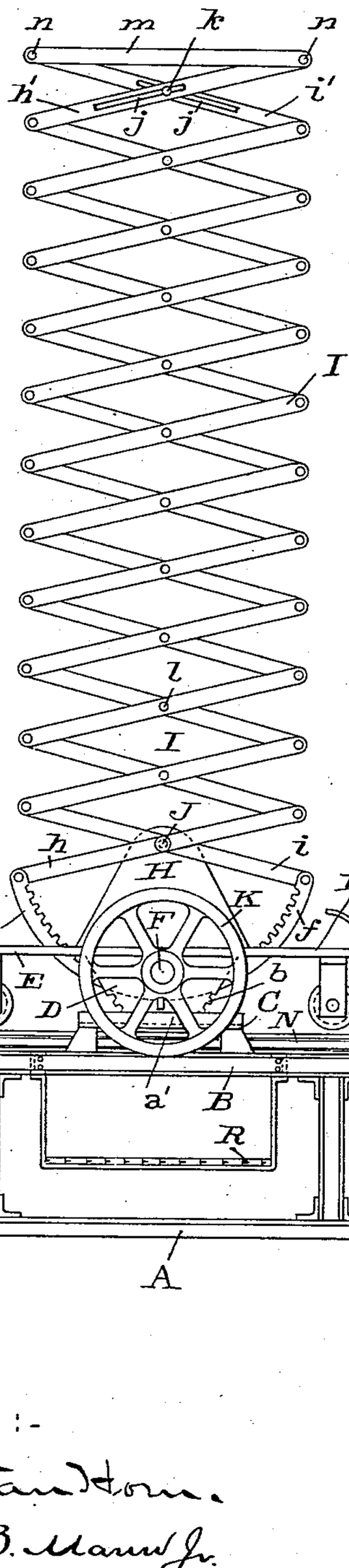
(No Model.) 3 Sheets—Sheet 1.

S. C. KINDIG.

EXTENSION LADDER AND FIRE ESCAPE.

No. 570,730. Patented Nov. 3, 1896.

Fig. 1.



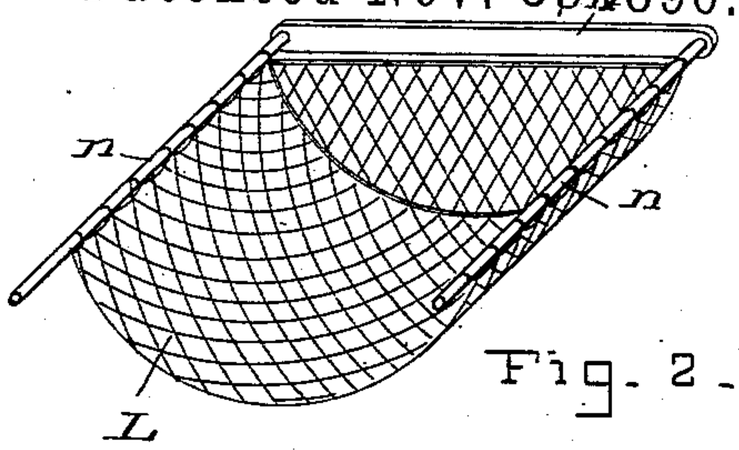
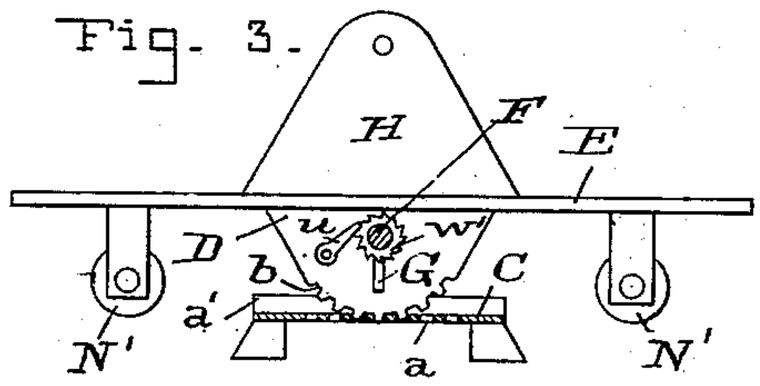


Fig. 2.

Fig. 3.



WITNESSES :-

Lee I. VanHorn.

Charles B. Mann Jr.

INVENTOR :-

Samuel C. Kindig

By Chas B. Mann

ATTORNEY.

(No Model.) 3 Sheets—Sheet 2.

