No. 714,762.

Patented Dec. 2, 1902.

G. E. TOWNSEND.

STEAM ROLLER.

(Application filed May 8, 1902.)

(No Model.)

3 Sheets—Sheet 1.

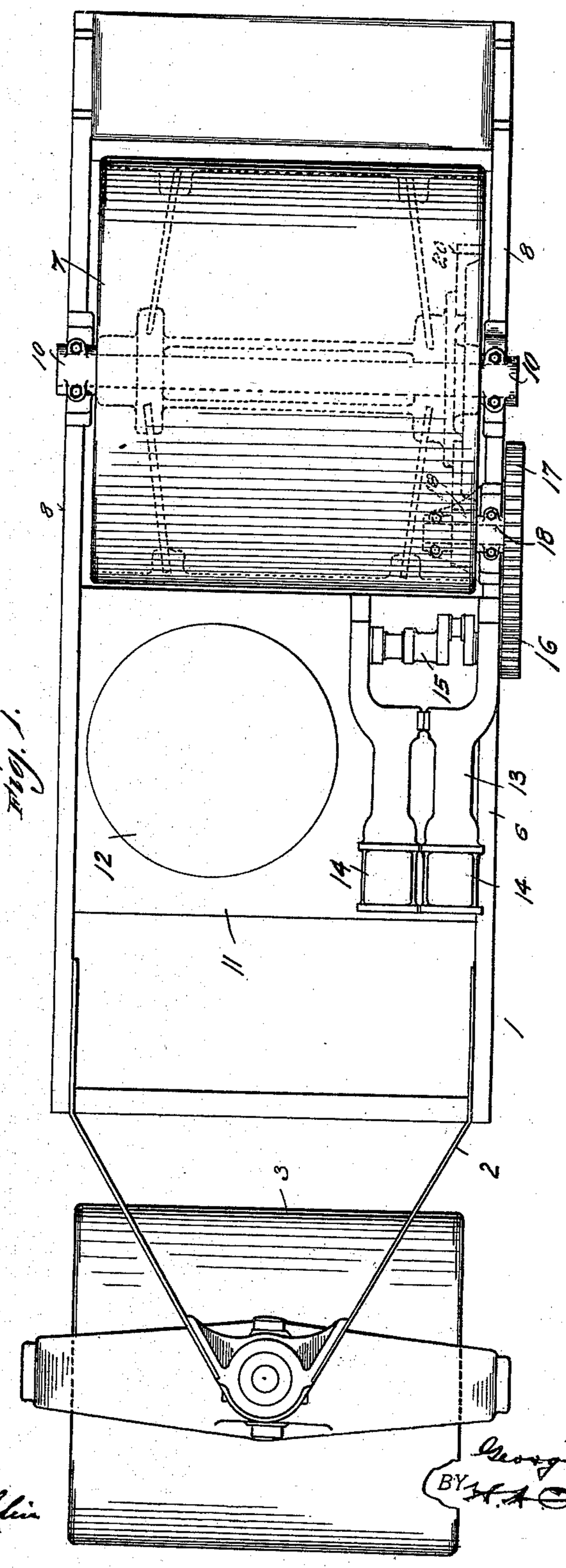

Fig. 1.

