft 25 to drive the latter which is provided at its front end with a worm engaging a worm gear engaging upon the cross shafts 33. These parts are shown encased.

The fuel tank is designated by numeral 26 and the fly wheel 32 is shown as mounted on the engine shaft 20. It is the purpose of my machine to be adapted for tamping the ground surface or material thereon throughout a wide area at either side and directly to the rear of the machine. To accomplish this, a tamper carriage is provided which comprises parallel rails 23 which support the tamping mechanism directly, is pivoted about the upper end of the centrally-mounted, vertical shaft 24 and beneath the lower bevel gear 45. To provide for suitable support for the heavy weight carried by the outer ends of these rails 23, a small carriage 53 is attached to lower edges of the rails and is provided with suitable bearing rollers 54 which ride upon an arc-shaped track 55, of at least 180° which is suitably supported upon the frame of the machine about the vertical shaft 24 as a center and overhanging the tractors at either end of the arc. Manual control means is provided for rocking the rails 23 with their tamping members about their vertical pivot shaft 24, said control means consisting of a worm gear 56 which is annular in design and bolted to the lower surface of an annular block 57 which carries the plates 58, shown clearly in Fig. 5 of the drawings, on which the inner ends of the rails

23 are secured. A longitudinal shaft 59 has at its rear end a worm 60 properly supported by a U-shaped plate 61 and thereby held in engagement with the worm gear 56. The forward end of shaft 59 is provided with a hand wheel 62 in reach of the driver's seat, so that the operator may swing the said tamper carriage bearing its tamper mechanism on its outer end together with its supporting rails 23, upon the said arc-shaped track, and about the said central vertical shaft 24, to either side of the machine, as may be desired.

Suitable control mechanism for varying the adjustment and the speed of various parts is provided as follows: The chains 28 and 29 are driven selectively from shaft 20 by the provision of sprockets integral with clutch sleeves 63 loosely mounted upon said shaft. Between these sleeves is a sleeve 64 keyed to shaft 20 and slidable thereon for engaging either clutch sleeve or neither, to positively drive either chain from said shaft, or remain in neutral position. On the end of shaft 37 opposite its gear, is a clutch 65 which in the position shown in Fig. 2. clutches the shaft to the pulley 39, which may make possible a disengagement of the latter pulley from the shaft. It is noted that chain 29 drives the worm shaft 51 which in turn drives a worm wheel within the casing 52 and thereby a vertical shaft 24 and the beveled gears 46. From the latter the sleeve 47 is driven loosely upon the shaft 25. Upon the latter also is mounted for slidable movement and keyed thereto, a clutch collar 66 which is shown in Fig. 5 as disengaged from the sleeve. When 66 and 47 are in engagement, it will be clear that the chain 29 may drive the shaft 25 and thereby the shafts 33 with parts attached thereto.

The clutch collar 66 is shifted by a lever 75 pivoted intermediate its ends and actuated by the link 76 connected to the lever 70, as shown in Figs. 1 and 2. The clutch sleeve or collar 64 is shifted in either direction by a rock shaft 77 actuated in turn by a link 78 connected with a hand lever 68. The clutch sleeve 65 is operated by the pivoted hand lever 74, shown clearly in Figs. 1 and 2.

Lever 67 and 69, shown in Figs. 1 and 2, actuate through links 79, concentric cross shafts one rocking within the other, the ends of the inner shaft, and outer tubular shaft, being shown in Fig. 2 as provided with links 80 and 81, respectively, for actuating the forward and reverse speeds of the shaft 20 by means well understood and which is now conventional and, it is thought, more detailed description is not required in this case, as no patentable protection is asked for that feature. Suffice it to say, that one of these members operates the shaft at low speed at its extreme throw, is in neutral position when partially engaged, and operates in high

speed when disengaged or open. The other member may reverse the drive of said shaft.

The machine is steered as follows: Shaft 25 drives shafts 33 through a conventional form of differential mechanism, and each of the shafts 33 drives a stub shaft 48 by a sprocket chain 31 as shown in the drawings. The stub shafts have the sprockets 15 mounted thereon for driving the tractor belts 14. By means of the usual differential, the tractors may be driven in different speeds from the same source of power as is well understood. The shafts 33 have mounted thereon outside the chains 31, brake pulleys 82 about which the brake bands 83 are mounted, and which latter are tightened by a common cable 84 guided about a pulley 85. The cable on either side of the machine, is tightened by an arm on a rock shaft, one being actuated by a foot lever 72 and the other by the foot lever 73, whereby the shafts 33 may be reduced in speed, to vary the relative speed of the tractors at either side and thereby steer the machine.