S. C. KINDIG.

EXTENSION LADDER AND FIRE ESCAPE.

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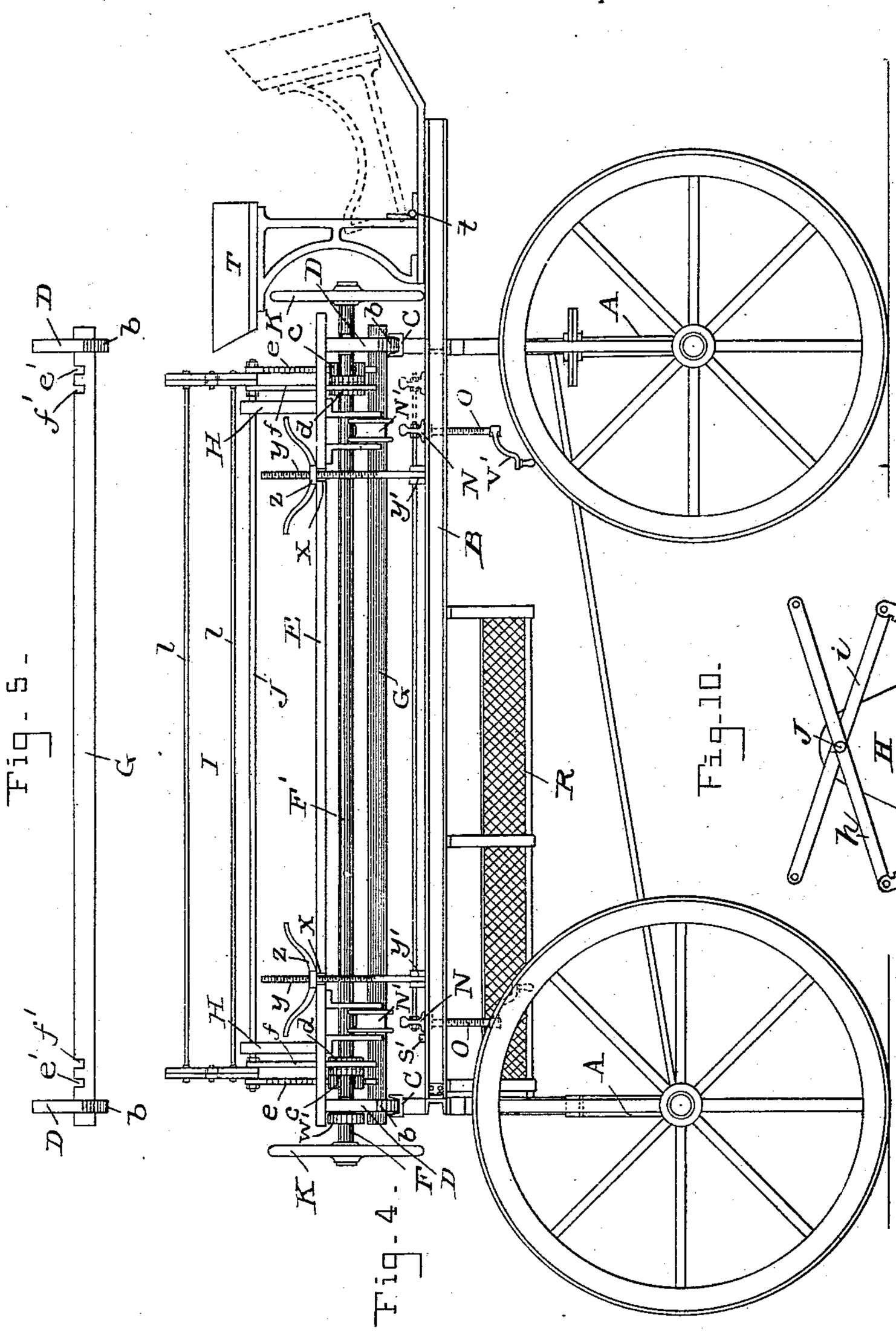

WITNESSES :-

Lee D. Van Horn.

Charles B. Mann Jr.

INVENTOR :—

Samuel C. Kindig

By Chas B. Mann

ATTORNEY.

(No Model.) 3 Sheets—Sheet 3.

S. C. KINDIG.

EXTENSION LADDER AND FIRE ESCAPE.

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Fig. 5.

