

No. 609,281.

Patented Aug. 16, 1898.

D. W. LEACH & O. TURNER.
PORTABLE FIRE ESCAPE APPARATUS.

(Application filed Aug. 2, 1897.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

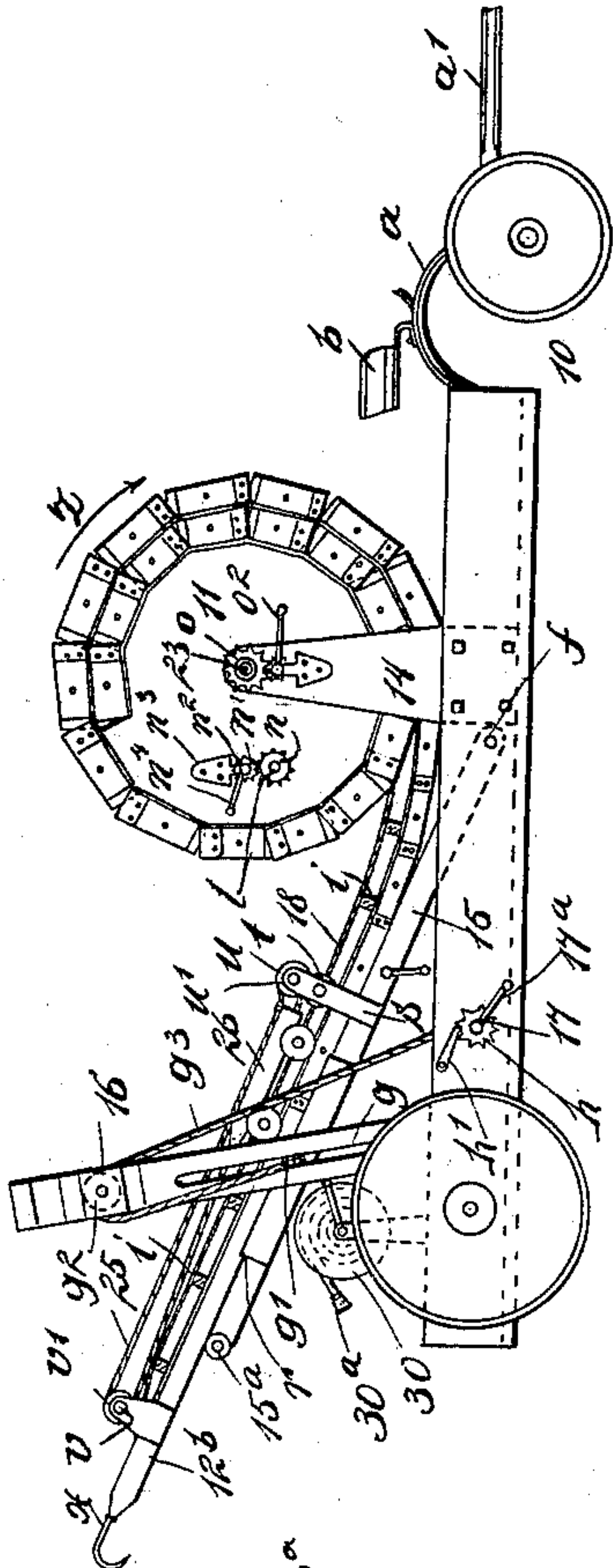


Fig. 2a.

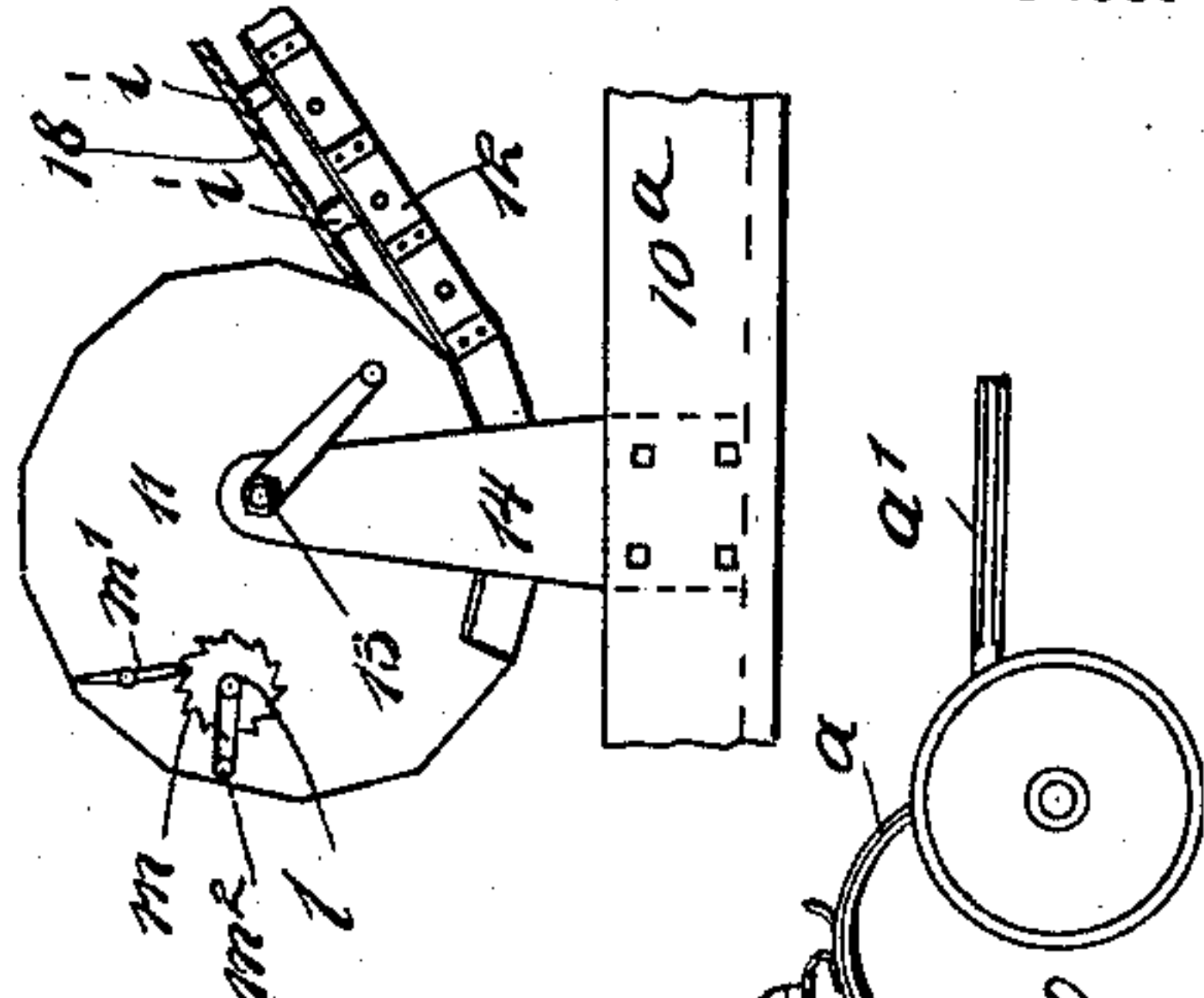


Fig. 2.

