J. RAES.

PORTABLE WIRELESS STATION TOWER.

APPLICATION FILED NOV. 9, 1912. RENEWED DEC. 30, 1913.

1,099,861. Patented June 9, 1914.

5 SHEETS—SHEET 1.

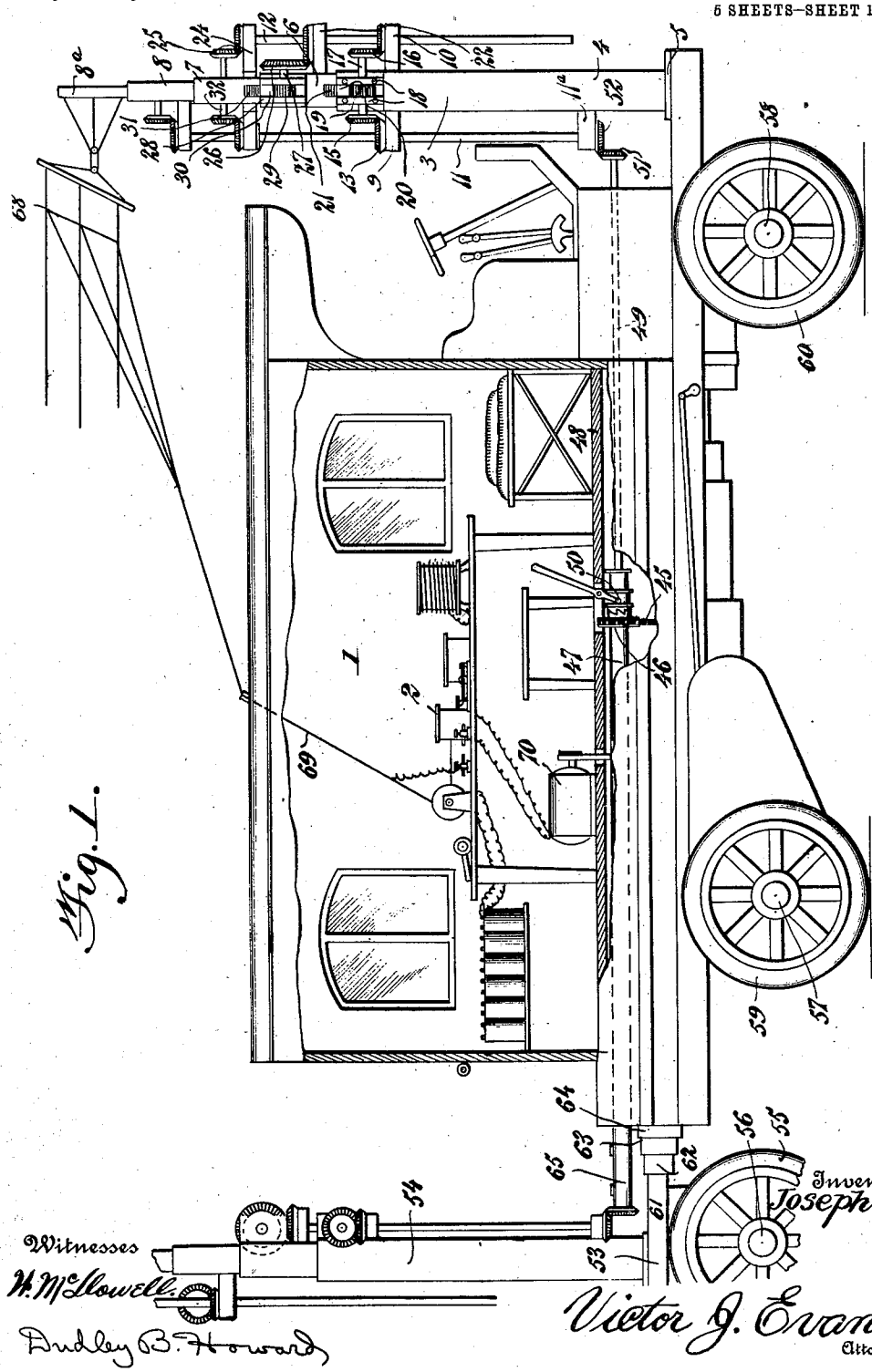


Fig. 1.

Witnesses

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5 SHEETS—SHEET 2.