At the end of the machine which we have called the front, because the engine is mounted there, the pulley or reel 17 projects beyond the end of the frame and is adapted to receive thereabout a rope or cable 86 one end of which may be held in the hands of an operative to tighten the rope so as to pull the shovel or scraper 87 across the open trench 88 to fill the latter with material 89 from the side of the trench preparatory to tamping the material down in solid condition. As the machine travels parallel to the trench, one operative may hold the rope while another guides the handles 90 of the scraper to move the material toward the open trench, after which the first operative loosens the rope so that the other may pull the shovel back for engagement of more material. It is evident that when the rope is tightened about the pulley 17, the rotation of the latter will readily stress the rope to actuate the scraper 87, so that when the tamper device 21 borne by the tamper carriage, which latter is supported on the said track 55, has been moved about the vertical shaft 24 to the side of the machine reaches the portion that has been filled in, the reciprocation of the tamper will serve to crowd the trench 88 with the solid material. The tamper may operate on either side of the machine at any point upon or between the limits of the track 55, so that both trenches may be filled on either side of the roadway. This machine is often used to fill trenches after the latter have had conduits 91 laid therein, though it is adapted to fill trenches of all kinds, the machine being guided parallel to the same during the filling and tamping. Further, blocks of suitable material, such as wood, concrete, clay or other similar material may be laid upon the packed material in the trench preparatory to tamping them in position. My

machine may also be used advantageously for tamping down blocks or the uncovered surface anywhere, whether above a filled trench or not, or for breaking up concrete, hard earth or for drilling rock.

Operation: Assuming that the machine is travelling upon the highway to a destination for tamping and filling operations, the tamping mechanism being out of operation temporarily, by shifting clutch 63 by lever 70, lever 71 is shifted into high speed position and clutch 64 shifted by lever 68 to drive shaft 25 and the connected shafts 33 from 20 through chain 28, so that the engine will drive the tractors 14 directly, though further controlled by the levers 67 and 69 through the speed transmission gear, as above explained, the machine may now be guided by the foot levers 72 and 73, to drive the tractor belts 14 at various relative speeds. While so travelling, the tamper carriage comprising the rails 23 supporting the tamping machine will usually be directed toward the rear in adjusted central position on the track 55 in the arc by the worm gears 56 and 60 by means of the hand wheel 62 and shaft 59. During such travel, the speed and direction of travel may be controlled by the hand levers 67 and 69.

When the machine is in position for tamping and filling operations, it is probably stationed by the side of and parallel to the open trench which is to be filled, or whose surface is to be compacted and blocks tamped down thereon, or any work of that nature performed, and the clutch 64 is shifted to drive parts 51 and 24 through the chain 29, whereby pulley 43 is driven and the sleeve 47 rotated. The clutch 65 is now shifted to closed position, thus beginning the actuation of the tamping mechanism through gears 36. The clutch 66 is now shifted to closed position so that shaft 25 starts to rotate and thereby the tractor belts at low speed, this speed being further reduced by shifting the transmission by 71 into low speed. Chain 30 will in the meantime drive shaft 18 and its reel, so that the scraper device 87 may be alternately power actuated toward the machine to move material over and into the trench, and released by loosening the rope 86 about the reel 17. During this operation of the machine while stationed alongside the trench, or in doing other filling or tamping work, the machine will be steered as in directing the same on the highway, and the machine may be halted temporarily in one position while continuing to use the tamper by merely disengaging the clutch 66; and the speed of the tamping operation may at all times be varied by the levers 67 and 69. Also, the exact position of the tamper 21 and bar 22 may be varied by swinging the tamper carriage to the extreme throw thereof on the track 55 to either side of the machine and beyond the tractors, or at any intermediate position to the rear of the machine. By my

mechanism the tamper may be operated in all positions of its adjustment on said track, because the driving means therefor is operated through the rotation of the shaft 24 about which the frame 23 is fulcrumed. This is a peculiar advantage of my improved mechanism over prior structures which have been adapted to travel astride the trench being filled and tamped, and which latter in their tamper mechanism have been restricted to a small arc to the rear of the machine, or, as has been more usual, the tamper operates within the strict lateral outline of the vehicle.

My machine, having means for positioning the operating tamper at either side thereof, it is clear that the machine may operate to fill and pack a trench with material on either side of a roadway or street while the machine is moving on the side of the trench toward the center of the street, though it is clear that for tamping operations it may travel astride the trench if it should be thought desirable. This is a very great advantage in that my improved machine is thereby capable of filling and compacting material in a trench which is very close to a curb, because the machine may operate on the side of the trench farthest from the curb, the swinging of the tamper carriage so far to the side of the machine supported on the said 180° track 55 permitting such extreme position. Such proximity to the curb has practically rendered other machines impracticable. Also my machine is rendered more positive in its action since the tractors are able to travel on a much more stable street surface than is usually found immediately adjacent the trench where the surface is apt to be covered with loose and often damp earth.

