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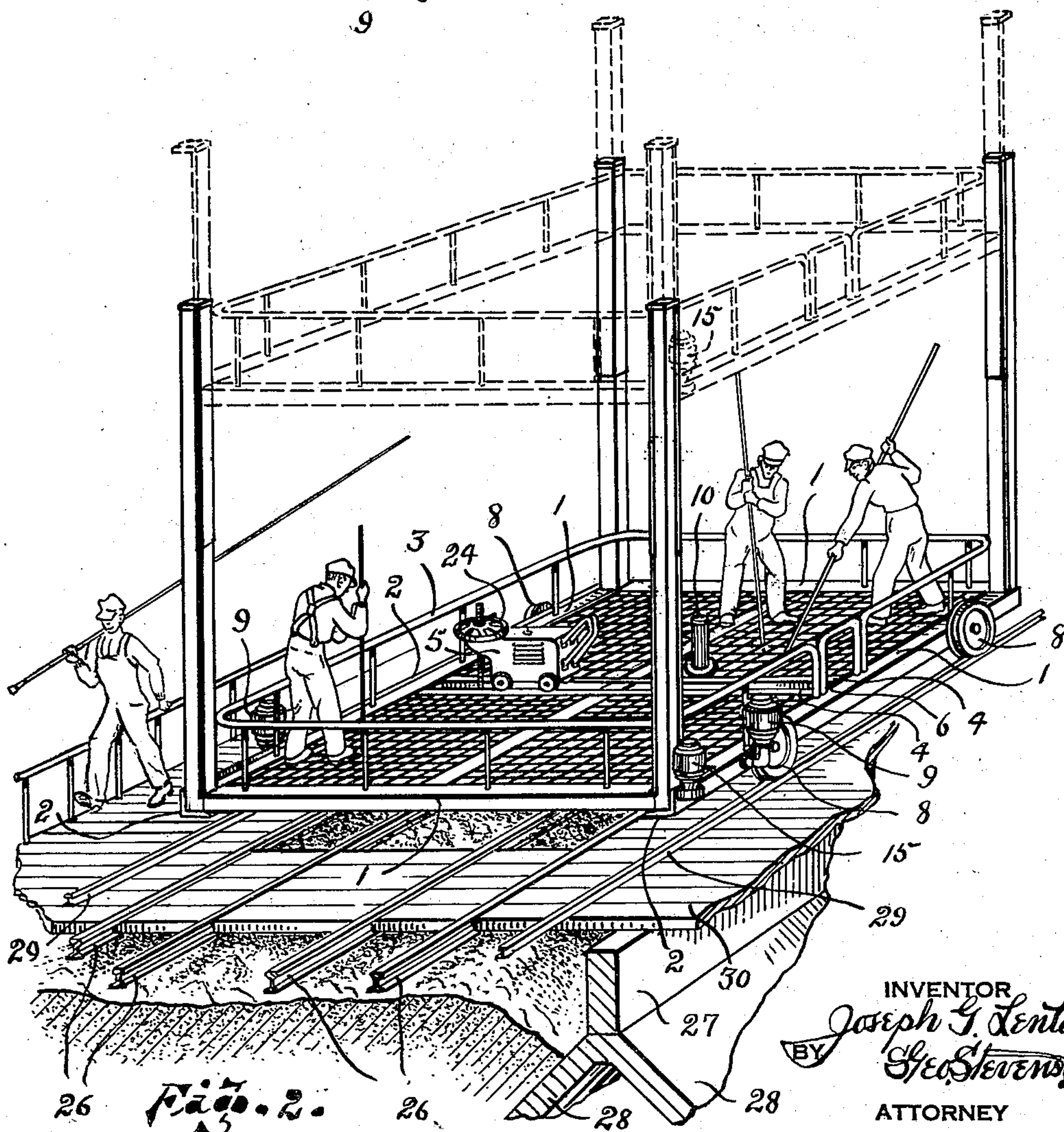