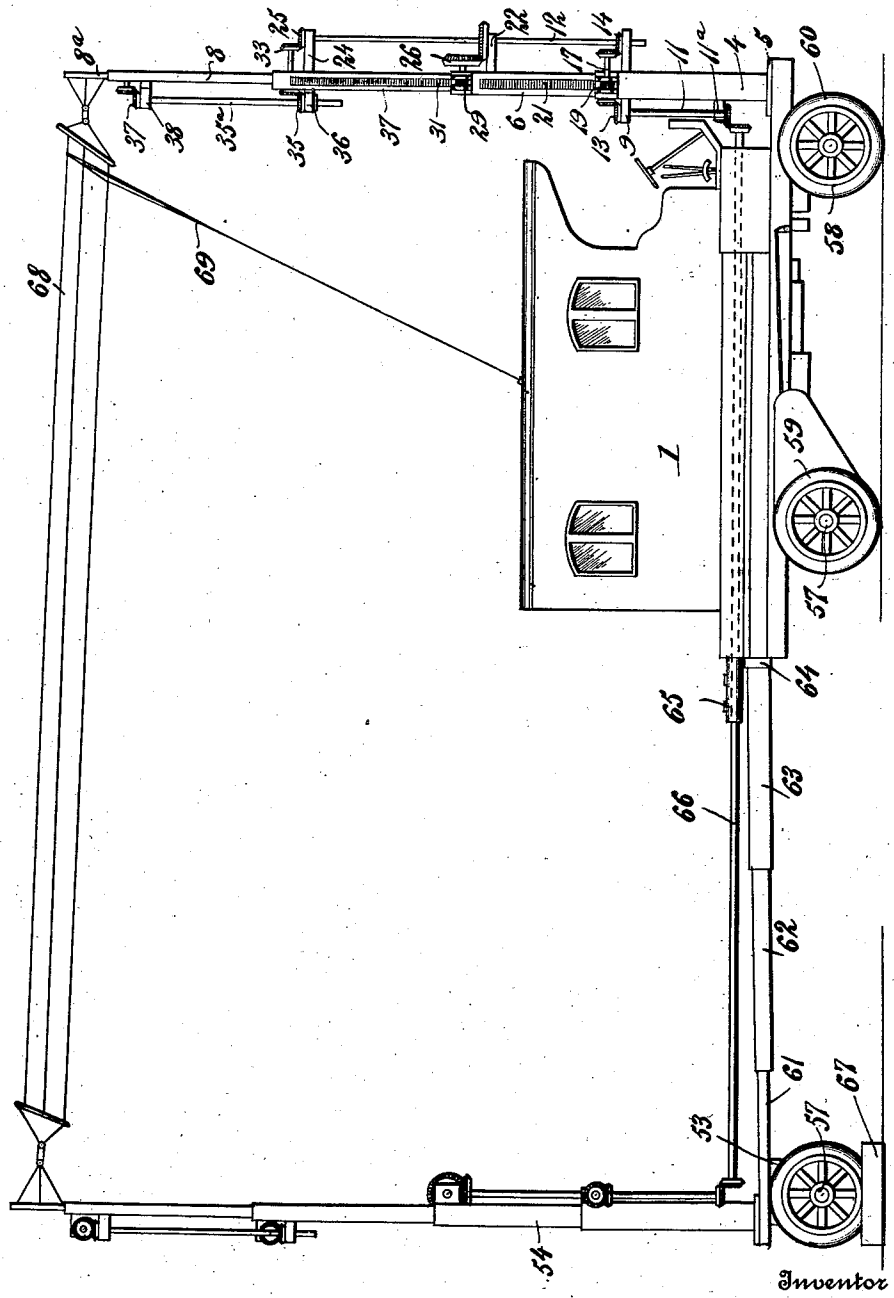


Fig. 2.

Witnesses

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5 SHEETS—SHEET 3.

