I. BENJAMINS.

MECHANISM FOR SUPPORTING AND HOISTING LOADS AND SUNDRY ARTICLES.

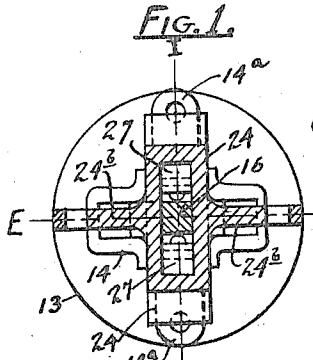
APPLICATION FILED JULY 25, 1916.

1,208,458.

Patented Dec. 12, 1916.

3 SHEETS—SHEET 1.

FIG. 1.



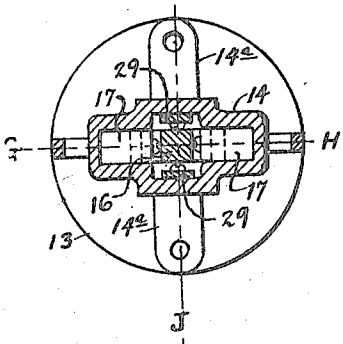


FIG. 2.

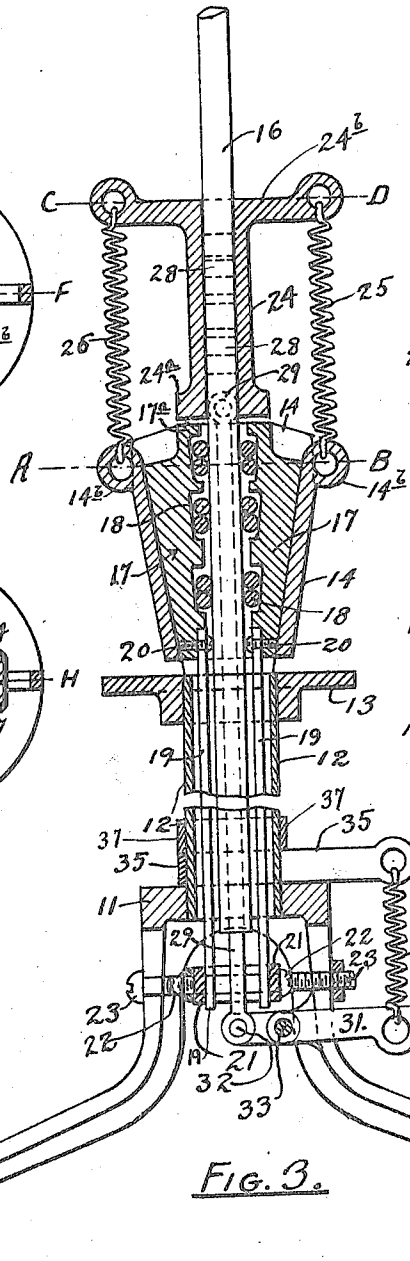
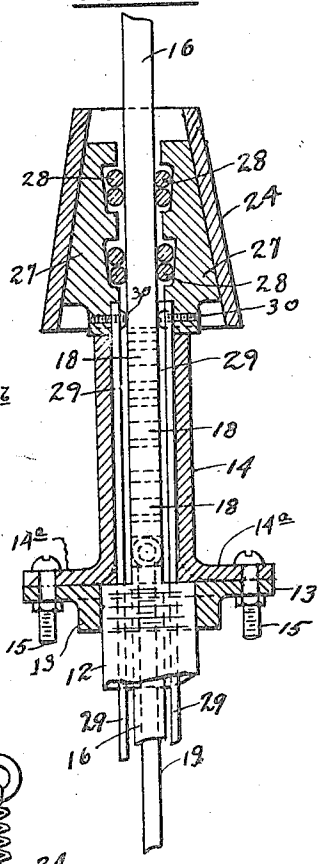


FIG. 3.

FIG. 4.



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3 SHEETS—SHEET 2.

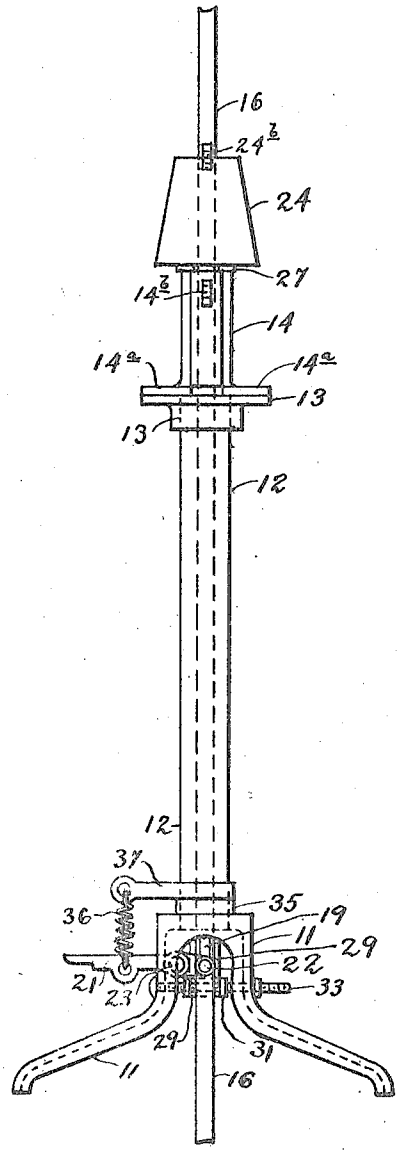


FIG. 5.