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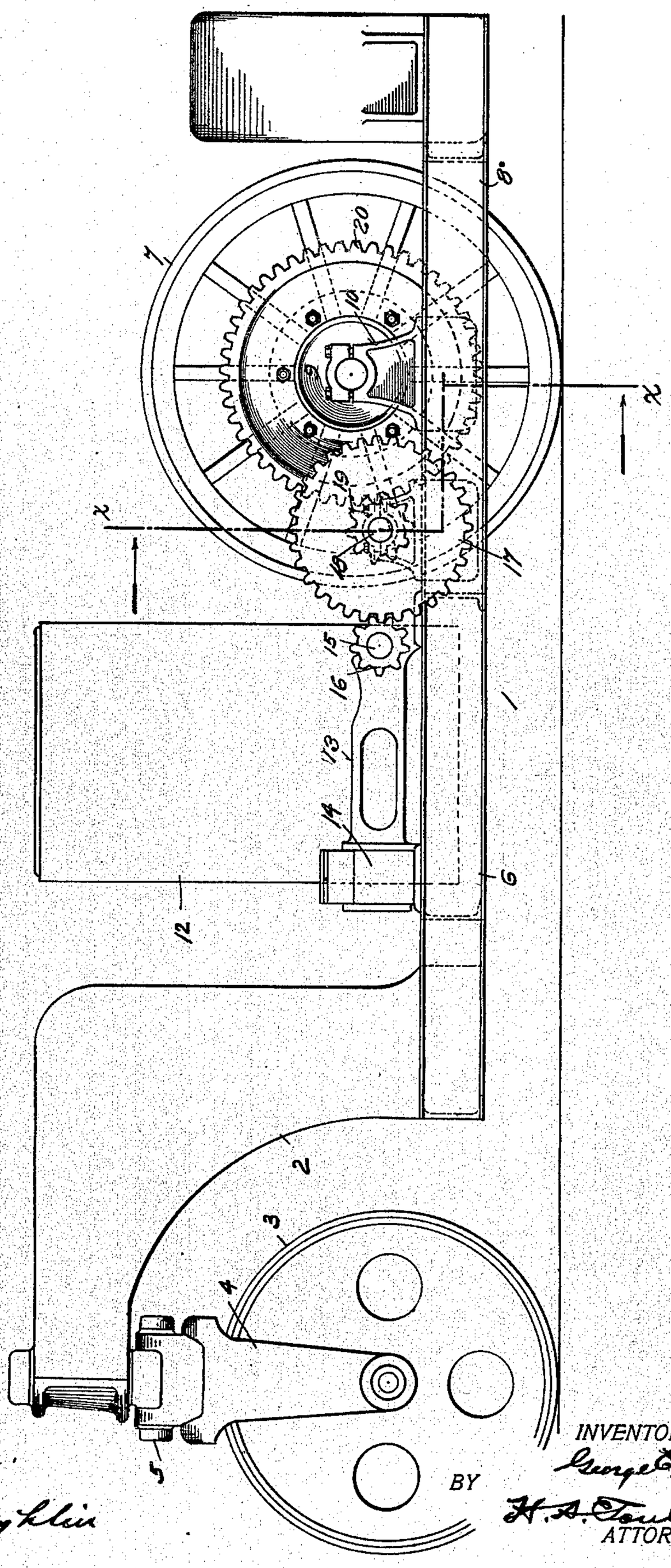

Fig. 2.