Fig. 3

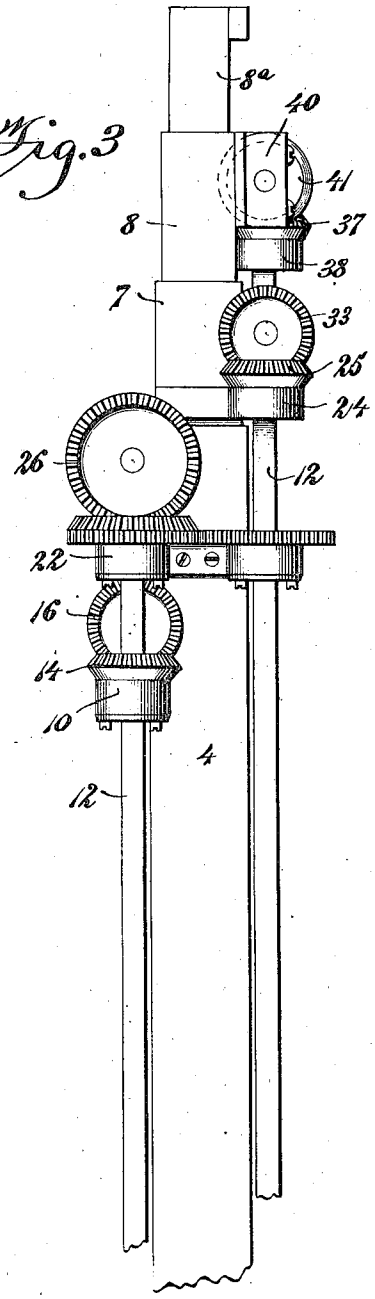
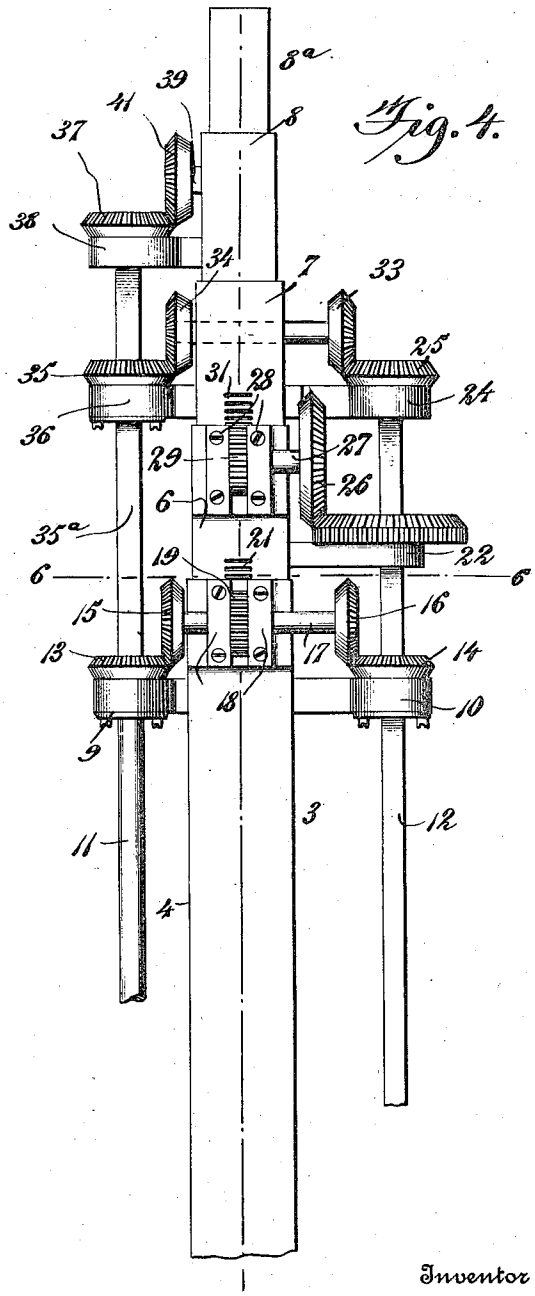


Fig. 4.



Witnesses

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5 SHEETS—SHEET 4.