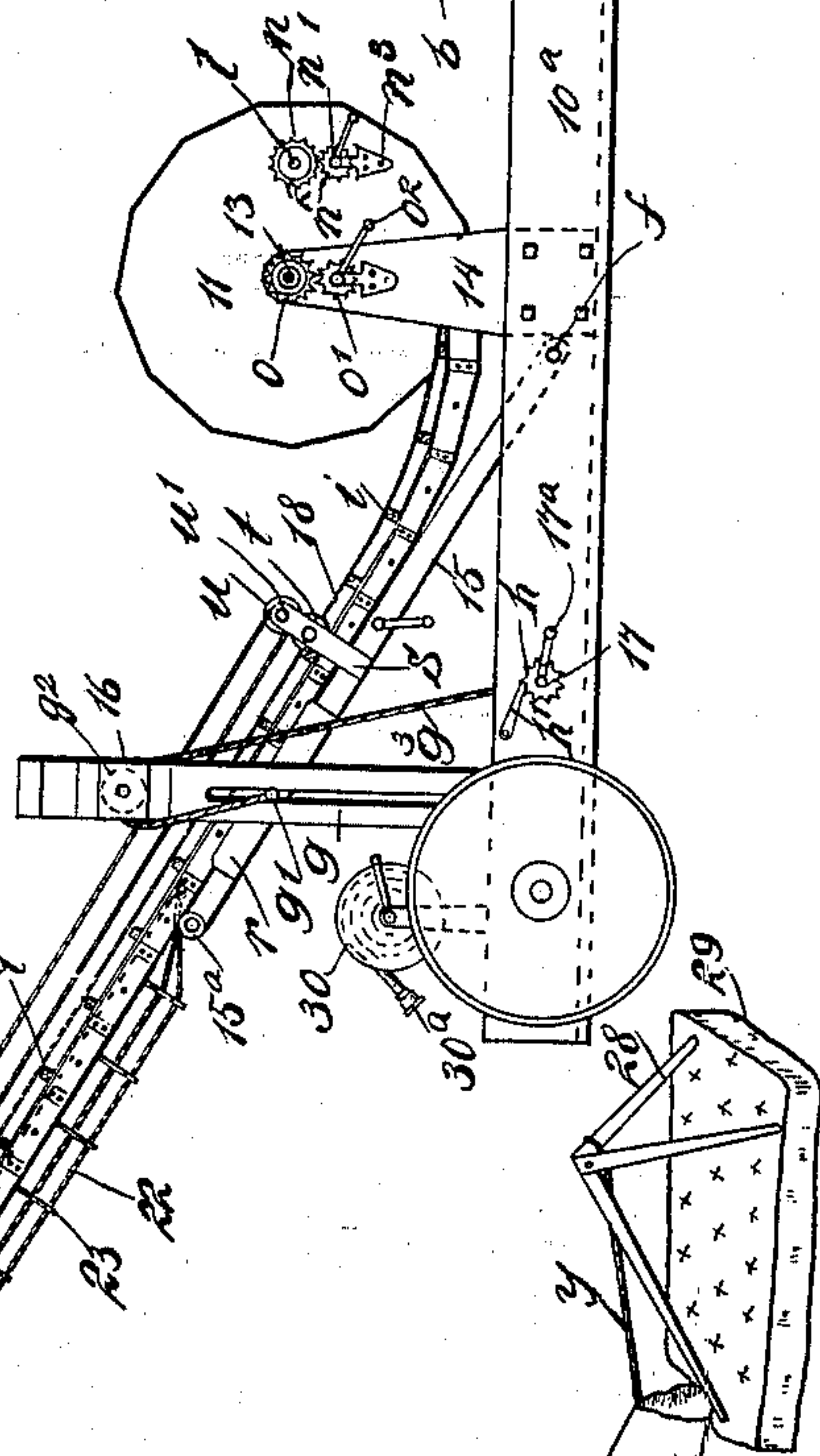
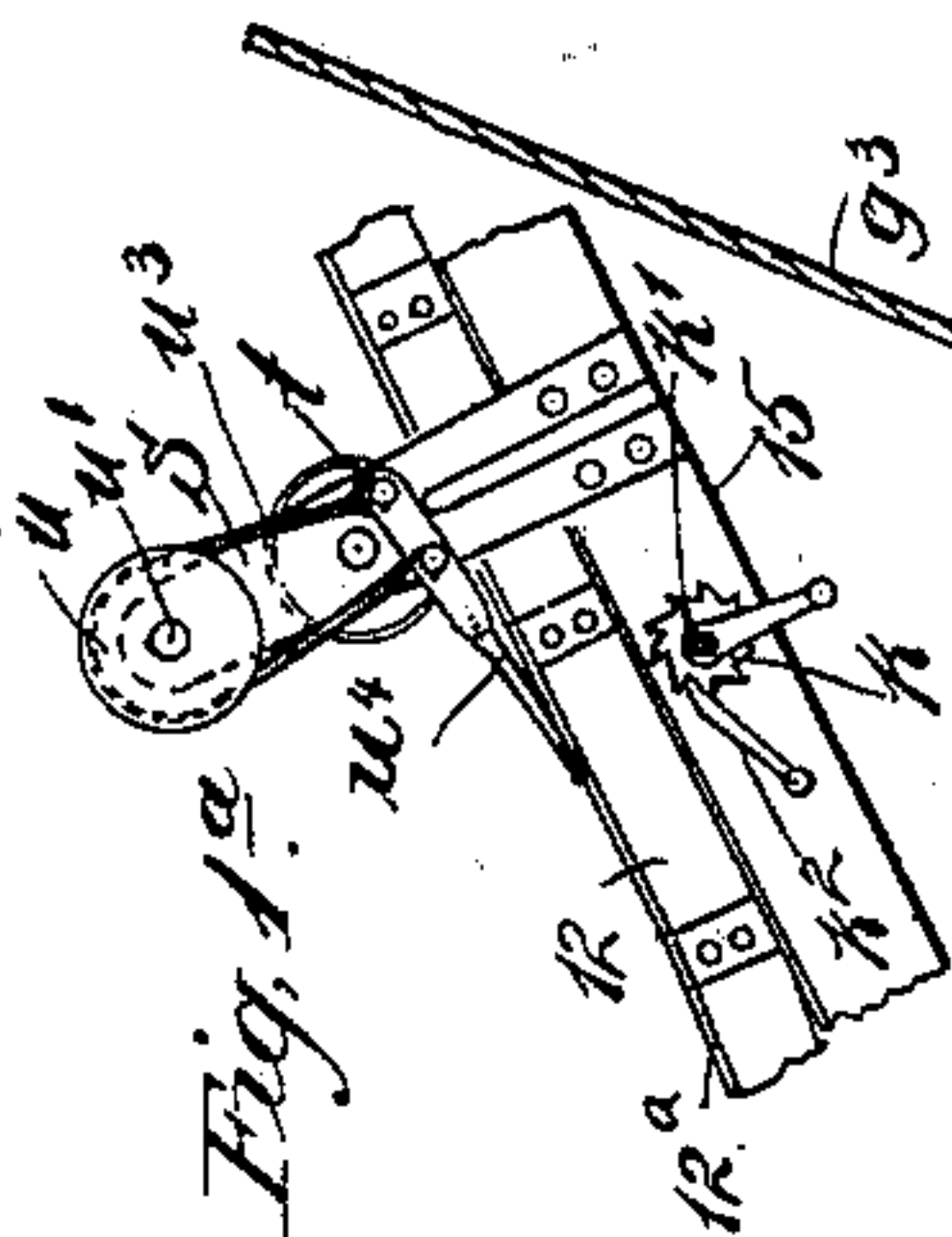


Fig. 1a.