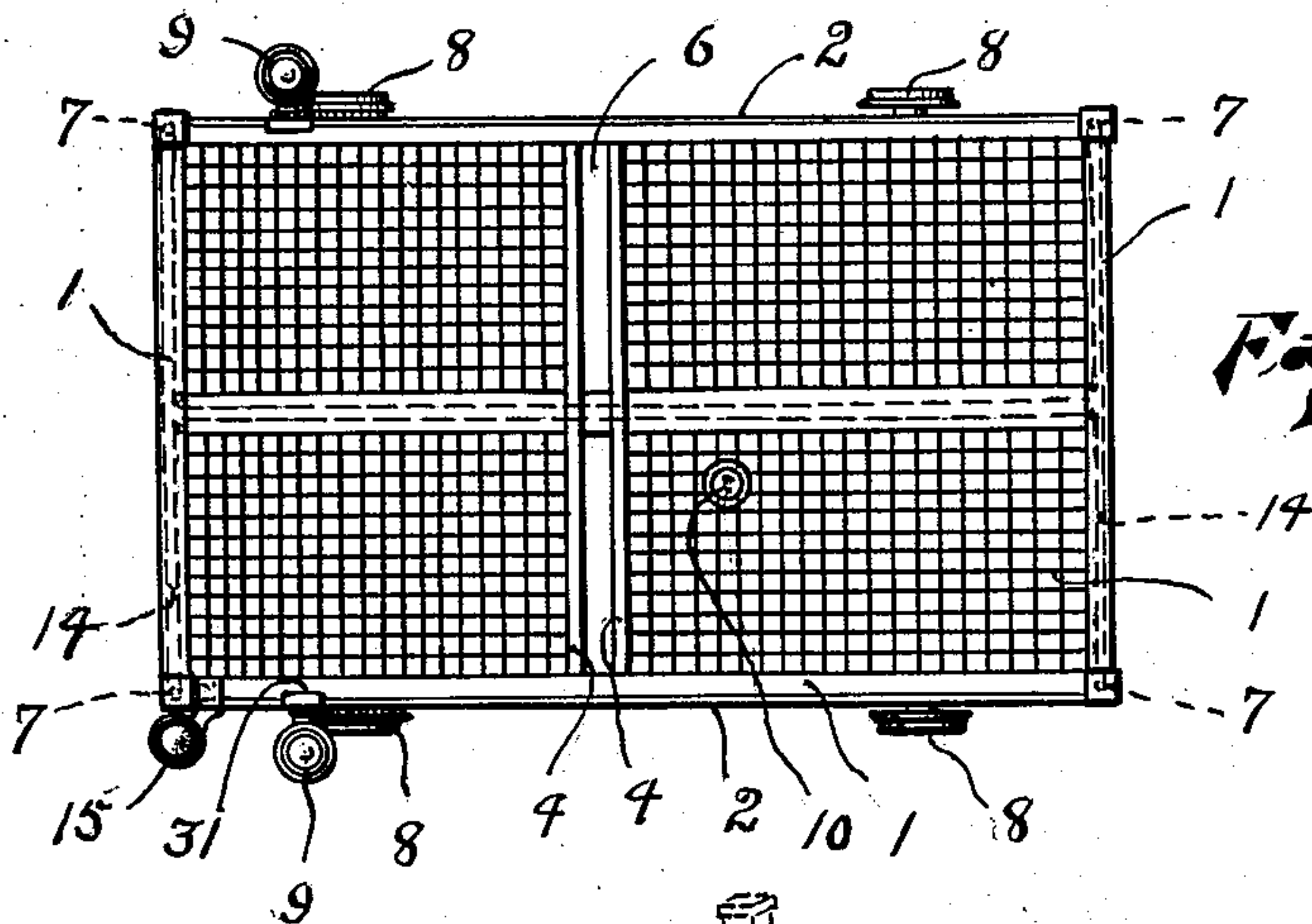
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HOPPER DISCHARGE EXPEDITER