Fig. 5

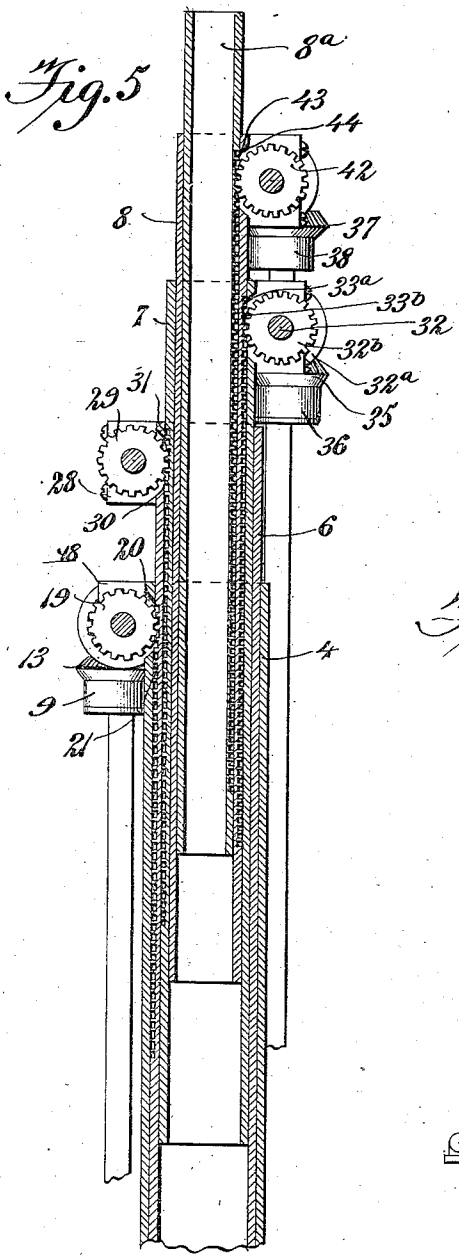


Fig. 6.

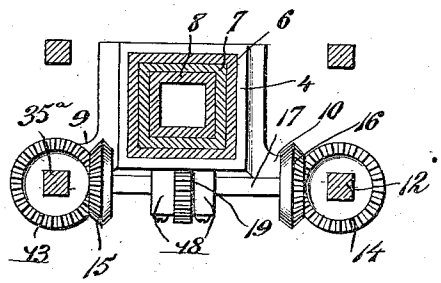
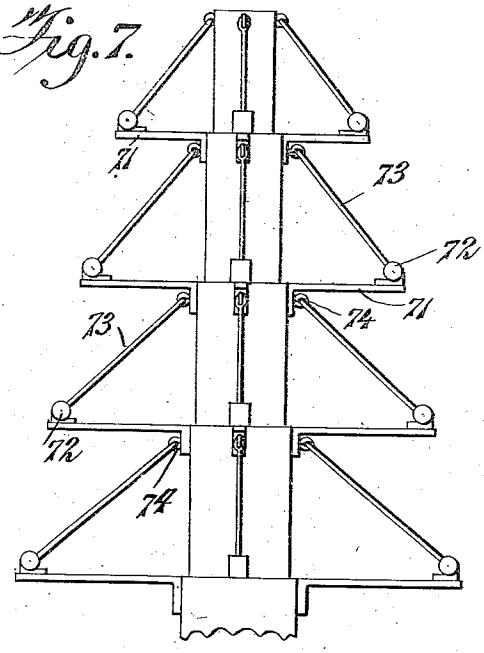


Fig. 7.



Witnesses

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5 SHEETS—SHEET 5.

Fig. 8.

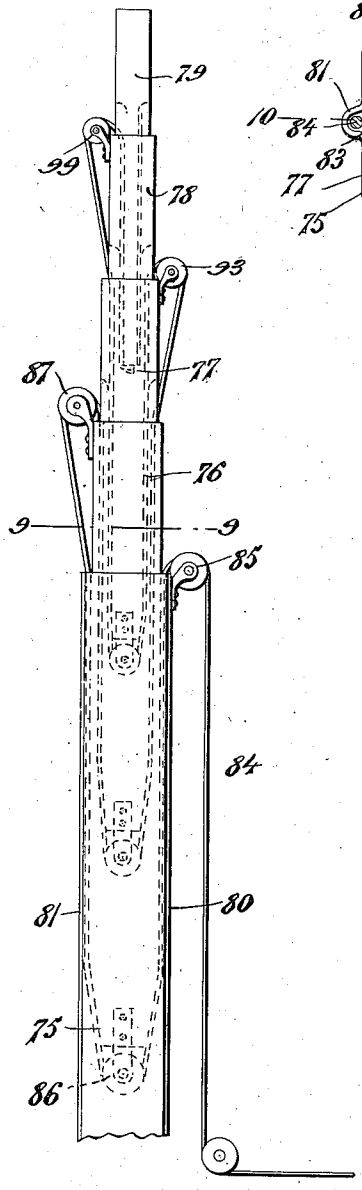


Fig. 9.