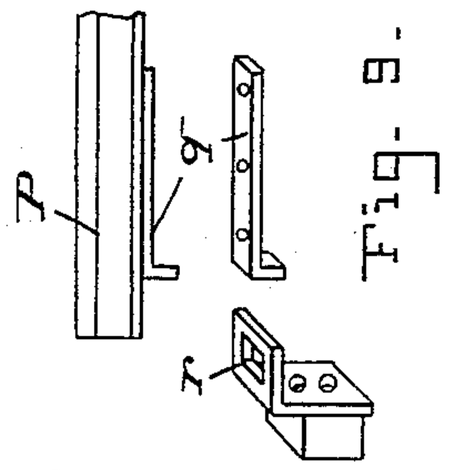


Fig. 6.

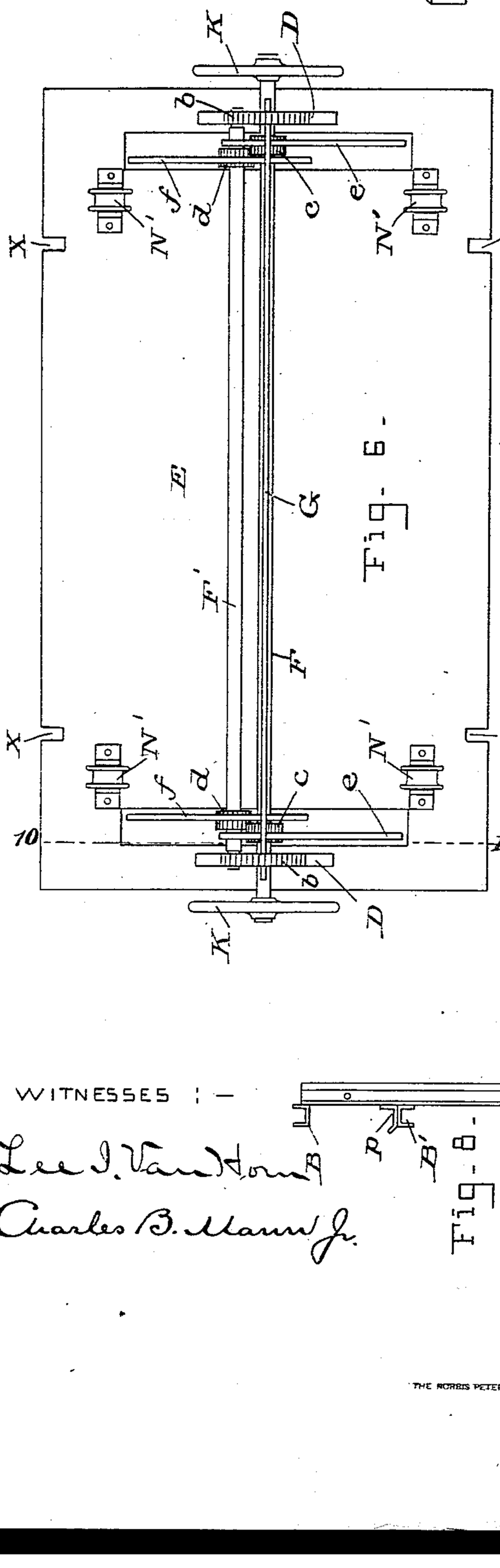


Fig. 7.