Filed Dec. 9, 1946

3 Sheets-Sheet 1



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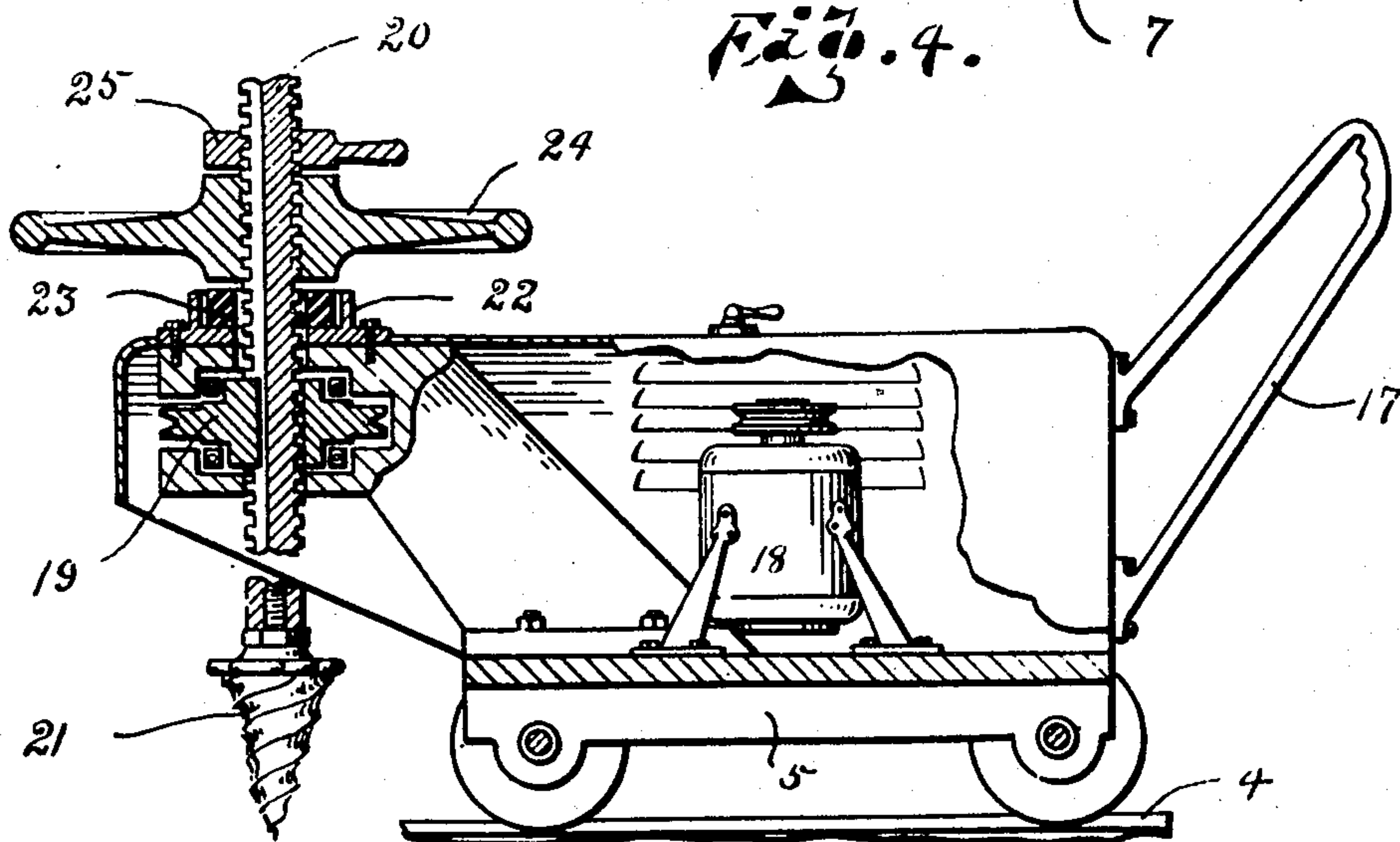