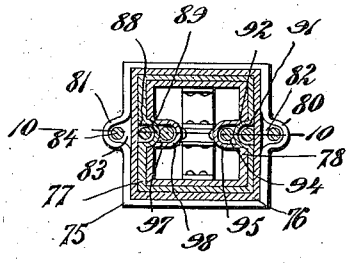
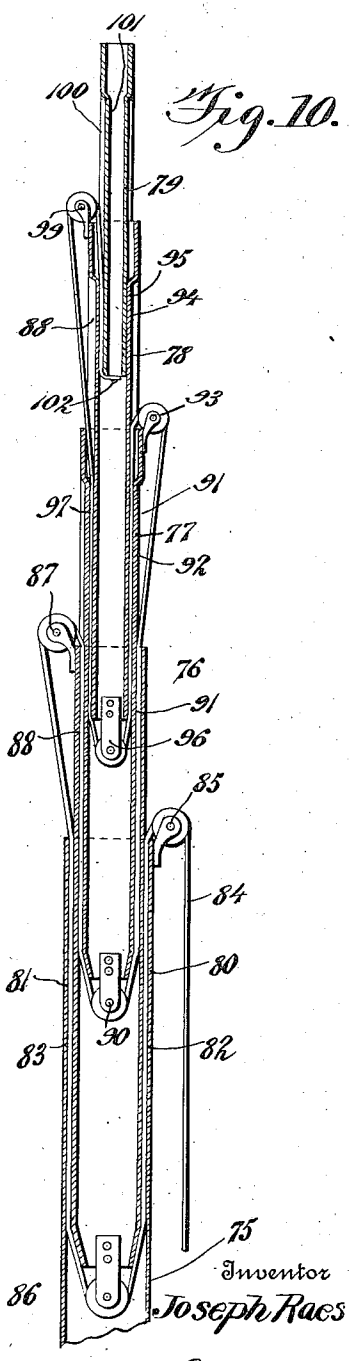


Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH RAES, OF SCHENECTADY, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, OF THIRTEEN-FIFTIETHS TO ELLEN F. WETHERELL AND FOUR TWENTY-FIFTHS TO SUSANNA W. BERRY, BOTH OF LYNN, MASSACHUSETTS, AND FOUR TWENTY-FIFTHS TO JOHN RAES, OF LONG ISLAND CITY, NEW YORK.

PORTABLE-WIRELESS-STATION TOWER.

1,099,861. Specification of Letters Patent. Patented June 9, 1914.

Application filed November 9, 1912, Serial No. 730,442. Renewed December 30, 1913. Serial No. 809,591.

To all whom it may concern:

Be it known that I, JOSEPH RAES, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented new and useful Improvements in Portable-Wireless-Station Towers, of which the following is a specification.

This invention relates to collapsible towers adapted especially for use in a portable wireless telegraph station, the primary object being to provide means for extending the tower sections by the application of a suitable source of power at the base of each tower.

A further object is the provision of means for use in a portable station of the class described for separating the towers to a proper distance and for automatically erecting the said towers immediately upon separation thereof.

A still further object is to provide a device of the class described which will, when its extensible parts are retracted, occupy a comparatively small amount of space so as to be readily moved from place to place.

Another object is the provision of means for strengthening and bracing the tower sections when extended, said means being automatically arranged in proper position upon extension of the said sections.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a fragmentary side elevation of a portable station of the class described showing the towers in closed relation with respect to each other, and tower sections retracted. Fig. 2 is a side elevation of the device showing the towers in separated position and the tower sections in extended position. Fig. 3 is a front elevation of the front tower carried by the truck. Fig. 4 is a side elevation of the same. Fig. 5 is a longitudinal sectional view taken on the line 5—5 of Fig. 4. Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 4. Fig. 7 is a fragmentary elevation showing the parts applied to the collapsible tower sections, the elevating means being omitted. Fig. 8 is a side elevation of a modified form of tower. Fig. 9 is a transverse sectional view taken on the line 9—9 of Fig. 8. Fig. 10 is a longitudinal sectional view taken on the line 10—10 of Fig. 9.

