

July 10, 1928.

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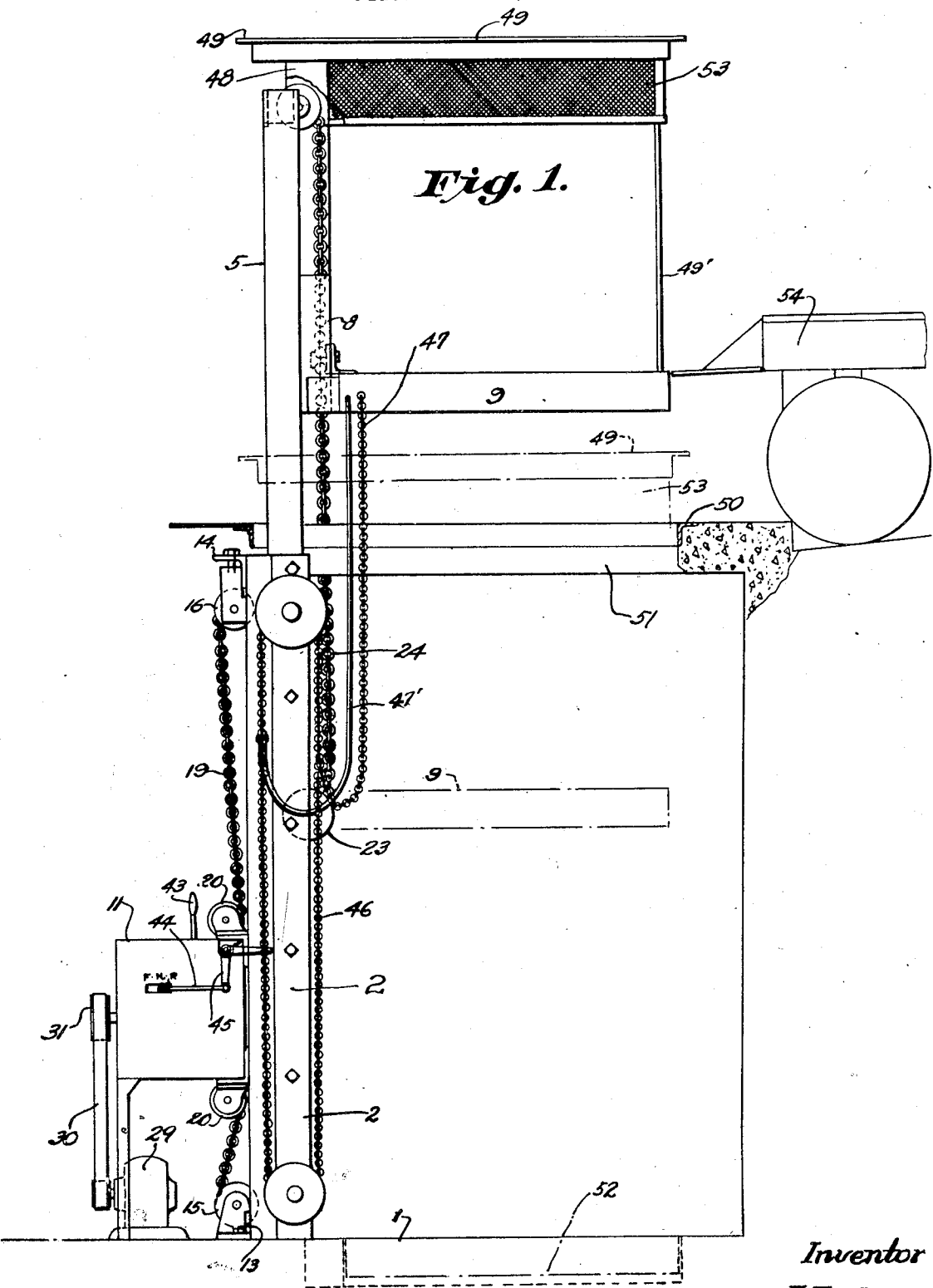
F. J. LEDERER

HOISTING MACHINE

Filed March 21, 1927

3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

Fig. 5.

Fig. 3.