A further advantage results from my improved construction, in that so great an arc for adjustment of the tamper frame 23 is provided without moving the power source for actuating the tamping mechanism. It will be noted that if the forward end of said frame 23 were extended toward the front of the machine an adequate distance to counterbalance the weight of the tamping machine at the rear end thereof, the front end of the rails 23, when the tamper carriage is swung about the shaft 24 to a position transverse of the machine, would project as far to the opposite side of the machine as the trench is to the operating or working side. This would be an obvious disadvantage. Applicant solved this problem by utilizing the pivot shaft 24 for driving means, and supporting the frame between the fulcrum and the tamper upon the arc-shaped track 55, as above stated. This frame 23 is therefore a lever of the third class having its load at the tamper mechanism, its fulcrum at the vertical shaft 24 and the support at the track 55, so that the tamper 22 may be swung to either side of the machine extending over the track 55, without extend-

ing the opposite end of the tamper carriage any further relative to the outline of the machine beyond the pivot 24 than when the carriage is in position lengthwise of the machine—a very positive advantage.

Then, too, by so constructing my machine that it may travel at one side of the trench or other line of work to be done, applicant is able to operate the scraper device before tamping the filled-in material, as it is evident that the said device could not well be operated to fill a trench while the tractor members of the machine were astride the trench. Applicant can therefore fill the open trench at one side of the machine at the same time operating the tamper mechanism subsequently or on a filled portion of the same trench. The two operations will therefore proceed at the same time, though upon different parts of the trench. Many advantages arise then from the capability of the machine operating wholly at one side of a trench.

While the tamper is shown in the drawings provided with the feet 21, it is evident that a foot of different outline and weight for other purposes may be substituted therefor. Further, the general arrangement of the frame and power drive mechanism may remain as here shown, though other tractor elements may be used in place of the belts 14, either power-driven or otherwise—for example, the machine may be trailed behind another vehicle.

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

1. The combination of a road tractor provided with a supporting framework and driving and steering means therefor, a tamping mechanism supported on said frame work, and a rotating shaft thereon having a winding reel secured to one end thereof whereby a scraping device may be driven toward and from said tractor by means of a flexible element attached to the device and adapted to be tightened about said reel.

2. A machine of the class described comprising a supporting framework supported on tractor belts, an elongated carriage pivotally mounted on said framework, a vertically-slidable tamper mounted on said carriage, operating means for said tamper, a rotating shaft mounted on said framework and carrying a reel secured to one end thereof, drive means for said shaft operatively connected with said tamper operating means, and a scraper device provided with a rope adapted to be manually wound about said reel.

3. A machine of the character described comprising a main frame, tractor belt drive mechanism supporting said frame, tamper mechanism mounted upon said frame about a vertical axis to permit oscillation of the tamper about the base of said machine, a movable scraper device, a rope secured to said

device for dragging the same towards the frame of said machine, reeling mechanism for pulling said rope, and power means on said frame for driving the tractor mechanism, the tamper mechanism and reeling mechanism.

4. The combination in a vehicular machine of a traction engine, a shaft actuated by said engine, a tamper mechanism, a scraper device movable toward and from said shaft, and a reel secured to one end of said shaft about which a flexible element having one end attached to the scraper may be wound, whereby rotation of the reel will tighten the said element and actuate the scraper.

5. A machine of the class described comprising, a main elongated frame, a carriage pivoted at one end upon a vertical drive shaft mounted centrally of said frame, a tamper mechanism mounted on the opposite end of said carriage, power means on said frame, and driving connections, including said vertical shaft, for actuating said tamper mechanism from said power means.

6. A machine of the class described comprising, a frame mounted on a single pair of spaced tractors, a carriage mounted to oscillate at one end about a vertical drive shaft mounted centrally of said frame, tamper mechanism mounted on the opposite end of said carriage, means for adjusting the position of said carriage about said shaft, means for driving said shaft independently or together, means for driving said tamper mechanism in any one of the positions of said carriage, and control means operable from a common position on said machine for determining the actuation of said tractors, the adjustment of the carriage, actuation of the tamper mechanism, relative speed of said tractors, and the relative speed of the tamper mechanism and the said tractors.