Referring to the drawings, and in particular to Figs. 1 and 2, it will be seen that I have provided a motor vehicle or truck 1 which has a wireless station mounted therein and consisting of the necessary set of instruments 2. An extensible tower 3 is provided on the front part of the truck, its hollow rectangular base section 4 being fixedly secured thereto, as at 5. The other tower sections 6, 7, 8 and 8^a are of similar cross section but are successively smaller in diameter so as to be telescoped within each other, the section 6 being received within the section 4. The tower section 4 is provided adjacent its upper end and at the front and rear sides thereof with a pair of bearing brackets 9 and 10. A vertical shaft 11 has its upper end rotatably mounted in the bracket 9 and its lower end rotatably mounted in a bracket 11^a secured to the section 4 adjacent its lower end, and is supported by the beveled gear 13, which latter is fixedly secured to its upper end and is supported by the bracket 9. A rectangular shaft 12 is rotatably and slidably mounted in an opening provided in the bearing bracket 10 and has a beveled gear 14 loosely mounted upon the same above the bracket 10, its rectangular opening receiving the said shaft and it being supported by the said bracket. A horizontal shaft 17 is rotatably mounted in a pair of spaced bearing brackets 18 attached to the side face of the section 4 and adjacent its upper end, and has the beveled gears 15 and 16 fixedly secured to its opposite ends and adapted for engagement with the gears 13 and 14, respectively. A pinion 19 attached to the shaft 17 between the brackets 18 works through the slot 20 provided in the side walls of the said section 4 and is engageable with the vertically disposed toothed rack 21 provided on the corresponding face of the section 6. The rectangular shaft 12 extends upwardly from the bracket 10 through an opening in the bearing bracket 22, which projects laterally from the section 6, then through a beveled gear 23 supported by said bracket 22, still farther upward through a bearing bracket

24 carried by the mast section or tower section 7 to its point of rigid connection with a supporting beveled gear 25 mounted upon the last-named bracket. A beveled gear 26 fixedly mounted upon a horizontal shaft 27, which latter is rotatably mounted in spaced brackets 28 detachably secured to the section 6, intermeshes with the gear 23, so that upon rotation of the shaft 12, the toothed pinion 29, which is fixedly secured to the shaft 27 between the brackets 28, will be rotated in the slot 30 provided therefor in the section 6 and engaged with the vertically extending tooth rack 31 provided in the side face of the section 7. A connecting shaft 32 is rotatably mounted in spaced bearing brackets 32^a carried by the section 7 adjacent its upper end and on the opposite side thereof from the shaft 27. The said shaft 32 extends horizontally and has a beveled gear 33 attached to its forward end intermeshing with the supporting gear 25, and a beveled gear 34 fixed to its lowermost end intermeshing with a horizontally rotatable beveled gear 35 which is supported by a laterally extending bearing bracket 36 attached to the section 7 opposite to the bracket 24, the said gear 35 being provided with a rectangular opening for the reception of the shaft 35^a, which latter is adapted to rotate the same. A pinion 32^b carried by the shaft 32 extends through a slot 33^a in the section 7 and engages the vertical rack 33^b provided on the section 8. The shaft 35^a is supported by a beveled gear 37, which is rigidly attached to its upper end and is supported by the laterally extending bearing bracket 38 and carried by the uppermost tower section 8. A horizontal shaft 39 mounted in spaced bearing brackets 40 carried by the said section 8 on the same side of the tower as the shaft 32, is provided at its outer end with a beveled gear 41, it intermeshes with the gear 37 and has a pinion 42 fixedly secured between the brackets 40 so as to engage the vertically extending rack 43 carried by the section 9 through the slot 44 provided in the upper portion of the section 8. A hydrocarbon engine, or some such suitable source of power, (not shown) which furnishes the motive power for the truck, is connected by means of a chain 45 with a sprocket wheel 46 carried by an operating sleeve or hollow shaft 47 mounted in suitable bearings within the truck body and beneath the floor 48 thereof. A longitudinally extending shaft 49 is connected at its innermost end by suitable clutch mechanism indicated by the numeral 50 with the said sleeve 47, and has its front or outermost end provided with a beveled gear 51 which intermeshes with a similar gear 52 secured to the projecting lower end of the shaft 11. It will thus be seen that when power is applied to the shaft 49, the shaft 11 will be rotated, the shaft 12 will be rotated likewise through the medium of the shaft 17, and the shaft 35^a will also be rotated through the medium of the shaft 32, causing rotation of the uppermost horizontal shaft 39. The rotation of the horizontal shafts will impart vertical movement to the movable tower sections through the medium of the racks and pinions provided therefor, so as to extend the said sections. A movable, supporting truck 53 carrying the rearmost tower 54 is provided with wheels 55 whose axle 56 is located above the plane of the axles 57 and 58 on the main body truck, which are supported by the wheels 59 and 60, so as not to interfere with the motion of the truck proper when the towers are in their closed position with respect to each other. A forwardly extending connecting pole 61 is attached to the truck 53 and has its forward portion slidably mounted within a telescopic member 62. The member 62 is telescopically received by a second member 63, which latter is also slidably mounted within a housing 64 provided within the truck body. The movable truck 53 is adapted to be moved away from the vehicle body or truck proper so as to separate the tower 54 from the tower 3 by any suitable means therefor, a telescopic connection between the said movable truck and vehicle body just described being extended to the limit in this operation. A rotatable, operating sleeve 65 is mounted in suitable bearings within the vehicle or truck body and is connected in suitable manner to the prime mover. A shaft 66 is slidably mounted within the sleeve 65 and is held against rotation therein by some suitable means, such as a keyed slot, or it may be constructed rectangular in cross section to be received by the rectangular bore provided in the said sleeve. The outer end of the shaft 66 is connected by suitable gears to the mechanism for elevating the sections of the tower 54, which mechanism is identical with the previously described mechanism for operating the tower 3, the tower 54 being merely turned through an angle of 90° so as to slightly change the relative position of the parts of the mechanism carried with relation to the mechanism on the tower 3. When the movable truck 53 is moved in its extended position, it is supported by a block 67 having grooves therein for the reception of the wheels 55. In this position of the movable truck, the shaft 66 has been moved outwardly through the sleeve 65 and is still adapted to be rotated by the prime mover when applied to the sleeve 65 through the medium of suitable clutch mechanism, not shown. The shafts 66 and 49 are adapted to be operated by the said prime mover so as to simultaneously extend the power section. When the towers are in their separated position and their extensible sections