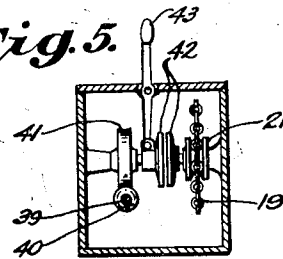
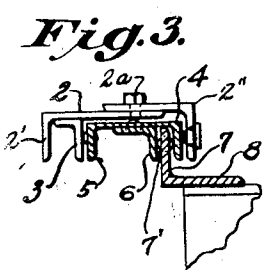
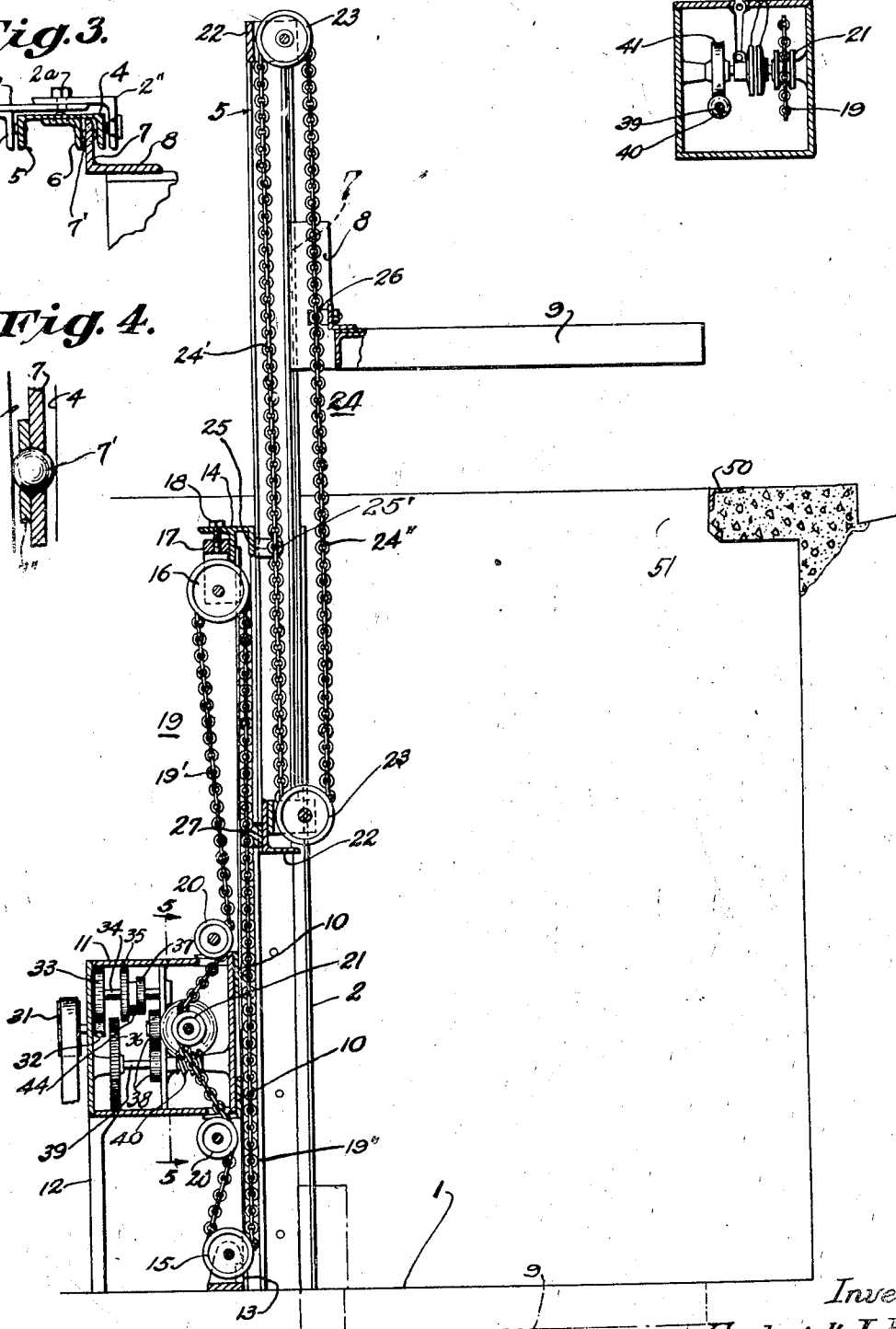


Fig. 4.



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Fig. 8.

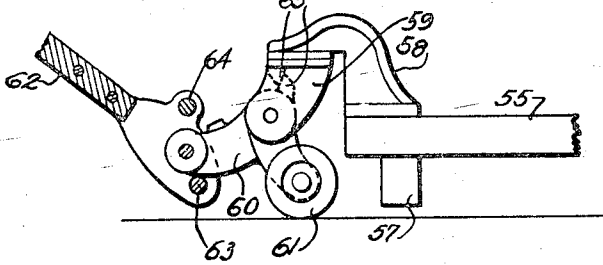


Fig. 9.