7. A machine of the class described comprising, a frame work mounted upon tractors, a vertical drive shaft mounted centrally in said frame work, an elongated carriage pivoted at one end upon said shaft whereby the outer or opposite end of the carriage may be swung about said shaft into position on either side of the machine and beyond either tractor, a tamper and operating means therefor mounted on the outer end of said carriage, means for actuating said tamper from said shaft, power means mounted on said frame work, and mechanism connected with said power means for driving selectively or together, said vertical shaft and said tractors.

8. A machine of the class described comprising, an arc-shaped track mounted on one end of said frame work with its concavity facing the opposite end of the machine, a traction frame work, a vertical drive shaft mounted on said frame work at the approximate center of the arc of said shaft, an elongated carriage pivoted at one end on said

shaft whereby its outer end may be swung through an arc of at least 180° and overhanging the machine in its position throughout the entire arc, and resting upon the track, a vertically-slidable tamper and operating means being mounted on the outer end of said carriage, means for actuating the tamper from said vertical shaft when the carriage is in any position in said arc, power means mounted upon said frame work for driving said shaft, and means for adjusting said carriage about said shaft in any desired position in said arc.

9. A unitary, vehicular machine comprising a supporting frame, a tamper mechanism for tamping down material on the ground surface adjacent the path of the machine and actuating mechanism for operating a scraper device for movement horizontally and transverse of the path of the machine.

10. The combination in a vehicular machine, of a supporting frame, a traction engine, horizontally movable scraping means connected detachably with and driven by said engine and movable transverse of the path of said machine, for filling material into a trench adjacent thereto, and a tamping mechanism also driven by said engine and pivotally mounted upon said frame for thereafter packing said scraped material in said trench.

11. A machine of the class described comprising an elongated framework, tractor mechanism supporting said framework, power drive means for said tractor mechanism, an arc-shaped supporting rail mounted on said framework at one end of the same, the said drive means including a vertical shaft positioned at the approximate center of the arc-shaped rail, an elongated carriage pivotally mounted for horizontal movement about said shaft at one end of the carriage, the other end extending out over and beyond the outline of the framework, with its intermediate portion resting upon said rail, a vertically-slidable tamper with actuating means therefor mounted upon the outer end of the carriage, driving connections between said vertical shaft and said tamper actuating means, and manually actuated means for adjusting said carriage about said shaft and upon said supporting rail.

12. A machine of the class described comprising, a frame work mounted upon tractors, an arc-shaped supporting track mounted upon one end of said framework, power drive means for said tractors including a vertical shaft positioned at the approximate center of the arc-shaped track, an elongated carriage oscillatable about said shaft by being pivoted at one end thereon, and the opposite end extending out over the outline of the framework and resting upon said track at an intermediate point, a vertically-slidable tamper with actuating means therefor

- mounted on the outer end of said carriage, the latter being of said length and the track being of such extent that the tamper end of the carriage may be swung into operative position on either side of and beyond either tractor, and driving connections between said vertical shaft and said tamper actuating means operable in any one of its adjustable positions.
13. A machine of the class described comprising, a frame mounted upon tractors, an elongated carriage supported upon said frame, an arc-shaped track mounted on one end of said frame with its concavity facing the center of the frame, power means for said tractors including a vertical shaft mounted on said frame at the approximate center of the arc of the track, and the said carriage being pivoted at one end about the upper end of the shaft and extending out over the outline of the frame and tractors with its intermediate portion resting upon said track, tamper mechanism mounted on the outer end of the carriage, and driving connections between said shaft and said tamper mechanism.
14. A machine of the class described comprising, a frame work mounted upon tractors, a vertical shaft mounted approximately centrally of the frame work, an elongated carriage having one end pivoted about said shaft and bearing a tamper mechanism at its opposite end, the weight of the carriage and tamper mechanism resting upon an arc-shaped track between the shaft and tamper, an engine mounted adjacent one end of the frame, and driving connections, including said shaft, for driving said tamper mechanism from said engine.
15. A machine of the class described comprising, an elongated frame mounted upon tractors, an arc-shaped track mounted adjacent one end of said frame with its convex surface facing outward, a vertical shaft mounted on said frame at the approximate center of said track, an elongated carriage fulcrumed at one end for oscillation in a horizontal plane about said shaft with its opposite end extending out over the outline of the frame and tractors, and its intermediate portion resting on said track, tamper mechanism mounted at an extreme end of said carriage, power means mounted on said frame and having driving connections with said shaft, and driving connections between said shaft and said tamper mechanism in any of the positions of said carriage and between said shaft and said tractors.

In testimony whereof I hereunto affix my signature.

AUGUSTUS J. PENOTE.