are extended into elevated position, the aerial 68 is located at the sufficient height for a proper operation of the wireless station, the said aerial being connected to the station instruments by means of the lead wire 69. The high tension current for use in connection with the station is generated by means of a dynamo 70 which is connected with the prime mover or source of motive power for the vehicle by some suitable means which may be readily regulated.

In Fig. 7 I have shown the upper end of each section of a collapsible tower provided with a plurality of laterally extending arms 71, which arms project preferably from the sides of the section by which it is carried. A spring retracted drum 72 is attached to the outer end of said arm 71 and carries a bracing cable 73 whose outer end is attached to the inner portion of the arm on the corresponding side of the tower section next above, as at 74. It will thus be seen that when the sections are in closed or collapsed position, the cables 73 will be partially retracted and will lie flat against the upper surface of their respective attaching arms. Upon extension of the tower sections, however, the cables will be extended to their limits, and will effectively brace the said sections, thus tending to resist lateral strains upon the tower due to heavy winds or the like.

In Figs. 8, 9 and 10, I have shown a modified form of tower which may be used in connection with my improved portable station and which may be operated without the use of shafts, gears, and such mechanism. The numeral 75 designates the hollow base section of the tower, which is rectangular in cross section and slidably receives a second section 76. A plurality of successively reduced, telescoping tower sections 77, 78, and 79 are provided. The section 75 is provided in opposite sides with outstruck portions 80 and 81, affording the internal, longitudinal grooves 82 and 83, respectively. The elevating cable 84 which is connected to some source of power, (not shown), such as a drum, passes over a pulley 85 attached to the section 75 at its upper end, down through the groove 82, around a pulley 86 carried by the lower end of the next section 76, then upwardly through the groove 83 in the opposite side of the said section 75, then forwardly to the pulley 87 carried by the upper end of the section 76, where it is turned downwardly through a longitudinal groove 88 provided in the outer face of the corresponding side of the section 77 by the instruck portion 89, around the pulley 90 attached to the lower end of the section 77, up through the groove 91 provided in the opposite side of the section 77 by the instruck portion 92 to the pulley 93 carried by the upper end of the section 77. From here it passes down through the groove 94 provided in the corresponding side of the section 78 by the instruck portion 95, around the pulley 96 carried by the lower end of the section 78, up through the groove 97 provided in the opposite side of the section 78 by the instruck portion 98. It then passes up over the pulley 99 carried by the upper end of the section 78 and downwardly through the groove 100 provided in the topmost section 79 by the instruck portion 101 to its point of attachment 102 with the lower end of the said section. Upon the application of power to the lower end of the cable 84, the tower sections will be drawn into their elevated, extended position by one continuous movement.