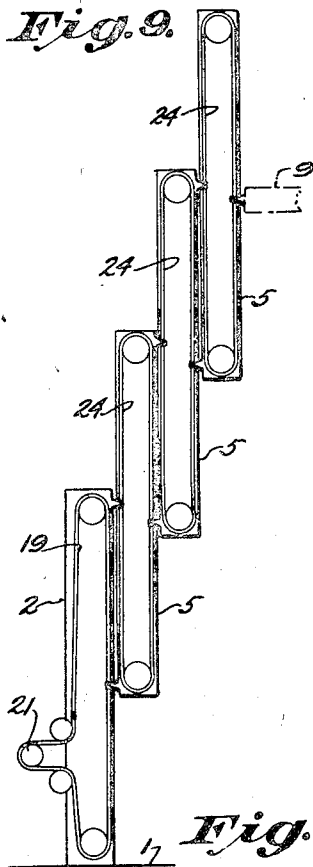


Fig. 6.

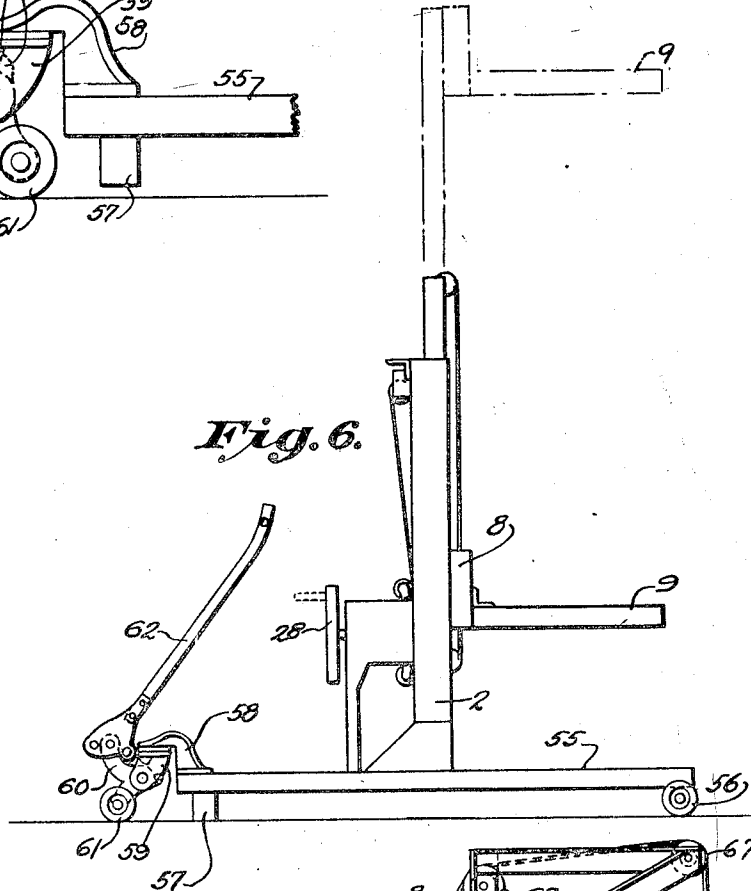


Fig. 7.

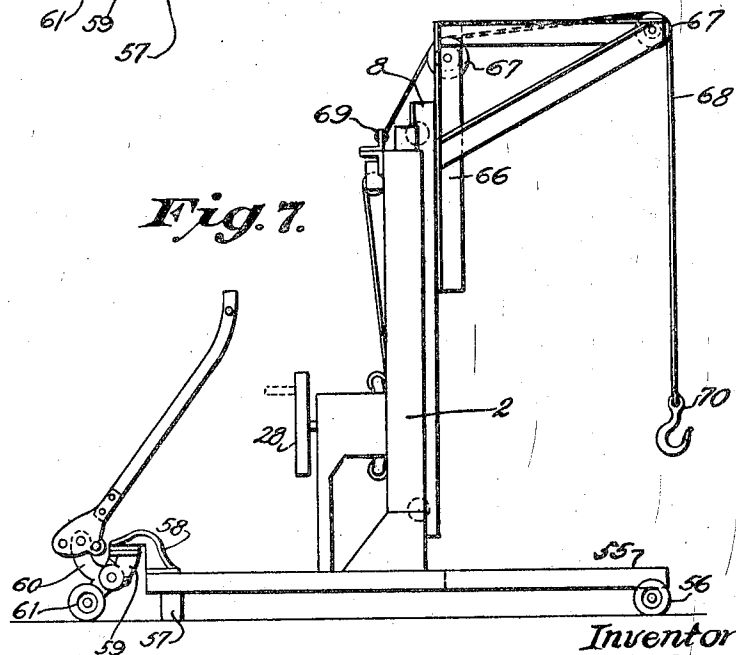
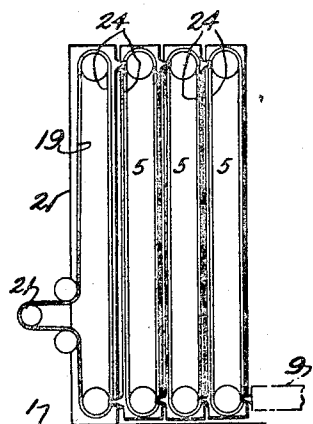