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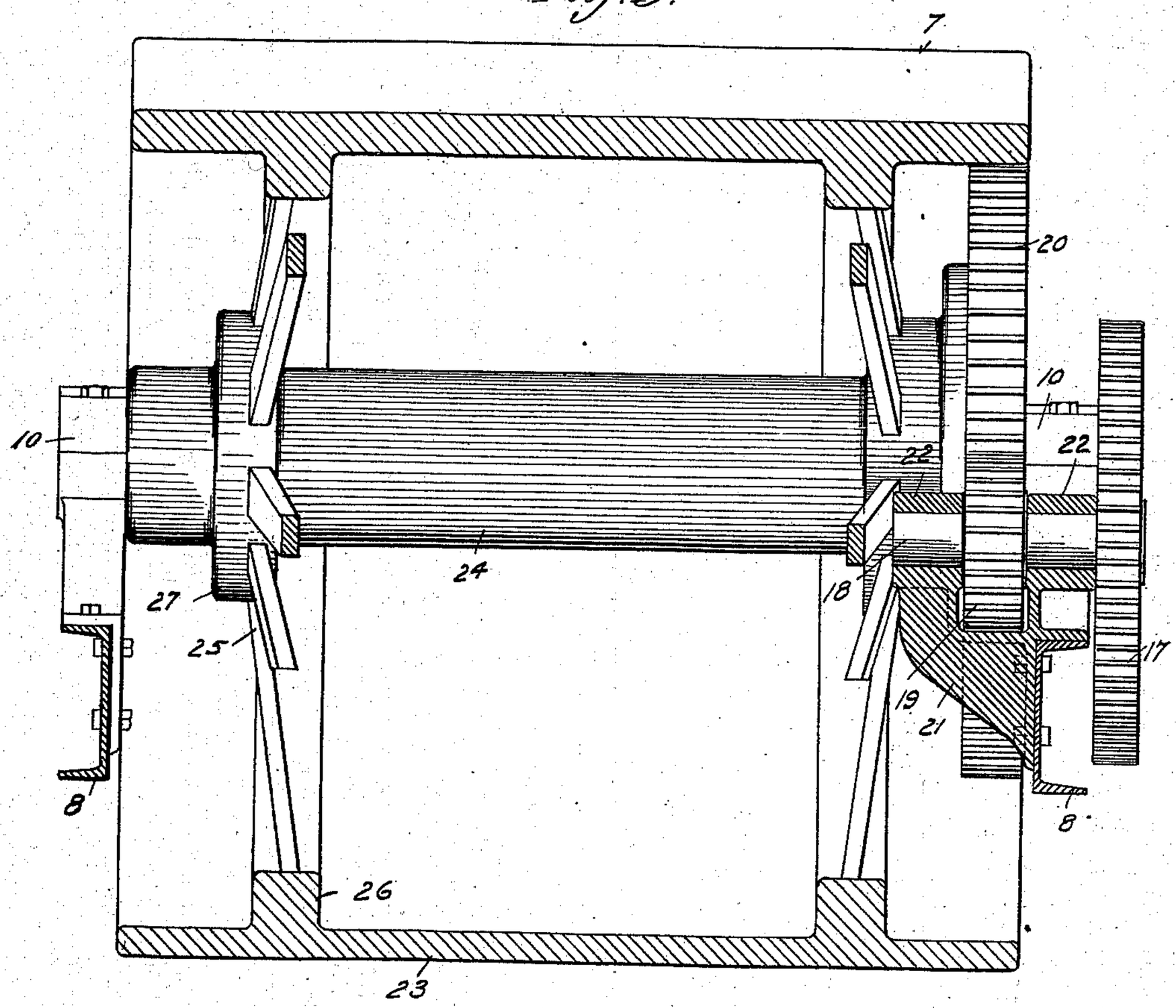
Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE E. TOWNSEND, OF SPRINGFIELD, OHIO.

STEAM-ROLLER.

SPECIFICATION forming part of Letters Patent No. 714,762, dated December 2, 1902.

Application filed May 8, 1902. Serial No. 106,452. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. TOWNSEND, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Steam-Rollers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to steam-rollers, and more particularly to that class used in smoothing asphalt pavements and for rolling gravel walks, lawns, &c.

The invention has for its objects, among other things, first, to provide an arrangement of the parts whereby the weight of the boiler and engine may be more evenly distributed upon the framework and whereby the vibratory strains of the engine due to the reciprocation of its parts will have as little effect as possible upon the supporting-frame, and, second, to provide a construction whereby the counter-shaft may be more firmly supported and better adapted to resist the strains to which it is subjected.

My invention further relates to a construction of driving-gearing for transmitting the power from the engine-shaft to the driving-roller, whereby the lateral thrust which is present in the usual construction and arises from the use of bevel-gearing may be avoided and whereby the employment of an engine-shaft located at the extreme side of the frame outside of the lateral edge of the driving-roller may be dispensed with, while at the same time the gear upon the driving-roller may be brought to such a distance above the surface of the ground as to obviate the danger of clogging or breakage of said gear.

To these and other ends my invention consists in certain novel features which I will now proceed to describe and will then particularly point out is the claims.

In the accompanying drawings, Figure 1 is a plan view of a roller embodying my invention in one form. Fig. 2 is a side elevation of the same, and Fig. 3 is an enlarged detail sectional view taken on the line $x\,x$ of Fig. 2 and looking in the direction of the arrows.