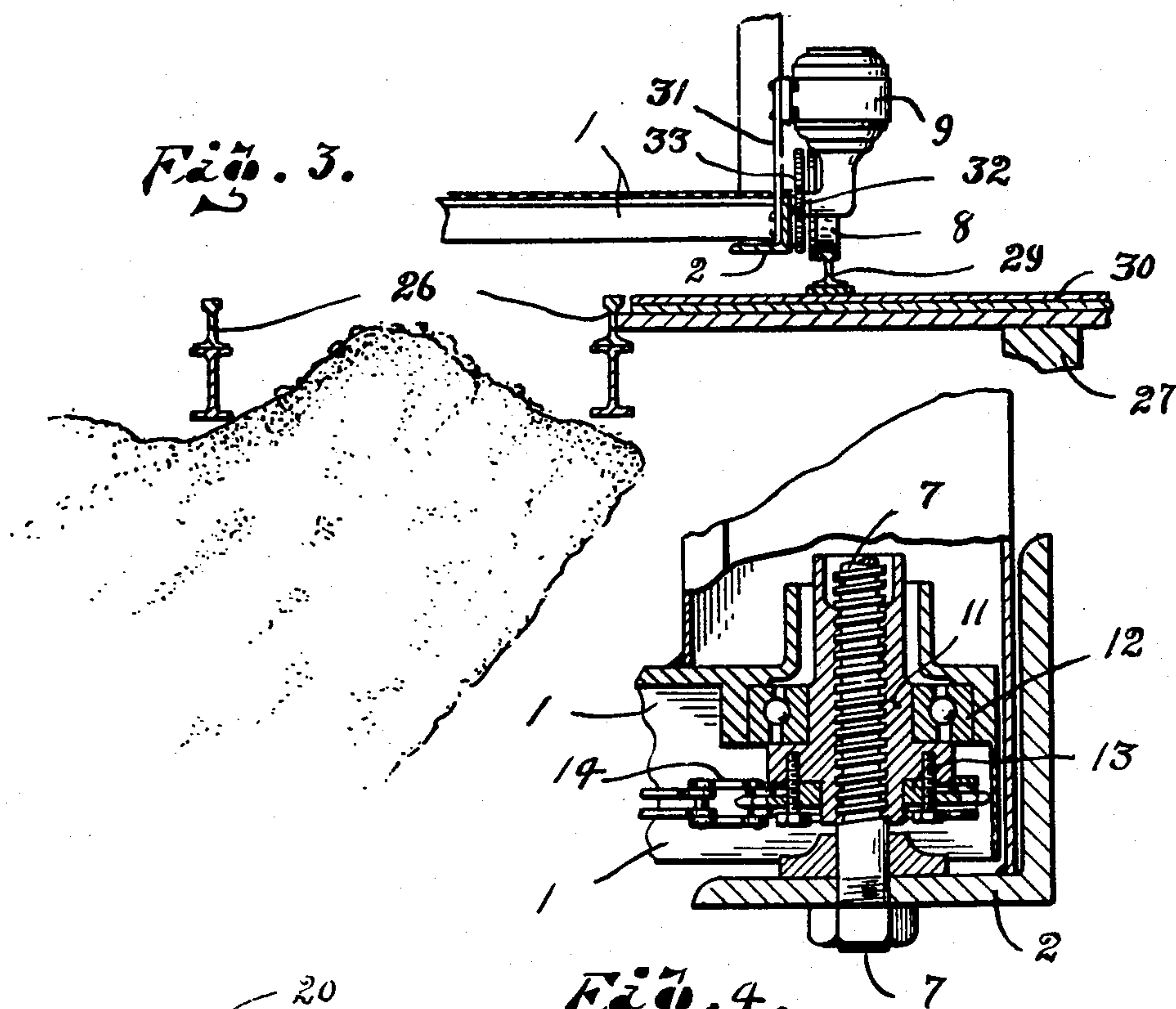
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HOPPER DISCHARGE EXPEDITER