Fig. 10.



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UNITED STATES PATENT OFFICE.

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HOISTING MACHINE.

Application filed March 21, 1927. Serial No. 176,994.

This invention relates to a hoisting machine and while it is capable of embodiment in various lifting and jacking machinery it more particularly relates to an elevator or lift especially adapted for commercial establishments where it is desired to lift boxes, barrels or other packages of merchandise either from a street sub-level to a loading position at the street level, and vice versa, or for the stacking or tiering of merchandise or the reaching of previously stacked merchandise.

Various machines have been devised for the handling of merchandise in different mercantile establishments, but either on account of the expense of their installation or other reasons they have not been favorably entertained by the trade or commercial world.

An object of the present invention is to provide a hoisting apparatus in the nature of an elevator or lift by which packages or containers of merchandise may be efficiently and expeditiously handled.

A further object of the invention is to provide an elevator in which the carrying platform will have the widest range of movement which will be substantially coextensive with the upright supporting or guiding frame structure.

Another object of the invention is to provide an elevator or lift which may readily be installed in a basement or cellar below the sidewalk, the entire structure of which will be normally compacted or collapsed beneath the sidewalk or street level, but which may be extended to a height sufficient for bringing the load-carrying platform to the level of the floor of wagons, trucks or other freight vehicles. The invention also resides in the provision of a novel cover or closure for the sidewalk opening through which the elevator platform is movable; and also in the provision of a novel cage or screen by which the basement or cellar may be conveniently ventilated to the exclusion of unauthorized entrances.

A further object of the invention is to provide an elevator or hoisting machine having an automatically extensible support or guiding frame structure which will be extended simultaneously with a relative elevation of the platform.

A still further object is to provide a novel extensible frame structure in which the units

or sections will be progressively extended from the lowermost or supporting section and which structure is readily adaptable for a variety of uses.

The invention also has for an object to provide a portable hoisting apparatus in the form of an elevator lift or derrick which may be moved about at will to the desired location and by which merchandise may be lifted to an elevation considerably above the normally collapsed height of the machine.

A still further object of the invention is to provide a novel portable supporting base for the elevator structure.

The invention will also be found to reside in the salient features of construction and the novel arrangements and combinations of parts hereinafter described in detail and succinctly set forth in the appended claims, reference being had to the accompanying drawings wherein;

Figure 1 is an elevation of a sidewalk lift or elevator equipped with the cover and guard for the sidewalk opening.

Figure 2 is a vertical section of the sidewalk elevator or lift with the manhole cover and guard removed.

Figure 3 is a detailed transverse section through one side of the guiding or supporting frame structure.

Figure 4 is a detailed view showing the manner of providing an antifriction bearing in the extensible frame structure.

Figure 5 is a detailed sectional view about on line 5-5 of Figure 2.

Figure 6 is an elevation showing the elevator or lift embodied in a portable structure.

Figure 7 is a similar view through a portable lift construction wherein the platform has been replaced by a derrick or screen construction.

Figure 8 is a detailed view of the front portion of the portable base or truck.

Figure 9 is a diagrammatic view showing in partially extended form a plurality of extensible frames.

Figure 10 is a similar view showing the extensible frames in their collapsed or inoperative relation.