It will be seen that I have provided a portable wireless station which is adapted especially for use in military operations, or the like, wherein it is desirable to have a number of wireless stations whose position may be changed at any time with as little consequent delay as possible.

A very desirable feature of the station which I have invented is the fact that it may be operated by a very small number of men, nearly all of the operations being performed by the prime mover of the vehicle itself.

What is claimed is:—

1. A portable wireless station comprising a motor vehicle, a tower carried by said vehicle, a horizontally extensible support provided on said vehicle, a movable truck attached to said support and adapted to be moved into spaced relation with respect to the vehicle, a tower mounted upon said truck, and an aerial connecting the upper extremities of said towers.

2. A portable wireless station comprising a motor vehicle, a tower carried by said vehicle, a horizontally extensible support mounted upon the vehicle, a movable truck including a body portion attached to the extensible support and adapted to be moved into spaced relation with respect to the vehicle and wheels attached to the body and adapted to be supported above the surface over which the vehicle travels, a tower mounted upon said truck, an aerial connecting the upper extremities of said towers, and means engageable with the truck wheels for further supporting the same when in operative position in spaced relation to the vehicle.

3. A portable wireless station comprising a motor vehicle, a tower carried by said vehicle, a horizontally extensible support mounted upon the vehicle, a movable truck including a body portion attached to the extensible support and adapted to be moved into spaced relation with respect to the vehicle and wheels attached to the body and adapted to be supported above the surface

over which the vehicle travels, a tower mounted upon said truck, an aerial connecting the upper extremities of said towers, and a portable supporting member upon which the truck wheels are adapted to rest when in operative position.

4. A portable wireless station comprising a motor vehicle, a tower mounted upon said vehicle and comprising vertically extensible sections, a horizontally extensible support attached to the said vehicle, a movable truck attached to said support, a tower mounted upon said truck and including vertically extensible sections, an aerial connecting the extremities of the said towers, a source of motive power provided upon the vehicle, and means connecting the said source with the sections of the respective towers whereby the same may be operated into their different adjusted positions.

5. A portable wireless station comprising a motor vehicle, a tower mounted upon said vehicle and comprising vertically extensible sections, a horizontally extensible support attached to the said vehicle, a movable truck attached to said support, a tower mounted upon said truck and including vertically extensible sections, an aerial connecting the extremities of the said towers, a source of motive power provided upon the vehicle, and means connecting the said source with the sections of the respective towers whereby the same may be operated simultaneously into their different adjusted positions.

6. A portable wireless station comprising a motor vehicle, a tower mounted upon said vehicle and comprising vertically extensible sections, operating mechanism for the said sections, a source of motive power provided upon said vehicle and adapted to be connected operatively with the said operating mechanism, a horizontally extensible support attached to the vehicle, a movable truck connected with the said support, a second tower mounted upon the said truck and including vertically extensible sections, an aerial connecting the uppermost sections of the said towers, operating mechanism for the said tower sections, a transmission shaft including telescopic sections, one of said sections being connected with the operating mechanism for the sections of the last-named tower, and means by which the other shaft section may be connected with the source of power.

7. A portable wireless station comprising a motor vehicle, a tower mounted upon said vehicle and comprising vertically extensible sections, operating mechanism for the said sections, a source of motive power provided upon said vehicle and adapted to be connected operatively with the said operating mechanism, a horizontally extensible support attached to the vehicle, a movable truck connected with the said support, a second tower mounted upon the said truck and including vertically extensible sections, an aerial connecting the uppermost sections of the said towers, operating mechanism for the said tower sections, a transmission shaft including telescopic sections, one of said sections being connected with the operating mechanism of the sections of the last-named tower, and means by which the other shaft section may be connected with the source power, the said transmission shaft being disposed parallel to and coextensive with the horizontal support.

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

JOSEPH RAES.

Witnesses:
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E. EDMONSTON, Jr.