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3 Sheets-Sheet 2



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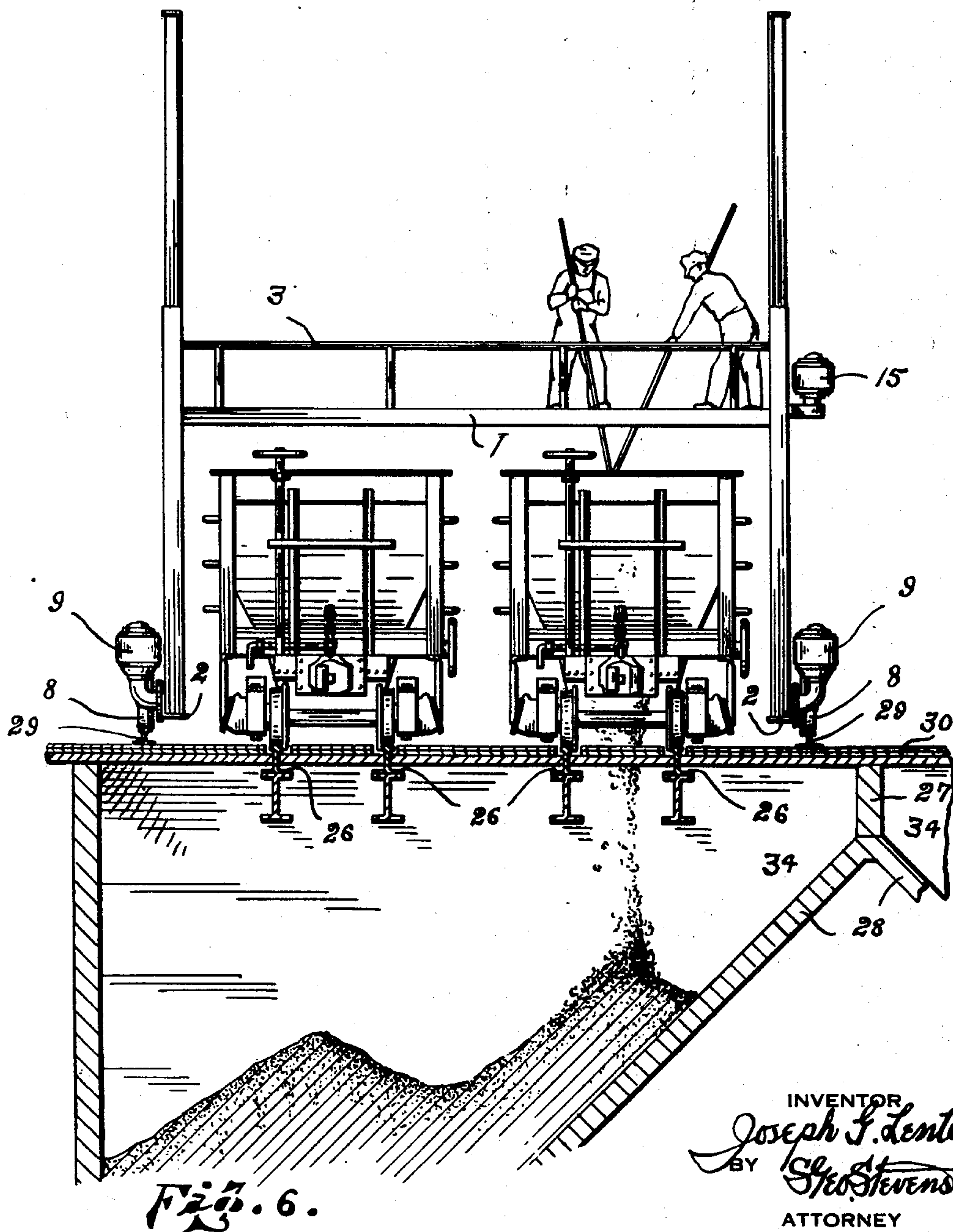
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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HOPPER DISCHARGE EXPEDITER

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6 Claims. (Cl. 259—1)

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This invention relates to an overhead expediting apparatus particularly adapted for use in aiding in the discharge of granular material such as iron ore or the like from hoppers in ore docks where it is temporarily stored, as well as from hopper cars such as are used in the transportation of ore or the like to the bins or hoppers in such docks for ultimate discharge into vessels or the like as common in many shipping ports along the Great Lakes of the North American continent and elsewhere.