In carrying the present invention into effect, I have shown in Figures 1 and 2 the supporting base 1 of the hoisting apparatus as being the floor of a basement or cellar extended out beneath the sidewalk, although

the hoist could have its own base separate and distinct from the floor and suitably anchored thereto. Rising from the base 1 is a pair of upright standards or guides 2 which are preferably of channeled formation, as shown in Fig. 3. For convenience, each channel member is composed of complementary angle members 2' and 2'' bolted together as by bolts or screws 2^a whereby either one of the angle members may be removed to facilitate the positioning and removal of the extensible frame or section. The channels are disposed in direct opposition and each upright may be provided with an additional guide in the form of an angle-iron 3 for defining with one wall of the channel upright 2 a guideway for the adjacent side member 4 of an extensible frame generally indicated at 5. Each side frame 4 is also preferably of channeled formation and provided with an angle-iron 6 similar to the angle-iron 3, for defining with an opposing wall of said side member 4 a guideway in which is vertically slidable a flange 7, which may be a part of a side member of another extensible frame 5, such as schematically shown in Figures 9 and 10, although for clearness in illustration only one extensible frame is shown in Figures 1 and 2, and the flange 7 forms a part of a carriage 8 which supports the platform 9. The carriage 8 has sufficient bearing in the side member 4 to permit of an easy sliding movement without binding. Obviously, antifrictional devices may be provided to ease the sliding contacts between the extensible elements, such as ball bearings 7' shown in Figures 3 and 4. These ball bearings may be retained in their pockets in flange 7 by any suitable means such as a retaining plate 7''. The uprights 2 may be braced by struts if desired, the braces or reinforcements in the present disclosure taking the form of transverse anchor members 10 which, not only connect the uprights 2 but also provide support for a gear box or transmission housing 11, additional support being provided for said housing by legs 12. The lower ends of the uprights are braced by a transverse, connecting angle member 13, while the upper ends of said uprights are connected by an angle member 14. These uprights and braces form a substantial frame which constitutes the stationary or guiding section or unit of the extensible structure. A pulley or sheave 15 is journaled in fixed bearings on the lower member 13 while a pulley 16 is journaled in a yoke or fork 17 which is adjustably connected to the upper member 14 by a bolt or screw 18. Obviously, pulley 15 may also be likewise adjustably mounted. An endless cable or chain 19 takes over these two pulleys 15 and 16 and after passing over guide pulleys 20, preferably located on the angle braces 10, one flight

19' thereof takes about a drive pulley 21 arranged in the gear or transmission housing 11.

Each extensible frame or section 5 is suitably braced and provided with transverse upper and lower frame members 22 on which are journaled the upper and lower pulleys 23, either one or both of which may be adjustably mounted as in the case of pulley 16, although such adjustable mountings have been omitted in the present disclosure for the sake of clarity. Over these pulleys 23 takes an endless cable or chain 24 which has one length or flight 24' connected at 25' to a fixed bracket 25 on the upper member 14 and which has its parallel length or flight 24'' connected at a suitable height to the carriage 8, as indicated at 26. In this connection it is noted that the bracket 26, or the point of connection with the chain, is located between the slidable flange 7 and the load-sustaining portion of the platform 9 whereby the chain will assume in part, some of the weight of the load and thereby relieve the flange to that extent, as well as reduce any binding tendency of the flange on its guide walls. The chain 19 has its other flight 19'' connected to the adjacent extensible frame by a bracket 27 on the lower transverse frame member 22. Referring particularly to Figure 2 it will be observed that any driving of the chain 19 which would tend to lift on the point of connection 27 with the extensible frame 5 would lift the latter, and by reason of the fixed point of connection 25' between the endless chain 24 and the stationary transverse member 14, the point of connection 26 with the carriage 8 would elevate the latter in its guideway provided in the side members 4. Therefore while the point of connection 26 on the carriage 8 will move relative to the supporting extensible frame 5 at a speed equal to the movement of the extensible frame in the guide members 2, the relative movement between the carriage 8 and the fixed guides 2 will be twice as fast, and in proportion to the number of extensible frames or units 5 the movement of the carriage and platform will be correspondingly increased. Thus, in an extensible structure such as is disclosed in Figures 9 and 10 wherein there are three extensible frames or units and one stationary frame, the movement of the platform will be four times as fast as the relative movement between adjacent frames or sections. Obviously, should the chain or cable 19 become too loose the slack may readily be taken up by the adjustment 17, 18.