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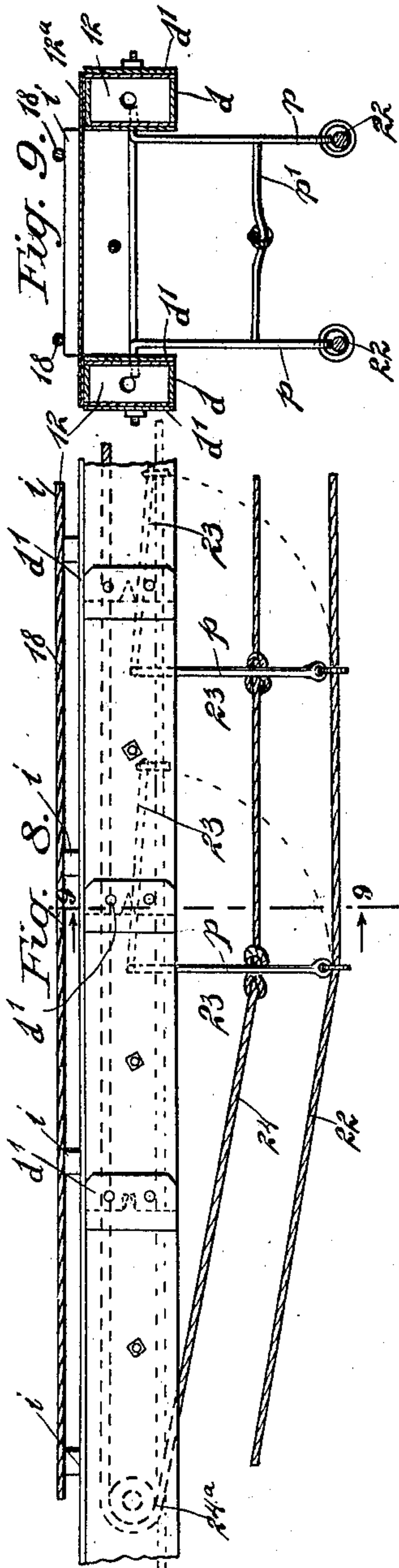
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Fig. 3.

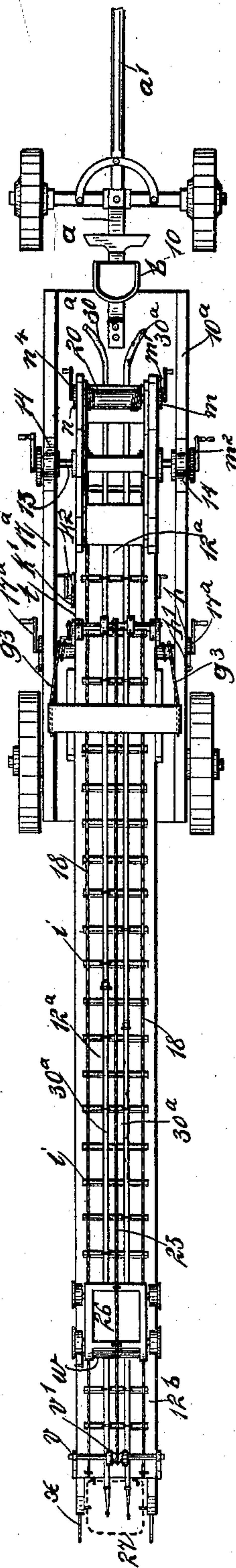


Fig. 7.