The difficulty experienced in getting sticky, frost effected or hard packed masses of sand, gravel or iron ore to flow freely from inclined pocketed receptacles such as hopper cars, hopper docks, and other types of temporary storage structures is well known to those versed in such transportation operations.

It is also well known that to date about the only practical means of expediting such operation is largely by hand and that upon many large ore docks for example, a large crew of men known as ore punchers are employed in the art of punching, jarring and scraping such retarded ore from the pockets of first the cars into the dock hoppers and ultimately from the latter into the vessel moored at the dock for such reception.

It is further well known what a treacherous occupation a puncher's job is and how frequently he may slip and fall into the pocket or upon the edge of the pocket near which he is operating, thus receiving injury, and much too often death by falling directly into the pocket and ultimately into the hold of the transporting vessel or ore boat.

In trying to provide against such danger many such ore punchers are equipped with life lines firmly attached to a stout body harness worn by each puncher as he works, all of which impedes their work as well as being uncomfortable and inconvenient.

Thus, one principal object of the instant invention is that of insuring absolute safety against such slipping or falling into the pockets of the cars or dock without need of incumbering belts or harnesses, thereby cooperating with the worker in preventing accident and making his job safer and easier rather than providing a mechanical substitute for his services.

Another object though subservient to safety is that of providing simple relatively inexpensive means to augment the efficiency of such manual labor.

Other objects and advantages will appear in the further description of the invention.

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Referring now to the accompanying drawings forming part of this application:

Fig. 1 is a top plan view of the basket-like working platform and conveyance for the punchers.

Fig. 2 is an enlarged perspective view of the cage with three punchers at work within same together with the power unit for the mechanical agitator and puncher.

Fig. 3 is a transverse vertical sectional view of one corner of the working platform adjacent one of the electrically powered traction wheels thereof and extending through a section of the ore dock deck as illustrated in Fig. 2.

Fig. 4 is an enlarged transverse sectional view of one corner of the platform chassis when in its lowermost position and about its respective threaded supporting post.

Fig. 5 is an enlarged side elevation and sectional view of the combined power and manually operated agitator unit.

Fig. 6 is a sectional view transversely of an ore dock and showing my workmen's platform in raised position over ore cars which dump into the pockets of the ore docks.

The electrically operated lift here employed is common in the automobile art and its comparative inexpense, efficiency and simplicity are well known and the specific arrangement of parts is no part of my instant invention even though I have illustrated parts thereof, such simply being done to comply with the necessity of illustrating a workable mechanism.

It is also known that other types of automobile lifts operated by V-belt transmission may be equally as efficient at that illustrated.

However, as one of the principal objects of the invention is to provide safety for operators as well as most conveniently positioning of the workers for best possible results, the safety basket-like platform 1 is supported upon the open chassis 2.

The floor of the working platform of the basket is of open mesh wire screen for the workers to freely walk about upon and work through with their usual long handled punchers, these being a type of tool with which they have always been familiar.

Wholly about the four sides of the working platform is provided the open railing structure 3 to adequately protect against any possibility of a worker falling overboard into either car or dock bin as the case may be.

The size of mesh or openings through the working platform may be varied to suit circumstances and in fact, some considerably sized openings above where the demand is greatest may be pro-

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vided for super-convenience in operating there-through.

Furthermore, there is provided a short section of track or spaced rails indicated at 4—4 for reception of the manually manipulated power supplying dolly 5, it being provided with four wheels for coactive engagement upon said rails 4—4 when manipulated thereupon by hand and between the rails at intervals may be formed spaced channel openings as at 6 through which the power driven super puncher and cleaner may be manipulated as will be more clearly described later.