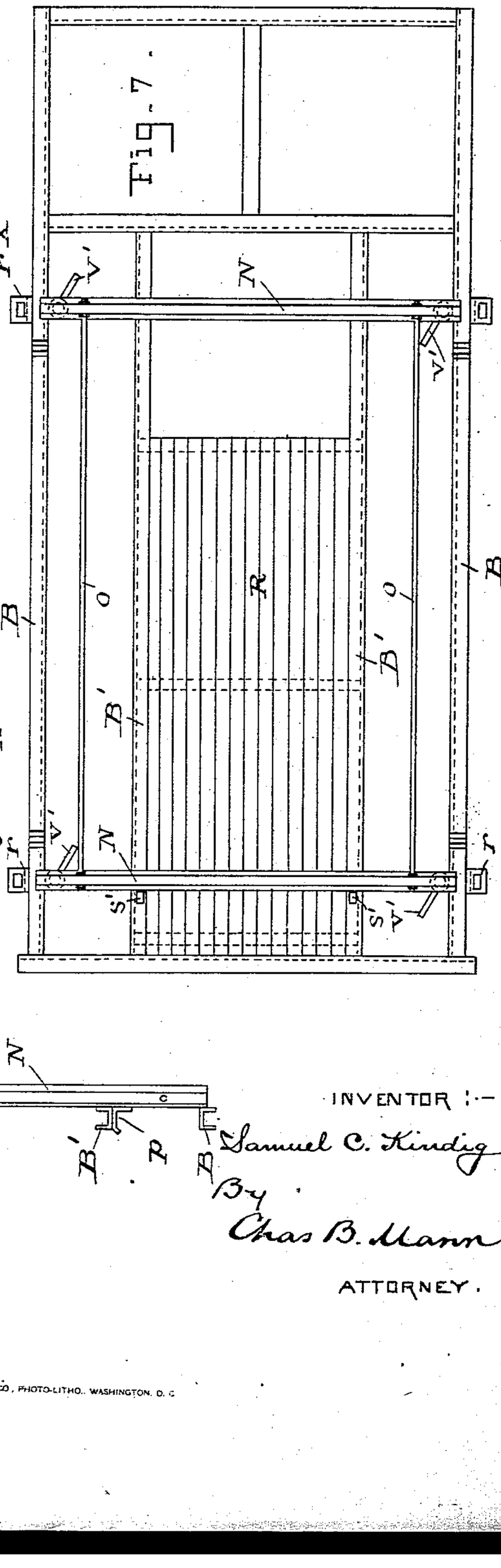
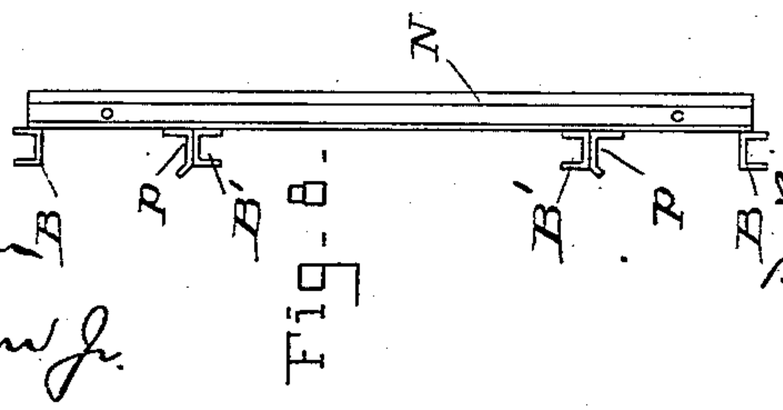


Fig. 8.



WITNESSES :—

Lee I. VanHorn

Charles B. Mann Jr.

INVENTOR :—

Samuel C. Kindig

By

Chas B. Mann

ATTORNEY.

UNITED STATES PATENT OFFICE.

SAMUEL C. KINDIG, OF BALTIMORE, MARYLAND.

EXTENSION-LADDER AND FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 570,730, dated November 3, 1896.

Application filed May 18, 1896. Serial No. 592,042. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. KINDIG, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in an Extension-Ladder and Fire-Escape, of which the following is a specification.

This invention relates to an extension-ladder and fire-escape which employs the mechanical device known as "lazy-tongs."

The object of the invention is to provide an apparatus for fire departments of cities and towns which can be used as an elevating and lowering apparatus, by means of which persons may be rescued from burning buildings, and which can also be used as a tower for supporting water-hose, pipe, and pipeman to facilitate throwing water into a burning building.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of the extension-ladder and truck, and also shows a lateral track which enables the ladder to be transferred from the truck to a position at one side. Fig. 2 shows one end of the flexible platform at the top. Fig. 3 is an end view of the ladder-base and pillow-block. Fig. 4 is a side view of the wagon-truck and part of the ladder. Fig. 5 is a view of the longitudinal bar. Fig. 6 is an inverted plan of the ladder-base and gearing. Fig. 7 is a top plan of the wagon-truck bed or frame. Fig. 8 is a cross-section view of the bed or frame. Fig. 9 shows the construction of hook end of lateral track. Fig. 10 is a cross-section taken near the end and shows the two pinions and related parts.

The letter A designates the axles of the wagon B, the bed or frame of which is preferably made of channel-iron or angle-iron. At each end of the frame is a grooved pillow C, having teeth *a* and serving as a rack-bar, on which rests the rockers D, which support the ladder-base E. This ladder-base may have the form of a frame and on its under side has the two rockers D, one at each end, which have teeth *b*, engaging the teeth on the grooved pillows C. The rockers allow the ladder-base to be tilted sidewise in either direction, the teeth prevent any slippage of the rockers, and the side flanges *a'* on the pillows, which form the groove, prevent any endwise movement or disconnection.