In the said drawings, 1 indicates the frame as a whole, comprising a forward portion 2, extending upward and outward to receive the front or steering roller 3, which is carried in a yoke 4, connected with the frame by a universal joint 5 in the usual manner. The frame also comprises a horizontal portion 6, upon which the boiler and engine are mounted and which is supported by the rear or driving roller 7, mounted in said horizontal portion of the frame. This horizontal portion may be constructed in any suitable manner; but I prefer to employ lateral channel-bars 8, between which the driving-roller 7 is located, its axle 9 being supported in brackets 10, carried by the channel-bars. In front of the driving-roller 7 the channel-bars are connected by a transverse platform 11, on which the boiler 12 and engine 13 are supported.

In rollers of this class as usually constructed the boiler is central with respect to the frame and the engine is of a vertical type, being located at one side of the boiler, with its cylinders uppermost and its crank-shaft extending longitudinally at one side of the frame. It results from this construction, first, that there is an excess of weight on the frame at that side thereof where the engine is located, and, second, that the thrust of the reciprocating parts of the engine is imparted to the frame in a direction transverse to its plane, so as to have a maximum vibratory effect upon the frame. To overcome these difficulties, I locate the boiler with its center at one side of the central line of the frame, as shown in Fig. 1, the engine being located on the other side of the central line of the frame in such a position that the combined weight of the boiler and engine is distributed in a substantially equal manner on each side of the frame. It will also be observed that the engine is horizontal, so that its thrust is in the direction of the plane of the body of the frame instead of transverse thereto, thereby minimizing the vibratory effect upon the frame. In practice I prefer the construction shown, in which the cylinders 14 of the engine are longitudinally arranged, the engine-shaft 15 being transverse with respect to the frame.

In rollers of this class as ordinarily constructed the driving-gearing comprises a bevel-gear on one end of the driving-roller, immediately adjacent to the periphery there-

of, working in conjunction with an engine-shaft extending longitudinally of the frame and provided with a bevel-pinion which meshes with said gear. This requires the location of the engine-shaft outside of or beyond the end of the roller and a consequent location of said shaft and the engine which drives it at the extreme side of the supporting-frame, this being one of the main reasons for the present objectionable lateral location of the engine. Moreover, a serious objection to the bevel-gearing thus employed in driving the roller is the fact that owing to the angle of inclination of the gear-faces a wedging action occurs which tends to produce lateral strains on the roller and shaft sometimes sufficient to spring them apart, so as to cause slipping of a cog, or even breakage of the teeth, this danger being more particularly present in quick reversal of the engine. To do away with these disadvantages, I dispense with bevel-gearing and employ the construction shown, in which the engine-shaft is provided at either end with a pinion 16, which meshes with a gear 17 on a counter-shaft 18, said counter-shaft being provided with a pinion 19, which meshes with a gear 20 on the driving-roller 7. In order to provide a firm bearing for the counter-shaft 18, which is subjected to great strain when in use, I mount said counter-shaft in a bracket 21, secured to the channel-bar 8, which forms a side member of the frame, and said bracket is provided on opposite sides of the pinion 19 with bearings 22 for the counter-shaft 18. In this way the counter-shaft is firmly supported on each side of the pinion, which meshes with the main gear of the driving-roller, and is thus enabled to withstand the strains to which it is subjected at this point. It will be observed that by reason of this construction the laterally-arranged longitudinally-extending engine-shaft is dispensed with, as well as the objectionable bevel-gearing. It will also be observed that the necessity of locating the gear on the driving-roller at the periphery thereof is done away with, the gear 20 being of such a diameter that its lower edge is a considerable distance above the surface of the ground, and, in fact, said lower edge does not extend below the lower edge of the adjacent side member or channel-bar 8 of the horizontal portion 6 of the frame, so that it is protected from contact with any obstacles lying on the surface of the ground. It will of course be understood that the objectionable features attendant upon the use of bevel-gearing—to wit, the wedging action and the lateral strains—are dispensed with.