It is deemed that the general arrangement of lift and the simultaneous cooperation of the elongated vertical screw-jacks at the four corners of the working platform are sufficiently well known in the art of such lifts as to require but meager specific description here, to wit: see Fig. 4 where one of the upright externally screw-threaded corner post supports 7 is installed within one of the angle side members 2 of the chassis for supporting the platform at each corner thereof, and each of which posts is fixed to its respective end of the angle side members 2 of the wheeled chassis.

The supporting wheels 8 of each such member are mounted upon the outer vertical sides thereof and inwardly of its respective corner as shown in Fig. 2 to permit of the platform basket being normally as near the track rails of the ore cars as possible, which redounds to the advantage of the punchers when expediting ore in a pocket of the dock above which the basket is being used.

A small reversible electric motor 9 is used for two of these wheels 8, one on each side of the chassis in lieu of other more complicated power transmitting means, both motors being connected up to operate in unison by throwing a single hand controlled switch on the switch stand 10.

In Fig. 4 is also illustrated one of the vertically elongated internally threaded stabilizing nuts 11 about the chassis supporting bolts and of which there is one at each corner of the chassis. Each of these nuts 11 is installed within a suitable ball bearing 12 within the chassis 2 and carried by the bottom of each nut is the operating sprocket 13 driven by the chain 14 carried within any suitable form of conduit from the motor 15, (see also Fig. 1.)

As is apparent, these sprockets may be driven in many different ways by either one or more motors, however, the usual practice is by a single motor as shown at 15 and common in the art of motor car lifts, so that manual operation of a suitable individual switch, also on the switch stand 10, will quickly raise the basket sufficiently high as shown in dotted lines Fig. 2 for passage thereunder of one or more loaded ore or other cars for the necessary expediting treatment in unloading same.

It is understood that in such operation the basket may be allowed to rest directly upon the car or cars above which it is raised and with the punchers being carried therewithin in perfect safety and in the most ideal position for engagement with the work to be done.

A further novel feature possible with the basket resting upon the top of one or more cars, and for example where the contents thereof is to be shared in different pockets of the dock which is frequently the case in grading the ore or even where there may be a surplus of burden in the car or cars being operated upon and requiring movement to another pocket, the same may be accomplished either by the traction power of the basket chassis or the traction means associated

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with the ore cars with the safety basket and its workmen therein resting upon the car or cars.

Another feature in connection with this novel form of safety work basket is that incorporated within and transverse the semi-open bottom thereof is a pair of narrow gauge track rails 4—4 for service of the manually operated power punching dolly car 5. This car is equipped as clearly seen in Fig. 5 of the drawing with suitable handle means 17 for moving it from side to side of the basket on its track 4—4 and the basket being selectively movable longitudinally of the car tracks of the ore dock results in the positioning of the dolly car horizontally being substantially universal.

The power car 5 is equipped with a suitable electric motor suggested at 18 for driving when desired as by V-belt the head sheave 19 of the agitator stem 20 for mechanically assisting in the expediting especially within the dock pockets by means of any design of rotary and/or reciprocal tool as suggested at 21.

This car 5 carries besides the operating sheave 19 which is vertically non-movable therein, a cup-like gasket holder 22 holding the relatively yieldable bushing or gasket 23 which is a sort of percussion washer to soften the jar of the stem 20 if dropped suddenly.

The stem 20 is externally screw-threaded the entire upper portion of its length and also splined for the permanently keyed sheave 19 so that the stem may be rotated by the hand wheel 24 when locked in respect to the stem by the tightening of the hand jam-nut 25 and freely reciprocated manually by say two operators, one upon each side of the hand wheel 24, it being noted that at such times, the sheave 19 will permit of such action by its key being freely operable in the longitudinal spline of the stem 20 and the stem with all its accessories freely rotated mechanically at any of such times by virtue of said splined connection with the sheave 19.