The ladder-base E has on each side two notches *x*, and the bed-frame B has on each side two bolts *y*, pivoted at *y'*. Each bolt carries a lever-nut *z*, and said bolts swing up into the notches. By adjusting the lever-nuts the ladder-base may be tilted to either side and held.

On the under side of the ladder-base is a main shaft F, and parallel with it is a supplemental shaft F'. Both shafts have bearings in the rockers D and both have two gears or pinions, those on the main shaft being designated *c* and those on the supplemental shaft being designated *d*. The pinions of these two shafts are in gear with each other. A longitudinal bar G connects the two rockers D and has position immediately below the main shaft and serves two functions—first, as a tie-bar or stay to hold the two rockers in rigid relation to each other, and, second, as a guide for the four segment rack-bars *e e* and *f f*. This bar has in its upper edge four slots *e' e'* and *f' f'*.

On the upper side of the ladder-base and at each end is a raised bearing H, which directly supports the extensible ladder I. A shaft J extends from one of these bearings to the other, and the four lowermost bars *h h* and *i i* of the lazy-tongs are pivoted on this shaft. Each of these lowermost bars at its outer end has pivoted to it one of the segment-racks above named. The two segment-racks *e* engage with the two pinions *c* on the main shaft and are guided and kept in such engagement by the slots *e'*, and the other two racks *f* engage with the pinions *d* on the supplemental shaft and are guided by the slots *f'*, which also keep the said racks engaged with the pinions. The main shaft F has at each end a crank or hand wheel K, by means of which the said shaft is turned. It will be seen that when the shaft is turned the geared pinions *c d* act on the segment-racks *e f* and they in turn on the lower bars *h i* of the lazy-tongs, whereby the entire series of lazy-tongs constituting the extension-ladder is operated.

Each pair of cross-bars at the rear side of the ladder, which are pivoted together at their center, are united to a corresponding pair at the front side of the ladder by means of a

rod *l*, the end of this rod serving as the center pivots. These pivot-rods *l* thus bind all the lazy-tongs bars at the rear side with all those at the front side. These central pivot-rods *l* are on all except the two uppermost bars at each end.

The two uppermost lazy-tongs bars *h' i'* at one end and *h' i'* at the other end have longitudinal slots *j*, and a floating pivot-bolt *k* is in the slots of the two bars. The ends of the two top bars at both rear and front are connected by a horizontal stretcher-bar *m*, and at each side a rod *n* extends from rear to front. Thus the two stretcher-bars *m* and two side rods *n* constitute a rectangular top frame. (See Fig. 2.) A flexible platform L, of canvas or netting, is hung within this rectangular frame and serves for persons who may be rescued to sit or lie upon when the apparatus is being lowered.

A pawl *u* on the ladder-base engages a ratchet-wheel *w'* on the main shaft, and when the platform or ladder is being elevated this pawl serves to retain it at the elevated position. Such a pawl and ratchet may be at each end of the main shaft.

This extension-ladder may be raised and lowered while in its normal position on the wagon or truck, but I have made provision for shifting the entire ladder and its operating mechanism laterally from the wagon to either side and supporting it on a track.

The construction of the channel-iron frame B is shown in Fig. 7. A crosswise track N rests upon this frame and is movable longitudinally. The two rails N of this track are connected by rods *o*, and at their under side these rails have guide-clips *p*, (see Fig. 8,) which take on opposite sides of the longitudinal bars B' of the frame and leave the track free to slide longitudinally of said bed or frame.

The ladder-base E has on its lower side four grooved rollers N'. When the cross-track N is in position immediately below the rollers, said track may be elevated by suitable mechanism, so as to take into the grooves of the rollers, and by still further elevating the cross-track the ladder-base and all parts attached to it may be lifted bodily and disconnected from the pillows C on the frame B, and the entire weight of said parts will then bear wholly on the rollers N', which rest upon the cross-track N. The ladder-base, ladder, and said attached parts may then be shifted laterally from the wagon, as hereinafter described.

The mechanism to lift the crosswise track N and the ladder-base E, resting on said track, consists of four vertical screws O, each turning in a fixed nut *v*, which is permanently secured to the bed or frame B. Each screw has a crank-handle *v'* at its lower end and a loose head v^2 at its upper end. This top head does not revolve with the screw. Said loose head v^2 at the top of the screw takes up under the end of the cross track-rail N. By turning all four of these screws O the track and ladder-base will be lifted.