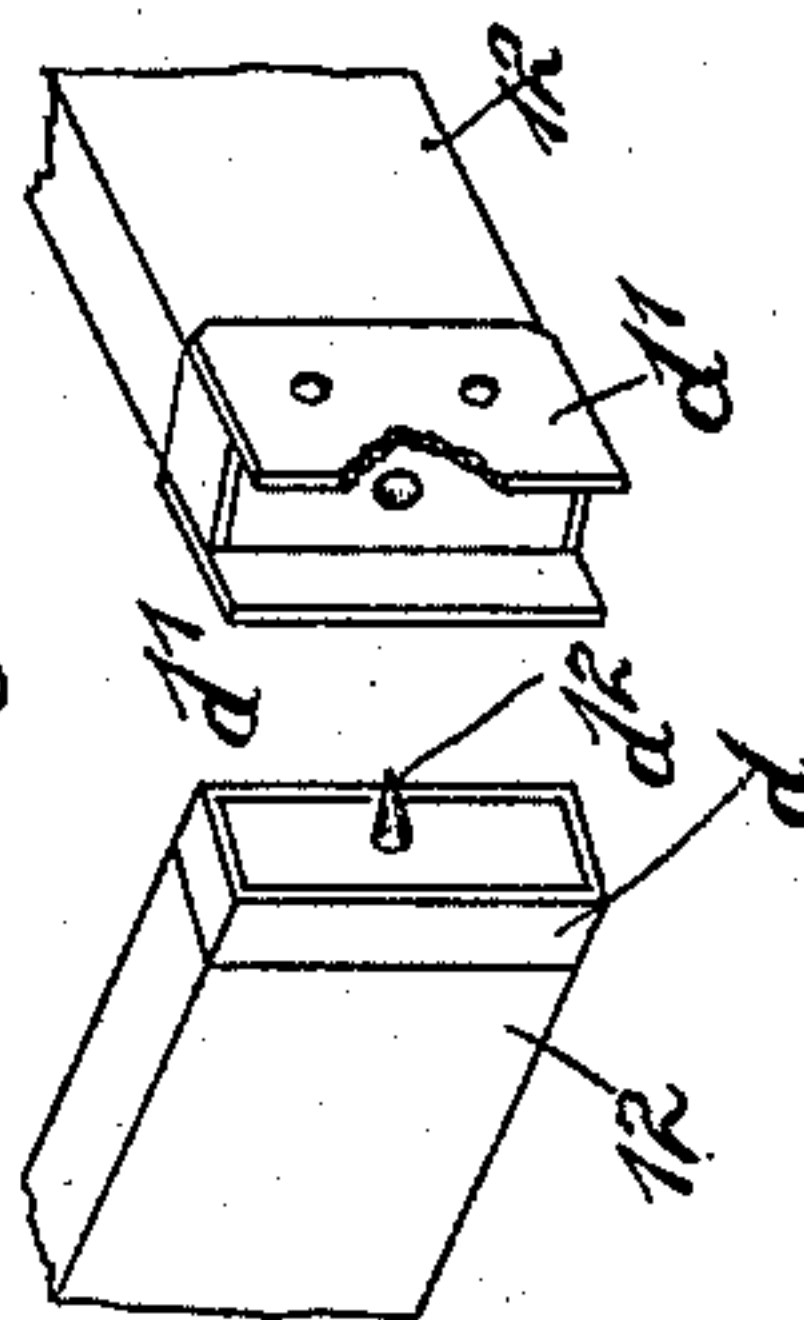
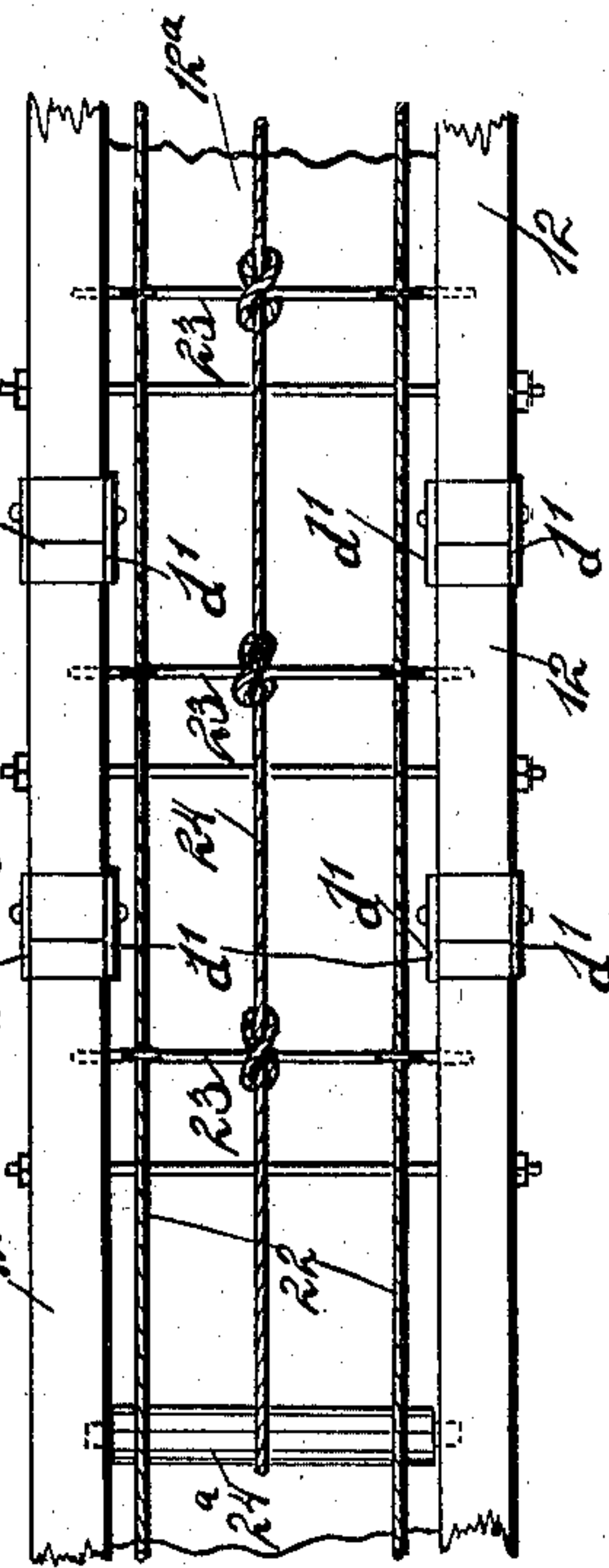


Fig. 6.



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Fig. 4.