Manual power may be provided for operating the drive pulley 21, such as is indicated at 28 in Figures 6 and 7, but oftentimes it is desirable to have motive power and for this purpose I have illustrated in Figure 1 an electric motor 29, the same be-

ing suitably located in an out-of-the-way position beneath the housing 11, and geared to the transmission as by a belt 30 and pulley 31 (see also Fig. 2). The shaft of this driven pulley 31 extends into the transmission housing and carries a gear 32 which is in mesh with a gear 33 fixed on a countershaft 34. Slidable on this countershaft is a gear unit the gear 35 of which may be meshed with a gear 36 for forward or "up" driving, and the gear 37 of which may be meshed with reversing gears 38 for reverse or "down" driving, whereby the shaft 39 which supports gear 36 and one of the gears 38 may be rotated in either forward or reverse directions. The shaft 39 is also equipped with a worm 40 in mesh with a worm gear 41, (see Fig. 5) which worm and gear constitute an irreversible drive whereby the platform will be locked in any position against unauthorized retrograde movement. The worm wheel 41 may be connected and disconnected from the drive pulley 21 by a clutch 42 and lever 43 for effecting a rapid descent of the platform. Under normal conditions the platform is operated by power both for raising and lowering, the gears 35 and 37 being slidable on their shaft 34 by an arm 44 (Fig. 1) which is in turn connected to a bell crank lever 45, and this bell crank lever is connected to an endless member 46 which is always accessible to anyone on the platform 9 by means of the flexible members 47 and 47'. The flexible member 47 is of such length as to automatically function at either extreme limit of movement of the platform, up or down, in bringing the gears 35 and 37 into neutral position and thereby automatically stop the machine. The two flexible members 47 and 47' provide means to move the endless member 46 in either direction from any position of the platform.

Slidably mounted in the carriage guideway of the side members 4 are standards 48 which rest upon the top of carriage 8 and which in turn support a cover 49 for seating on the coping or sill 50 about the sidewalk opening 51 for closing said opening. Additional supporting means in the form of a post 49' may be provided when desired. After the cover seats on the sill 50, the platform 9 may be lowered to the basement floor or into a pit provided therein for such purpose, such as is indicated at 52. On the under side of the cover 49 is provided a screen skirt 53 of a shape substantially conforming to the sidewalk opening 51, and when it is desired to ventilate the basement or elevator shaft, the carriage will be elevated sufficiently to lift the cover 49 from off the sill as is indicated in dotted lines in Figure 1. Such a grating or screen will prevent the unauthorized entrance of anyone into the basement as well as guard against accidents. When the platform is raised the cover 19 will of course

also be elevated, which cover may be permanently connected to the carriage, if desired.

By reason of the extensible supporting frame structure for the platform it is possible to raise the platform substantially to the top of the uppermost extensible frame or section. In Fig. 1 is diagrammatically shown at 54 the rear portion of a truck or wagon backed up against the curb, and illustrating an advantage of the improved elevator or lift in that the platform may be elevated to the level of the floor of the truck or wagon for readily sliding any large packages or merchandise from or to the platform as will be very obvious.

In lieu of having the base 1 permanent or stationary it may be of a portable nature such as is indicated at 55 (Fig. 7) wherein the base constitutes the body of a wheeled truck jack or linesman's platform, the rear wheels 56 being suitably journaled to the rear end of the truck body while the front wheels are adjustable for lowering the front end of the truck body into engagement with the ground or floor and thereby secure the supporting base against movement. The truck body may be made of suitable angle iron or preformed frame members and is preferably provided with a transverse floor-engaging member 57 which is raised and lowered from and to the floor by the proper manipulation of the front wheels. Overhanging the front edge of the truck body is the bracket 58, to which is swiveled a fork 59, the latter supporting on a horizontal pivot a bell crank lever 60. On one arm of the bell crank lever is mounted a pair of wheels or casters 61 and on the opposite arm of the bell crank is pivoted a handle 62 (Fig. 6) which has spaced stops 63 and 64 which are adapted to engage the opposite sides of the adjacent bell crank lever arm for swinging the bell crank lever about its horizontal pivot. By swinging the handle 62 back over the body of the truck, as in Figures 6 and 7, the caster wheels 61 will be swung forwardly so as to drop the frame member 57 down onto the floor, and by swinging the handle forwardly, as in Figure 8, the stop 63 will engage the adjacent arm of the bell crank lever and cam the wheels 61 rearwardly to lift the forward end of the truck body, the rearward position of the wheels 61 being determined by a pair of lugs 65 respectively provided on the bell crank lever and the fork 59.

The elevator or lift in the portable style of hoisting machine is substantially the same as that shown and described in Figures 1 and 2, with the exception that manual power is provided instead of motive power. By reason of its portable nature this latter form of elevator or hoisting machine may be carted about from place to place in a commercial establishment, and by reason of its compactness, when in its lowered or inoperative po-

sition, it may be moved through low doorways or arches without disrupting or tearing down either the hoisting machine or the building structure.