A lateral track P is provided to connect with the side bar of the bed B. Two rails P each have at one end on the bottom a hook *q*, which engages an eye or loop *r*, which is attached to the side bar, and thus one end of the lateral rail is supported on the bed of the wagon. A suitable screw-jack Q is employed to support the other end of the lateral rail, and a rod *s* connects the said two lateral track-rails and keeps them in proper relation to each other. When the crosswise track N has been lifted, as already stated, the ends of said track will abut or be coincident with the ends of the lateral track P, and then the ladder-base E, ladder, and their attached parts may be transferred by means of the rollers N' from the wagon to the lateral track, and thereby said parts may be placed close to a building or may be moved toward a building in order to avoid the overhead electric wires.

Provision is made on the bed or frame of the wagon for carrying the lateral track, jacks, and other detachable parts when the wagon is moving. In the present instance this consists of a hanger R, supported under the bed B. This hanger may be seen in Figs. 1 and 4. The detachable parts named may all be placed into said hanger from the rear end of the wagon.

The longitudinal bars B' of the bed or frame have stop-lugs *s'* on top, against which the crosswise track-rail N abuts when said rails are in position immediately below the rollers N'. These stop-lugs insure that the rails N will be properly placed to receive the rollers when the rails are lifted by the screws O. When it is desired to tilt the ladder-base E sidewise, the said track-rails N must be moved along on the frame-bed B toward the front of the wagon to the position indicated by broken lines in Fig. 4. In this position the cross-rails N will not be in the way of the rollers N' when the base and rollers tilt.

The seat T at the front is pivoted at *t*, so as to tilt forward, as indicated by broken lines in Fig. 4, and thus give access to the wheel K for turning and raising the lazy-tongs ladder.

From the foregoing description the various operations of the ladder apparatus will be understood.

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

1. The combination of the wagon bed or frame having at each end a grooved pillow, C, provided with rack-teeth; a ladder-base having rockers which set in said grooved pillows and provided with teeth which engage the said rack-teeth; a lazy-tongs extension-ladder mounted on said ladder-base; and mechanism for operating said ladder, whereby the ladder, the mechanism, and the base may all be tilted sidewise in either direction and the ladder raised and lowered while in the tilted position.

2. The combination of the wagon bed or frame having at each end a grooved pillow, C, provided with rack-teeth; a ladder-base having rockers which set in said grooved pillows and provided with teeth which engage the said rack-teeth, and said base having side notches; and screw-bolts whose ends are pivoted to the bed or frame and swing into said side notches and carry lever-nuts which engage the top surface of the ladder-base.

3. The combination of the ladder-base; two rockers on the under side of said base; a main shaft, F, and a supplemental shaft, F′, both having bearings in said rockers; gear-wheels on said two shafts which engage each other; a longitudinal bar, G, connecting the rockers and having position below said shafts and said bar provided on its top edge with four slots; a lazy-tongs extension-ladder mounted on a shaft, J, upon said base; and four segment rack-bars, each of which has one end pivoted to one of the lowermost bars of the lazy-tongs and each engaging with a different one of said gears on the shafts and fitting and sliding in one of the said top slots on the bar as shown and described.

4. The combination of the lazy-tongs extension-ladder having the two top bars, h', i', at both the front and rear of the ladder provided with longitudinal slots, j, and the said bars which cross each other having a floating pivot-bolt, k, in said slots and connected by a horizontal stretcher-bar, m; the said two stretcher-bars connected by two side rods, n, thereby forming at the top of the ladder a rectangular frame; and a flexible platform hung with said frame, as shown and described.

5. The combination of a wagon bed or frame; a crosswise track on said bed or frame; a ladder-base supported on said frame free of the said crosswise track; a lazy-tongs extension-ladder mounted on said ladder-base; mechanism for operating said ladder; a lateral track connected with said bed or frame, and rollers on the lower side of the ladder-base to take upon the said crosswise track, whereby the ladder-base, ladder and attached parts may be shifted laterally from the ladder bed or frame.

6. The combination of the wagon bed or frame having at each end a grooved pillow, C, provided with rack-teeth; a ladder-base having rockers which set in said grooved pillows and provided with teeth which engage the said rack-teeth; a lazy-tongs extension-ladder mounted on said ladder-base; mechanism for operating said ladder; a cross-track on said bed or frame and movable longitudinally of said bed or frame; rollers on the lower side of the ladder-base to take on said cross-track; and mechanism to elevate the cross-track and lift the ladder-base and disconnect the rockers from the said pillows.

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

SAMUEL C. KINDIG.

Witnesses:
CHARLES B. MANN, Jr.,
LEE I. VAN HORN.