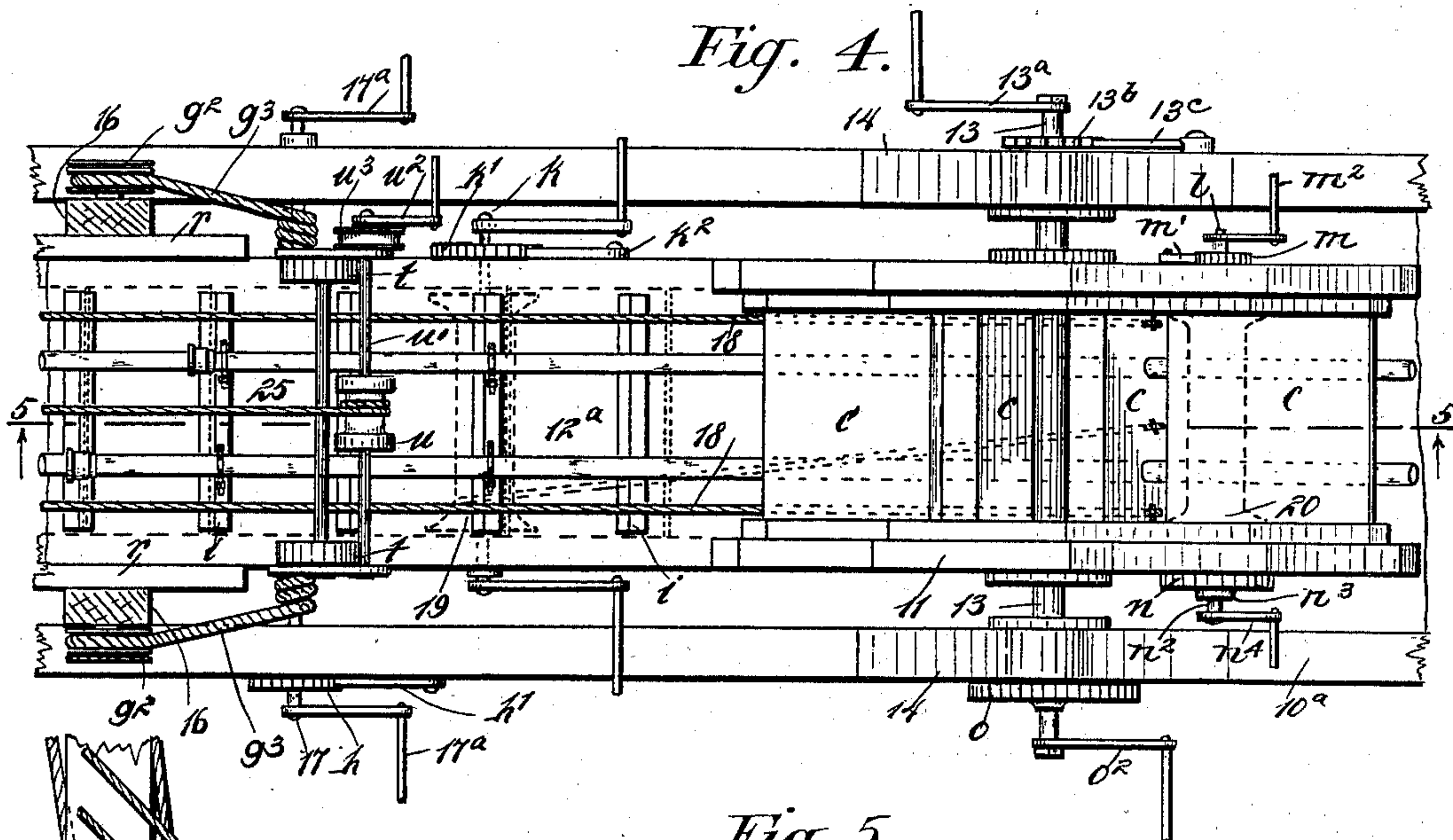
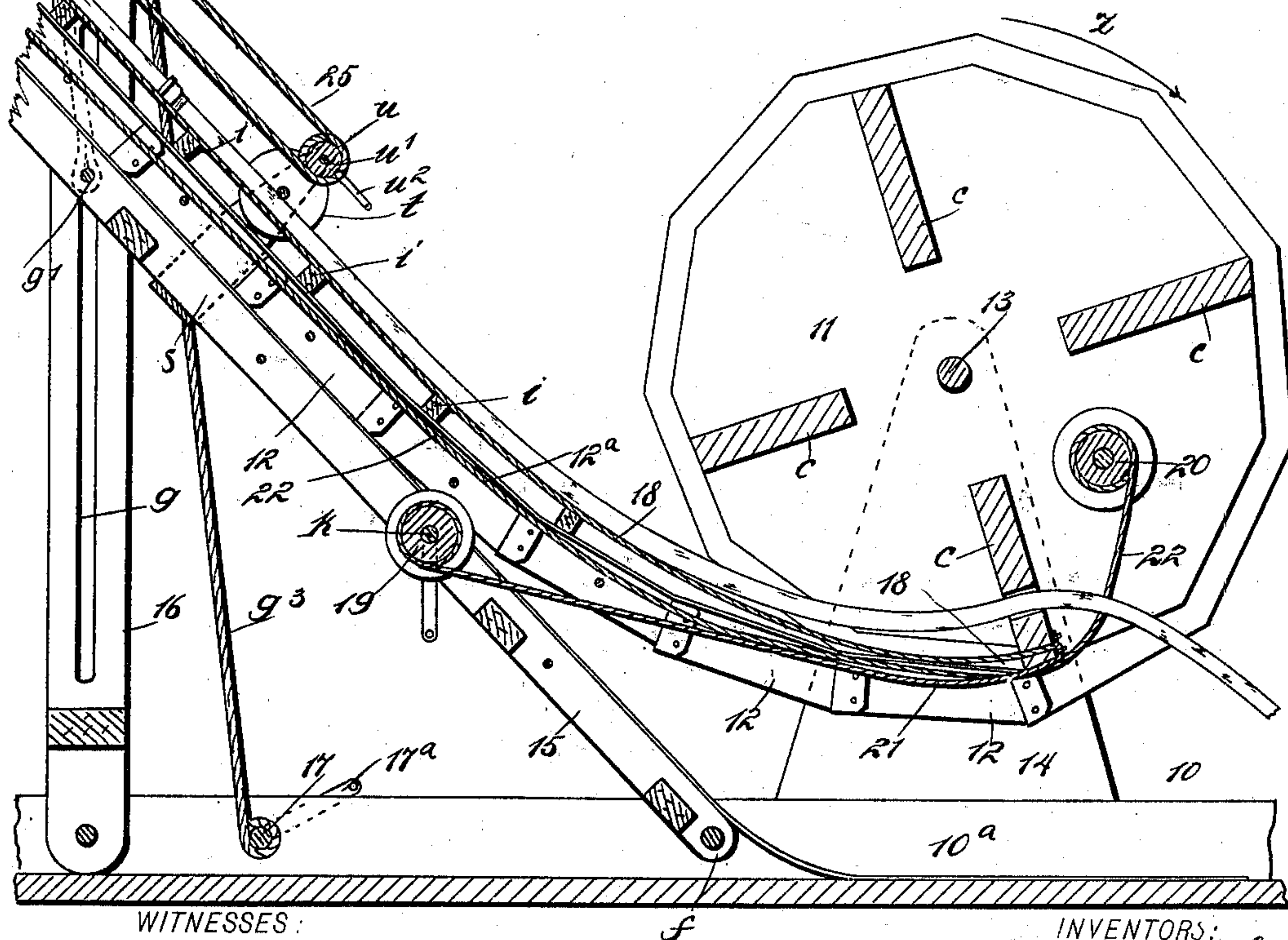


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID WALLER LEACH AND OSCAR TURNER, OF TRUCKEE, CALIFORNIA.

PORTABLE FIRE-ESCAPE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 609,281, dated August 16, 1898.

Application filed August 2, 1897. Serial No. 646,740. (No model.)

To all whom it may concern:

Be it known that we, DAVID WALLER LEACH and OSCAR TURNER, of Truckee, in the county of Nevada and State of California, have invented a new and Improved Portable Fire-Escape Apparatus, of which the following is a full, clear, and exact description.

This invention relates to a class of fire-escape devices that are mounted upon a vehicle for ready transportation, and has for its object to provide an apparatus of the indicated character which possesses novel features of construction that adapt the device for disposal in a compact condition on a suitable vehicle and permit a quick and easy uncoiling and elevation of a helically-coiled trackway that is a main feature of the invention and also give the same any degree of inclination required for effective service.

The invention further comprehends practical means for rendering the flexible trackway rigid at any point of its extension and elevation, thereby adapting said trackway for use as a safe and commodious bridge whereon a car may be moved to transfer passengers from a burning building to the ground and also carry firemen up or down, as the needs of the service may demand.

A further object is to provide a device of the indicated type with a tubular flexible conduit that may hang from the upper end of the elevated trackway and afford an easy safe avenue of escape for persons that are in the upper portions of a burning structure by sliding down through the conduit to the ground.

The improvement further provides convenient and reliable means for elevation of one or more lines of fire-hose along with the trackway to enable firemen to apply streams of water directly upon a fire from the erected trackway, and thus be enabled to perform more efficient service in the extinguishing of flames than can be accomplished from the ground.

To these ends the invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of the complete device adjusted for transportation. Fig. 1^a is an enlarged side view of portions of the car-controlling mechanism and of the trackway which said car traverses. Fig. 2 is a side elevation of the apparatus in complete form arranged for service. Fig. 2^a is a side view in part of the trackway and supporting-reel therefor, the trackway being in extended condition. Fig. 3 is a plan view of the apparatus when arranged for service. Fig. 4 is an enlarged plan view of the reel that supports the trackway and whereon it may be coiled, a trackway portion connected with said reel, means to operate the trackway for its extension or coiling upon the reel, and hose-sections disposed on the trackway. Fig. 5 is a sectional side view taken substantially on the line 5 5 of said Fig. 4. Fig. 6 is an inverted plan view of an upper portion of the extended trackway. Fig. 7 is a fragmentary perspective view of two mating sections of the flexible trackway, showing tongue and socket ends thereon. Fig. 8 is a side view of the upper portion of the extended trackway and of a novel device for simultaneously stiffening the joints of all the trackway-sections; and Fig. 9 is a transverse sectional view of the trackway and adjuncts thereon, taken essentially on the line 9 9 in Fig. 8.