5 In lieu of the platform 9, the carriage 8 may be provided with a derrick or crane-like arm 66 having guiding pulleys or sheaves 67 over which may take a cable 68, one end of which is suitably anchored to a fixed part on the stationary frame structure as indicated at 69, and the opposite or free end of which is provided with a hook or other suitable load-supporting means 70. Such construction permits of the rapid lifting of the hook 70 when the supporting frame structure is extended, and may be embodied in such hoisting apparatus as wrecking cars.

In a portable structure such as is shown in Fig. 6 the lift may be moved about from place to place, through narrow and low passages and then be extended to its full height, if desired, so that any person on the platform may reach a very high ceiling or a very high shelf. The extensible frame structure such as is shown in Figs. 9 and 10 is readily adapted to a variety of uses, such as an extensible ladder, scaffold, or truck dump body, and by reason of the progressively increased speed of the uppermost extensible frame or unit, any person standing on said frame or unit in a ladder or scaffold construction could expeditiously be elevated at a rapid rate of speed to a very high elevation. Other uses for such an extensible frame will readily suggest themselves to those skilled in the art, and it is therefore desired not to limit the invention to any particular use. For instance, the extensible structure could be mounted in an inverted position on the side of a building; or it could be mounted for extending in a horizontal direction, which position readily adapts itself to extensible trucks.

I claim:—

1. A hoisting machine comprising spaced uprights, an endless member supported thereby, an extensible frame telescopically related to the uprights and connected at its lower portion to said endless member, a second endless member supported by said extensible frame and having one flight connected to a fixed part of said uprights, and a carriage vertically slidable in said extensible frame and connected to the opposite flight of said second endless member.

2. An extensible structure of the class described comprising a stationary frame, an extensible frame slidably connected therewith, an endless member for each frame supported by pulleys thereon, the endless member of the stationary frame being connected to the lower portion of said extensible frame and one flight of the endless member of said extensible frame being connected to a fixed part of said stationary frame, and a member slidably connected to the extensible frame

and connected to the opposite flight of the endless member of said extensible frame.

3. An extensible structure of the class described comprising a stationary frame and an extensible frame slidably connected therewith, an endless member for each frame supported by pulleys thereon, the endless member of the stationary frame being connected to the lower portion of said extensible frame and one flight of the endless member of said extensible frame being connected to a fixed part of said stationary frame, a member slidably related to the extensible frame and connected to the opposite flight of its endless member, and a platform carried by said slidable member.

4. An extensible structure of the class described comprising a stationary frame, and an extensible frame slidably connected therewith, an endless member for each frame supported by pulleys thereon, the endless member of the stationary frame being connected to the lower portion of said extensible frame and one flight of the endless member of said extensible frame being connected to a fixed part of said stationary frame, a member slidably related to the extensible frame and connected to the opposite flight of its endless member, a platform carried by said slidable member, and means for driving the endless member of said stationary frame.

5. An elevator comprising a stationary frame, an extensible frame slidably connected therewith, pulleys on each frame, an endless member for each frame taking over the respective pulleys thereof, the endless member of the stationary frame being connected to the lower part of the extensible frame, and the endless member of the extensible frame having one flight connected to a fixed part of the stationary frame, and a platform slidably related to the extensible frame and fixedly connected to the opposite flight of its endless member.

6. An elevator comprising a stationary frame, an extensible frame slidably connected therewith, pulleys on each frame, an endless member for each frame taking over the respective pulleys thereof, the endless member of the stationary frame being connected to the lower part of the extensible frame, and the endless member of the extensible frame having one flight connected to a fixed part of the stationary frame, a platform slidably connected to the extensible frame and fixedly connected to the opposite flight of the endless member of said extensible frame, and power operated transmission means for driving the endless member of the stationary frame selectively in opposite directions.

7. An elevator comprising a stationary frame, an extensible frame slidably connected therewith, pulleys on each frame, an endless member for each frame taking over the

respective pulleys thereof, the endless member of the stationary frame being connected to the lower part of the extensible frame, and the endless member of the extensible frame having one flight connected to a fixed part of the stationary frame, and means for relatively adjusting the pulleys on one of said frames to tighten the endless member.

8. An elevator comprising a stationary frame, an extensible frame slidably connected therewith, pulleys on each frame, an endless member for each frame taking over the respective pulleys thereof, the endless member of the stationary frame being connected to the lower part of the extensible frame, and the endless member of the extensible frame having one flight connected to a fixed part of the stationary frame, a platform slidably connected to the extensible frame and fixedly connected to the opposite flight of the endless member of said extensible frame, and a closure member slidably connected to the extensible frame and operable by the platform, said closure being adapted for closing an opening in a sidewalk or floor through which the platform is movable.