By this arrangement it is apparent that such cooperative connection of human and mechanical disintegrating so selectively available is unusual in the art in its capabilities.

As to the type of agitators possible of utilization either manually by the workmen or the power tool for punching, scraping or pushing, there is no limit except power to operate as they may be applied or removed beneath the bottom of the basket.

The stem 20 of the power puncher evidently is confined in its operation in respect to the bottom of the basket to the open channel 6, but as previously stated, having at instant command unrestricted movement in either horizontal direction makes such action available at any point within the limits of the area covered by the basket.

The details of ore dock construction as illustrated in Figs. 2 and 3 are such as is well known in many harbors on the Great Lakes where two sets of twin lines of railway tracks indicated at 26—26 are installed over two rows of pockets upon opposite sides of the mid-structure beam 27, the floors of the inclined pockets being illustrated at 28—28 and the division walls between the pockets being indicated at 34—34. It is apparent that for accommodation of this novel type of overhead expediter for ore either in the cars or dock pockets, suitable rails 29 spaced upon opposite sides of the twin tracks 26—26 must be provided upon the deck 30 of the dock for guiding traction of the chassis of the hopper discharge expediter.

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One of the traction motors of the expediter chassis is more clearly illustrated in Fig. 3 of the drawing where an upstanding bracket 31 is shown as suitable support for the motor 9 which carries the spur gear 32 in constant mesh with the larger gear 33 fixed to the shaft of the wheel 8.

As is well known, all ore docks of this description are equipped with electrical energy throughout their entire length.

Having thus described my invention, what I claim is:

1. In a safety device for use in expediting the discharge of granular material from a receptacle: a vertically and horizontally movable perforated platform for supporting workmen thereupon above said receptacle, so that long handled punchers may be operated through the perforations, said platform having an elongated opening therethrough, a dolly car upon said platform selectively movable over said opening, and means carried by said dolly car projecting through said opening for further expediting the discharge of said material.

2. In a safety device for use in expediting the discharge of granular material from a receptacle: a wheeled motor-driven chassis, a reticulate platform above said receptacle and vertically movable on said chassis, a manually and electrically operated dolly car upon said platform having means extendable through said platform for expediting the discharge of said iron ore, and a pair of spaced rails transverse said platform for reception of said dolly car, so constructed and arranged that said platform may be selectively positioned adjacent ore pockets or above ore cars and said dolly car may be positioned universally above said pockets or cars.

3. In a safety device for use in expediting the discharge of granular material from a receptacle: a wheeled motor-driven chassis, a perforated platform vertically movable on said chassis, an elongated opening through said platform, a selectively movable dolly car upon said platform and spanning said opening and having means extendable therethrough for expediting the discharge of said material, so constructed and arranged that said platform may be positioned adjacent said receptacle or above said receptacle.

4. In a structure comprising a plurality of lon-

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gitudinally aligned receptacles for temporarily storing granular material to be optionally discharged therefrom, and a track over said receptacles for movement of cars for dumping the contents thereof into said receptacles; a perforated platform supported upon wheels spanning said track and longitudinally movable over said receptacles, whereby elongated tools may be manually manipulated through said perforations so as to engage said material and augment the discharge thereof from said receptacle, said platform being vertically movable and having a supporting frame with no transverse members at its lower ends so that a car may move thereunder on said track and said tools engage the material therein to augment its discharge therefrom into a receptacle.

5. In combination with a structure having tracks longitudinally thereof and a plurality of pockets into which granular material is dumped from cars movable along said tracks for temporary storage, a pervious platform, means for supporting said platform over said tracks and pockets, said supporting means having no transverse members at its lower ends and said platform being movable vertically so as to be held adjacent said tracks or above said cars whereby the dumping of said material from said pockets and cars may be expedited through the perforations of said platform.

6. The structure as set forth in claim 5 further characterized by said platform and supporting means being horizontally movable.

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