In the drawings illustrating the invention, 10 represents a four-wheeled vehicle, the body 10^a of which is in the form of a rectangular platform having substantial side walls erected thereon for the support of the main portions of the apparatus. Preferably the front axle and wheels are held to swing in advance of the vehicle-body by an arched reach *a*, secured on the forward end of the body and pivoted upon the front axle, as shown in Fig. 3, a driver's seat *b* being mounted upon said reach, and a tongue *a'* projected from the axle for the attachment of horses. A sufficient area and weight is provided for the vehicle-body 10^a and its running-gears to insure a stable base for the fire-escape apparatus when in erected condition, as is represented in Fig. 2, and at a suitable point on the vehicle-body, which may be near the forward end of the same, the reel-frame 11 is positioned.

The reel-frame comprises two side pieces

of like form, the peripheries of which are polygonally spiral, said sides being held spaced apart a proper distance by the transverse blocks *c*, and preferably the polygonally spiral peripheries of the sides are rabbeted at their inner corners, thus affording space for the accommodation of parts of the flexible trackway 12, which will presently be described. The skeleton-framed reel 11 is mounted on a transverse journal-shaft 13, that projects at each side of the reel for a rotatable engagement with two bracket-standards 14, that at their lower ends are affixed in a vertical position directly opposite each other on the sides of the vehicle-body, and the height of the shaft 13 is such as will provide sufficient space between it and the platform of the body to permit a wrapped adjustment of the trackway 12 to be effected upon the reel-frame.

The trackway 12 consists of two series of track-sections in the form of rectangular blocks of like dimensions, each block comprising an oblong piece of wood or other suitable material, one end of each block being shod with a rectangular ferrule *d*, and the opposite end furnished with oppositely-secured side flanges *d'*, as clearly represented in Fig. 7. The end of each trackway-section that is encircled by a ferrule *d* is of such dimensions as will allow said ferrule to freely enter between the flanges *d'* on a section next to it, and in the ends of the trackway-sections having the ferrules thereon a tapered dowel-pin *d²* is inserted and projects therefrom, so as to enter a socket in the end of the section next in sequence, this doweled and socketed connection of the two series of trackway-sections serving to hold said sections alined in each series when the dowels are embedded in the sockets.

There is a flexible band 12^a of proper width and thickness provided, to which the two series of trackway-sections are secured. Preferably the band 12^a is formed of sheet-copper and at each side edge is folded inwardly, thereby rendering such folded parts of the band substantial, but permitting a flexure of the band between each pair of trackway-sections 12 that are located and affixed upon what in service becomes the lower side of the band, along each side edge of the same, as is clearly shown in Fig. 9.

On the vehicle-body 10^a, at the rear of the reel-frame 11, a rockable bed-frame 15 is pivoted at the lower end of the same, as shown at *f* in Figs. 1, 2, and 5. The bed-frame is formed of two side bars, of wood or other suitable material, secured together and spaced apart by cross-bars, thus producing a light strong structure for the support of the trackway 12.

At each side of the vehicle-body 10^a stanchions 16 are pivoted by their lower ends, and these stanchions are connected by cross-bars to form a rockable prop-frame. The prop-frame members 16 are longitudinally slotted

for a proper distance from the lower ends thereof, as is represented in Figs. 1, 2, and 5, and in said slots *g* the ends of a pivot-bar *g'* are loosely inserted, said bar being transversely affixed in the side members of the bed-frame 15. Sheaves *g²* are oppositely supported in brackets upon the sides of the prop-frame members 16, near the upper ends of the same, and flexible connections, such as ropes or chains *g³*, are furnished to adapt the prop-frame for adjustably supporting the bed-frame 15.

As shown in Figs. 1, 2, and 4, one end of each flexible connection *g³* is secured upon a projecting end of the transverse pivot-bar *g'* outside of the prop-frame members 16, and thence said connections trend upwardly and over the sheaves *g²*, from which they extend down to a cross-shaft 17, journaled in the sides of the body 10^a, these ends of the flexible connections being attached to the shaft. A crank-handle 17^a is secured upon each projecting end of the shaft 17, and at one side a ratchet-wheel *h* is affixed upon the shaft-body, the teeth of said wheel being engaged by a pawl *h'*, as shown in Figs. 1 and 2.

It will be seen that by rotating the shaft 17 the bed-frame 15 may be given any desired degree of inclination from a horizontal plane and be sustained at a proper angle of elevation from the platform of the vehicle-body by the prop and flexible connections already described.

The polygonally spiral formation of the peripheries of the side pieces of the reel-frame 11 produces a shoulder on each periphery at the point farthest from the shaft 13, and to these opposite shoulders one end of the trackway is attached by any preferred means, as best shown in Fig. 5. The length of the trackway sections 12 is equal to the length of each side of the polygonal periphery of each side wall of the reel-frame, so that a revoluble movement of the reel-frame 11 oppositely from the direction of the arrow *z* in Fig. 5 will closely wrap the trackway upon the reel-frame if said trackway has been extended upon and beyond the bed-frame 15.

On the upper side of the flexible band 12^a at spaced intervals, preferably near the ends of the trackway-sections 12, a series of cleats *i* are secured, and these cleats are of such a length as to permit them to enter between the radial flanges produced on the peripheries of the sides of the reel-frames 11 by rabbeting the inner corners thereof, as before mentioned, said cleats affording footholds for persons that may traverse the trackway in either direction. The series of spaced cleats *i* extend throughout the length of the flexible trackway, and on their normally upper sides a pair of flexible check-ropes 18 are disposed and are secured thereto, one rope near each side of the trackway. The flexible check-ropes 18 are preferably of wire cordage and become taut when the sections 12 of the trackway are extended and alined, and on any

portion of the trackway that may be uncoiled and disposed in a level condition the check-ropes prevent downward flexure and take the strain from the band 12^a, the rear ends of the check-ropes being attached to a cross-piece or spacing-block *c* of the reel-frame.

At the upper end of the inclined bed-frame 15 a transverse roller 15^a is rotatably supported, and the diameter of the roller adapts it to sustain the weight of the outer portion of the trackway and to reduce friction when the trackway is progressively moved over the roller. It will be seen in Fig. 1 that the outer end of the trackway consists of a single section 12^b, which is considerably longer than the foldable sections that are connected thereto, and also that when the major portion of the hinged sections 12 are in coiled condition on the reel-frame 11 some of the jointed sections and the long outer section lie upon the bed-frame 15.