9. An elevator comprising a stationary frame, an extensible frame slidably connected therewith, pulleys on each frame, an endless member for each frame taking over the respective pulleys thereof, the endless member of the stationary frame being connected to the lower part of the extensible frame, and the endless member of the extensible frame having one flight connected to a fixed part of the stationary frame, a platform slidably connected to the extensible frame and fixedly connected to the opposite flight of the endless member of said extensible frame, a closure member for an opening in a wall through which the platform is movable, said closure member being operably connected to the platform, and a skirt depending from the platform.

10. An elevator comprising an upright stationary frame, an extensible frame slidably connected to the stationary frame, an endless drive member vertically arranged on the stationary frame and connected to the extensible frame, a driven endless member vertically arranged on the extensible frame and having one flight connected to the stationary frame, and a load supporting means slidably connected to the extensible frame and secured to the opposite flight of said driven endless member.

11. A hoisting machine comprising a frame including a supporting base and an upright guide frame having an extensible frame slidably connected to the guide for up and down movement, a load-carrying platform slidably connected to the extensible frame for relative up and down movement, an endless driving member supported on the upright guide frame and having one flight

connected to the extensible frame for operating the same, a driven endless member supported on the extensible frame and having one flight connected to the upright guide frame and its opposite flight connected to the load-carrying platform at a point between its slidable connection with said extensible frame and its load supporting portion, and means for driving the first endless member.

12. A hoisting machine comprising a frame including a supporting base and an upright guide frame having an extensible frame slidably connected to the guide for up and down movement, a load-carrying platform slidably connected to the extensible frame for relative up and down movement, an endless driving member supported on the upright guide frame and having one flight connected to the extensible frame for operating the same, a driven endless member supported on the extensible frame and having one flight connected to the upright guide frame and its opposite flight connected to the load-carrying platform, and power operated transmission means for driving the first endless member, said transmission means including an irreversible worm and gear whereby the load-carrying platform will be locked in any and all of its positions against unauthorized movement.

13. A hoisting machine comprising a frame including a supporting base and an upright guide frame having an extensible frame slidably connected to the guide for up and down movement, a load-carrying platform slidably connected to the extensible frame for relative up and down movement, an endless driving member supported on the upright guide frame and having one flight connected to the extensible frame for operating the same, a driven endless member supported on the extensible frame and having one flight connected to the upright guide frame and its opposite flight connected to the load-carrying platform, power operated transmission means for driving said first endless member which includes forward and reverse gearing, and control means for the reversible gearing accessible from the platform in all positions of the same.

14. A hoisting machine comprising an upright guide frame, an extensible frame slidably connected thereto for up and down movement, spaced pulleys arranged at the top and bottom of the extensible frame, an endless member taking over said pulleys and defining spaced flights, means connecting one flight to the upper portion of said guide frame, a load-carrying platform connected to the upper flight and slidably connected to the extensible frame for movement coextensive of the same and means for sliding the extensible frame in said guide frame a distance substantially equal to the

spacing of said pulleys whereby said load-carrying platform will be moved substantially from one extreme limit of said extensible frame to the opposite extreme limit.

- 5 15. A hoisting machine comprising a frame including a supporting base and an upright guide frame having an extensible frame slidably connected to the guide for up and down movement, a load-carrying platform slidably connected to the extensible frame for relative up and down movement, an endless driving member supported on the upright guide frame and having one flight connected to the extensible frame for operating the same, a driven endless member supported on the extensible frame and having one flight connected to the upright guide frame and its opposite flight connected to the load-carrying platform, and power operated transmission means for driving the first endless member, said transmission means including an irreversible worm and gear whereby the load-carrying platform will be locked in any and all of its positions against movement, and means located between said irreversible worm and gear and said first endless member for disconnecting
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the two whereby said load-carrying platform may have an accelerated descent.

16. A hoisting machine comprising a base, an upright frame thereon, an extensible frame slidably connected to the upright frame for up and down movement, a platform slidably connected to the extensible frame, means for lifting said extensible frame on said upright frame, and means for lifting said platform on and relative to said extensible frame by and during movement of said first means.
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17. A hoisting machine comprising a frame including a supporting base and an upright guide frame, an extensible frame movable up and down on the guide frame, a load-carrying member supported by said extensible frame for relative up and down movement, a pulley on the upper portion of the extensible frame, a flexible member connected to the load carrying member and taking over the pulley to a fixed anchor on said guide frame, and a pulley-supported, flexible driving member on said guide frame and connected to the extensible frame for lifting the latter.
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