In apparatus of this type as usually constructed the driving-roller consists of a cylindrical steel tread or peripheral portion bent to shape and having separate heads secured to its ends by riveting, these heads being secured to an axle which rotates in supporting-bearings in the frame. As an improvement on this construction I propose to construct the driving-roller of a cylindrical body portion 23, cast in a single piece, a cylindrical hub portion 24, sleeve-like in form and also cast in a single piece, and connecting-spokes 25, having their ends united with the body portion and hub in the process of casting, the body portion being provided with annular ribs or collars 26 and the hub being provided with similar ribs or collars 27 to receive the ends of said spokes. In the construction of this roller the body is cast first, being at the same time cast around the outer ends of the spokes, and the hub portion is cast last, being at the same time cast around the inner ends of the spokes, and in this way the cooling of the metal causes no injurious strains on the spokes. This produces a less expensive and stronger roller, and since the tread-surface of the roller is of cast metal it affords a better adhesive surface, does not become worn and polished, as does the steel tread of the ordinary roller, and takes a better grip upon stones or other objects lying in the path of the machine. Instead of employing a rotating axle I am enabled to employ a non-rotating axle having its ends fixed or stationary in the brackets 10, the sleeve-like hub 24 forming an extended bearing on said axle and turning on the same.

In a machine of this type as ordinarily constructed having inverted vertical engines the machine as a whole is rendered top-heavy, owing to the fact that the heaviest parts of the engine—to wit, the cylinders and their associated parts—are at or near the top of the machine and high above the level of the supporting-frame and of the axles of the supporting-rollers. By the construction which I have devised, in which the engine is horizontal, it rests directly upon the supporting-frame at a low level, which brings it below the horizontal plane of the supporting-axle of the driving-roller, thereby correspondingly lowering the center of gravity and greatly increasing the stability of the machine.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as these details may obviously be modified without departing from the principle of my invention.

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

1. A steam road-roller of the character described, comprising a low horizontal frame, a driving-roller mounted within said frame, said frame being suspended from and lying below the driving-wheel axle, a boiler and engine mounted side by side on said frame in front of the driving-roller, the engine on one side of the central longitudinal line of the frame, and the boiler mainly on the other side of said line, so that they counterbalance each other, the engine being horizontal and below the level of the driving-roller axle and reciprocating in the direction of the length

of the frame, and gearing connecting the engine-shaft and driving-roller, substantially as described.

2. In a steam road-roller of the character described, the combination, of a low horizontal frame, a fixed elevated axle from which said frame is suspended, a roller mounted on said axle within said frame and having a spur-gear secured thereto within the plane of one of the outer ends thereof, a boiler and engine located on said frame, the engine-shaft being provided with a pinion, and a counter-shaft mounted on the side member of the frame parallel with the axle, extending within the plane of the geared end of the roller and provided with a spur-pinion to mesh with the spur-gear of the roller, the other end of the counter-shaft being provided with a gear to mesh with the engine-shaft pinion, substantially as described.

3. A steam road-roller of the character described, comprising a low horizontal frame, a fixed elevated axle from which said frame is suspended, a driving-roller mounted on said axle within said roller and having a spur-gear located within the plane of one of the outer ends thereof, a boiler and engine mounted side by side on said frame in front of the driving-roller, the engine on one side of the longitudinal central line of the frame, and the boiler mainly on the other side of said line, so that they counterbalance each other, the engine being horizontal, below the level of the driving-roller axle, and reciprocating in the direction of the length of the frame, the engine-shaft being provided with a spur-pinion, and a counter-shaft mounted on the side member of the frame parallel with the axle, extending within the plane of the geared end thereof and provided with a spur-pinion to mesh with the spur-gear of the roller, the other end of the counter-shaft being provided with a spur-gear to mesh with the engine-shaft pinion, substantially as described.

4. In a steam-roller of the character described, the combination, with a frame having a horizontal portion comprising longitudinally-extending side members, of a driving-roller located between said side members and provided with a spur-gear, which does not extend below the lower edge of the adjacent side member, a boiler and engine located on opposite sides of said frame, the engine being horizontal and provided with an engine-shaft having a terminal pinion at one side of the frame, and a counter-shaft mounted on the adjacent side member of the frame and provided at one end with a gear meshing with the engine-shaft pinion and at the other end with a pinion meshing with the driving-roller gear, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. TOWNSEND.

Witnesses:
E. O. HAGAN,
IRVINE MILLER.