A winch-drum 19, secured on a shaft *k*, is rotatably supported by the latter on the side members of the bed-frame 15 to be rotated by crank-handles on the ends of the shaft which project outside of the bed-frame, and a ratchet and pawl *k'* *k*² are adapted to hold the shaft and drum from rotation. Another winch-drum 20 is journaled in the side walls of the reel-frame 11 near the periphery of the reel. On one end of the shaft *l*, whereon the drum 20 is secured, and which end projects outside of the reel-frame 11, a ratchet-wheel *m* is affixed, that may be engaged by a pawl *m'*, pivoted on the reel-frame and serving when engaged with the ratchet-wheel to prevent the drum 20 from rotating. A crank-handle *m*² is secured on the shaft *l* outside of the ratchet-wheel *m* and enables the manipulation of the drum 20, for a purpose which will presently be described. On the other projecting end of the shaft *l* a spur-gear *n* is affixed, which is meshed with a smaller pinion *n'* on a short shaft *n*², journaled in the side of the reel-frame and also in a bracket *n*³ thereon, a crank-handle *n*⁴ being secured on the short shaft outside of the pinion, so that a rotation of this handle will aid the rotation of the drum 20 in a slow but powerful manner.

A wire rope 21 or other flexible connection is wrapped upon and has one end secured to the drum 19 and thence extends rearward to the reel-frame 11, whereon it is attached by the other end near the shoulders to which the trackway is attached. It will be evident that if the trackway is coiled mainly upon the reel-frame 11 and the drum 19 is rotated in a proper direction this will shorten the rope 21 and rotatably move the reel-frame in the direction of arrow *z* in Figs. 1 and 5.

The principal means for the projection of the trackway-sections 12 12^b consist of the large spur-gear *o*, secured upon a projecting end of the shaft 13 outside of a bracket-standard 14 and in meshed engagement with a pinion *o'* on a short shaft journaled in the

side of the frame 11 and in an arm thereon, the outer end of said shaft having a crank-handle *o*² secured thereon, which when manipulated enables the assured slow rotatable movement of the reel-frame in the direction of the arrow *z*. On the opposite end of the shaft 13 a crank-handle 13^a may be removably secured to aid the operation of rotatably moving the reel-frame 11, and on the shaft 13, near the handle 13^a, a ratchet-wheel 13^b may be secured, which is engaged by the pawl 13^c to aid in holding the trackway in wrapped condition on the reel-frame. To render any extended portion of the trackway rigid, so that flexure of the same is prevented, two truss-chords 22 are provided, preferably of flexible material, such as wire rope, these chords having their outer extremities secured upon the free end of the outer trackway-section 12^b near each side thereof, the opposite extremities of the truss-chords being attached to the drum 20, so as to be wrapped thereon.

A series of spaced truss-braces 23 is provided for each truss-chord, said braces being each preferably formed as shown in Fig. 9, comprising a pair of arms *p*, held parallel by the cross-bars *p'*, and having lateral journals oppositely projecting at the upper end of each arm, which journals are loosely engaged in perforations produced in the inner sides of each pair of oppositely-disposed trackway-sections 12.

A wire stretching-rope 24 is longitudinally extended below the trackway near the transverse centers of the truss-braces 23, and said rope is firmly attached to each lower cross-bar *p'*, as indicated in Figs. 2, 6, and 8. The rope 24 is endless and at the doubled outer end thereof is engaged with a roller 24^a, journaled in the sides of the long trackway-section 12^b, the inner doubled end of the stretching-rope being loosely engaged with a projection of any suitable form on a trackway-section 12, that is always above the bed-frame 15. The wire ropes 22, that are the truss-chords, pass through ring-eyes formed or secured on the lower ends of the arms *p*, so that a rocking movement of all the truss-braces 23 to project them downwardly in parallel planes will stretch the chords 22 and adapt them to render rigid the extended trackway or any portion of the same which has been projected in advance of the bed-frame 15.

It will be seen that when the trackway has been projected beyond the bed-frame 15 any degree that is needed for the service to be rendered a pull on one run of the endless stretching-rope 24 will, if exerted in a proper direction, rock the previously-folded truss-braces 23 downwardly, as shown in Fig. 8, and so stretch the truss-chords as to reliably stiffen the joints of the extended trackway-sections 12 to form a stable bridge. The truss-chords 22 may also be rendered taut by a rotatable adjustment of the drum 20 in a direction to wrap the ends of said chords upon the drum, the ratchet-wheel *m* and pawl *m'*

serving to hold the chords from relaxing when properly stretched, it being understood that the braces 23 have previously been rocked down by the stretcher-rope 24, as before explained.

At opposite points on the bed-frame 15 guide-plates *r* are secured, said plates being attached to the outer sides of the bed-frame, near the upper end of the same. The guide-plates *r* loosely contact with the outer sides of the trackway-sections 12 and prevent lateral displacement of the trackway while in transit to a fire or after the trackway has been extended. At the front of the guide-plates *r* two posts *s* are erected at opposite points on the outer sides of the bed-frame 15, and between these posts a pair of rollers *t* are located, said rollers being fixed upon a journal-shaft that at the ends runs in perforations in the posts *s*.

The diameter of the rollers *t* and their relative position above the portion of the trackway resting on the bed-frame permits the rollers to loosely bear upon the trackway, and thus prevent it from rising from the bed-frame at any time. Above the rollers *t* and their shaft another shaft *u'* is journaled in the posts *s*, said shaft having a pulley *u* secured on it near its transverse center and a crank-handle *u²* on one end of the shaft. On the shaft *u'*, near the crank-handle *u²*, a friction-pulley is affixed, upon which a friction-band *u³* is placed, the ends of said band extending down to a pivoted lever *u⁴* on the side of one of the posts *s* and being thereto attached at each side of the pivot of said lever, so that a rocking movement of the lever will tighten or slacken the band *u³*, as may be desired. (See Fig. 1^a.)

On the forward portion of the long trackway-section 12^b a transverse roller-shaft *v* is rotatably sustained by side brackets, a roller *v'*, fixed on the shaft *v*, being provided to coact with the pulley *u* for the support of the draft-rope 25. A truck 26, having four wheels, is mounted upon the trackway portion that rests and is extended beyond the bed-frame 15, flanges on the truck-wheels preventing displacement of the truck. The friction-band brake device hereinbefore described greatly facilitates the safe descent of the truck 26, as it enables an operator to with ease perfectly control the movement of the truck and to arrest it at any point during the downward passage of the same.

Preferably a drum *w* is journaled in projections on the truck-body, so as to extend across the forward end of said body, and at one end of the drum a crank-handle is affixed, by means of which the drum may be rotated by an operator in the truck. One end of the draft-rope 25 is affixed to the drum *w*, and said rope is thence extended forwardly to pass around the roller *v'* from the lower side, as shown in Figs. 1 and 2. From the roller *v'* the draft-rope 25 trends toward the pulley *u* and is wrapped thereon to place one or two

turns of the rope around the pulley, thus adapting the latter to reliably pull on the rope in either direction as the crank-handle *u²* is revolved. From the pulley *u* the draft-rope 25 is forwardly extended to be attached by the other end to a staple or other projection on the rear end of the truck-body. The position of the truck 26 adapts it to traverse the extended trackway when a portion of or the entire trackway is outwardly projected from the reel-frame 11 and given any desired inclination by an adjustment of the bed-frame 15 and prop-frame members 16, such a movement of the truck being readily effected either by rotation of the pulley *u* or the roller *v'*, as may be most convenient in service.

On the free end of the uppermost trackway-section 12^b two stout hooks *x* are secured, which are bent downwardly, said hooks being provided to enable operators of the fire-escape to secure the upper end of the extended trackway upon a window-sill in the upper portion of a building or upon any other projection therefrom, which will greatly aid in support of the trackway while in service.

A tubular flexible conduit 27 is furnished as an adjunct for the fire-escape apparatus and when arranged for use has its open end hung in distended condition from the upper end of the trackway-section 12^b, as indicated in Figs. 2 and 3. The conduit 27 may be produced from strong canvas of such a length and internal capacity as will permit the free passage therethrough of occupants of a burning building at which the trackway is erected, and to enable the free exit of persons who have slid down within the conduit 27 from the lower end of the same this end is held distended and in stable position by a three-legged brace 28, that is affixed upon a mattress 29 and is connected by a rope *y* to the lower end of the conduit, as shown in Fig. 2.

On the rearward portion of the body 10^a a hose-reel 30 is mounted, whereon sections of fire-hose 30^a may be wrapped and carried along with the apparatus. Other sections of fire-hose 30^a are disposed on the upper side of the trackway-sections 12 12^b, so that these hose-sections may be put into service when the trackway is in position at a building for the escape of persons from the building. The lower ends of the fire-hose 30^a, that are exposed forwardly on the vehicle-body 10^a, may be extended to have connection with a fire-engine or other source of water-supply under pressure, and to this end the hose-sections 30^a on the reel 30 may be utilized.

It will be seen in Fig. 3 that the two lines of fire-hose in extended condition on the trackway-sections 12 12^b have branch pipes on their upper ends, which may be manipulated to direct water upon the fire by firemen on the trackway or in the truck 26. From the construction and arrangements of parts it will be evident that when the device in complete form is adjusted so as to wrap the

major portion of the trackway upon the reel-frame 11, as shown in Fig. 1, and draft-animals are connected to the tongue of the vehicle 10 the compact condition of the fire-escape apparatus will permit a rapid transportation of the same to the scene of a fire. The vehicle being halted opposite a point where the apparatus is to be used and wheeled into position so that the upper end of the trackway will face the building it is to rest upon, said trackway may be quickly erected partially or completely, as the exigencies of the situation may require, by a rotatable movement of the reel-frame in the direction of the arrow *z*, (see Figs. 1 and 5,) and when in place the trackway may be stiffened in the manner already described, so as to convert the sections 12 12^b into an inclined roadway having cleats on its surface that afford footholds for those who pass up or down.

If the trackway is located at an open window, it will be available for the safe and rapid descent of occupants of the building, and in case there are invalids, aged persons, or infants to be rescued these may be taken down in the truck 26 or may be slid down through the flexible conduit 27, and to insure the latter from being consumed it may be made of asbestos fabric or of canvas thoroughly saturated with water.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A portable fire-escape, comprising a vehicle, a reel-frame rotatable on the vehicle, a trackway comprising a pliable band that may coil on the reel-frame, a series of trackway-sections secured in sequence on said band, a series of cleats secured on the normally upper side of the pliable band, means to coil the trackway on the reel-frame, and a device to support the trackway extended at different angles of elevation from one end of the vehicle, as specified.

2. A portable fire-escape, comprising a vehicle, a pliable band, trackway-sections secured on the band so that the band may flex between the sections, a rotatably-supported reel-frame on the vehicle whereon the trackway may be wrapped, means for rotating the reel-frame for extension and retraction of the trackway, rockable braces on the jointed trackway-sections, and flexible connections adapted by draft strain to rock said braces and stiffen the joints of the trackway, and also to render said joints flexible, as specified.

3. A portable fire-escape, comprising a wheeled vehicle, a reel-frame having a rotatable support on the wheeled vehicle, a trackway composed of a pliable band, two series of sections held in parallel planes on said pliable band, and devices on the reel-frame and on the trackway-sections adapted to render the trackway rigid at its joints after the extension of said sections from the reel-frame, as specified.

4. In a portable fire-escape, a reel-frame

having a polygonally-spiral periphery and rotatably supported on a vehicle, a normally flexible trackway composed of a pliable band, sections held in sequence on the pliable band to be wrapped upon the reel-frame, and truss-chords on the trackway adapted to stiffen the joints at the ends of the trackway-sections when said trackway is extended and the chords are drawn taut, as specified.

5. In a portable fire-escape, the combination with a vehicle-body, and a rotatably-supported reel-frame thereon, of a normally flexible trackway connected by one end to the reel-frame whereon said trackway may be wrapped, a device for the revoluble movement of the reel-frame for unwrapping or coiling the trackway thereon, and means for supporting the trackway at an incline on the vehicle-body comprising a bed-frame pivoted at its lower end on the vehicle-body, a prop-frame composed of two longitudinally-slotted stanchions pivoted at lower ends on said vehicle-body, a pivot-bar on the bed-frame loosely engaging ends thereof in the slots of the prop-frame members, and means to hold said prop-frame and bed-frame inclined at a desired angle, as specified.

6. In a portable fire-escape, the combination with a vehicle-body, a rotatable reel-frame thereon, a flexible trackway secured by one end to the reel-frame, means for rotating the reel-frame to wrap the trackway thereon, an adjustable bed-frame whereon one end of the trackway is disposed, an upright prop-frame pivoted on the vehicle-body and slidably engaged with the bed-frame, a winch mechanism adapted to rock and hold the prop-frame and a device for reversely rotating the reel-frame for an extension of the trackway beyond the bed-frame, as specified.

7. In a portable fire-escape, the combination with a vehicle-body, a rotatable reel-frame thereon, means for rotating the reel-frame in either direction, and a flexible trackway carried in part by the reel-frame, of a rockable bed-frame on the vehicle-body, whereon one end of the trackway rests, a prop-frame for the bed-frame, and a device on the prop-frame and vehicle-body and engaging the bed-frame for changing the inclination of said bed-frame, as specified.

8. In a portable fire-escape, the combination with a vehicle-body, and a reel-frame having its periphery polygonally spiral, producing a shoulder in said periphery, of a trackway composed of two series of trackway-sections secured at the side edges of a pliable band, one end of the trackway being fastened to the shoulder on the reel-frame, which trackway may be wrapped upon the reel-frame and lie against the sides of its polygonal periphery, as specified.

9. In a portable fire-escape of the character described, a flexible trackway, comprising oblong trackway-sections, a pliable band whereon said sections are arranged and secured in sequence along the side edges thereof, stay-

ropes secured on the upper side of the trackway to reinforce the joints at the ends of the sections, and means for stiffening the said joints when the trackway is extended, as
5 specified.

10. In a portable fire-escape of the character described, a flexible trackway, comprising two spaced series of oblong trackway-sections, dowel and socket connections between the
10 meeting ends of said sections, a pliable band

whereon the trackway-sections are affixed, stay-ropes on the upper side of the trackway, truss-chords having rockable braces, and a stretcher-rope engaging said braces to simultaneously adjust them, as specified.

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