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3 SHEETS—SHEET 3.

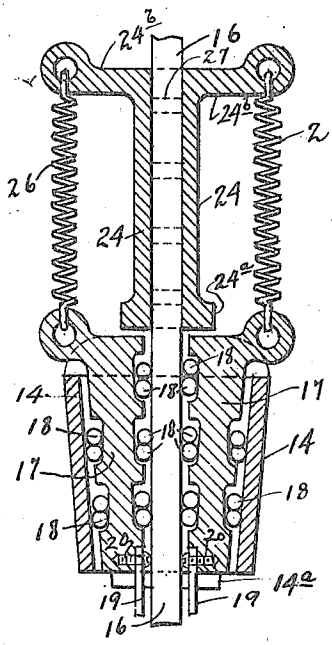


FIG. 6.

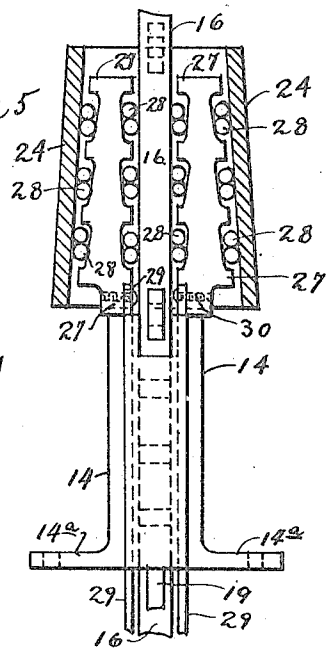
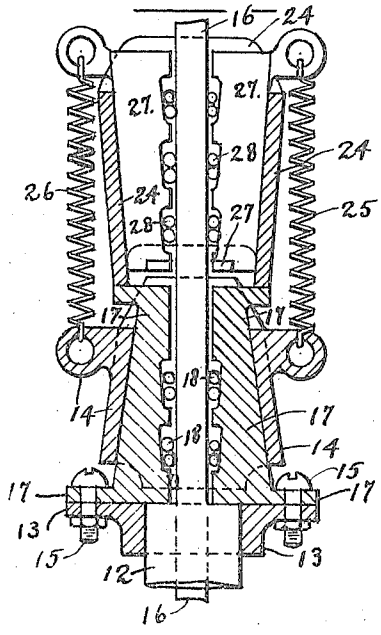
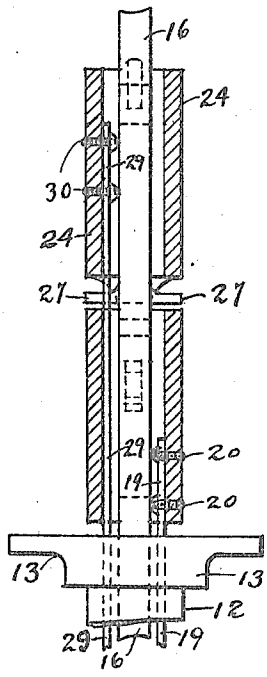


FIG. 7.

FIG. 9.

FIG. 8.





Inventor

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UNITED STATES PATENT OFFICE.

ISRAEL BENJAMINS, OF BATH BEACH, NEW YORK.

MECHANISM FOR SUPPORTING AND HOISTING LOADS AND SUNDRY ARTICLES.

1,208,458. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed July 25, 1916. Serial No. 111,320.

To all whom it may concern:

Be it known that I, ISRAEL BENJAMINS, a citizen of the United States, residing at 1804 Eighty-sixth street, Bath Beach, in the county of Kings and State of New York, have invented a new and useful Mechanism for Supporting and Hoisting Loads and Sundry Articles, of which the following is a specification.

My invention relates to improvements in a mechanism for supporting and hoisting loads, such as cans of ashes from boilers and furnaces, materials, tools and work in machine-shops and factories, cases to be loaded on trucks and cars and artillery ammunition, also sundry articles, such as dress forms, music stands, dumbwaiters, dental chairs, barbers' chairs, draftsmen's and bookkeepers' stools, office chairs, baby chairs and other similar loads and articles, and it consists in the novel features hereinafter described.

The objects of my improvement are: First: To produce a mechanism for supporting and hoisting loads and sundry articles, which contains no racks and pinions or screws of any kind, also no winches and ropes. Second: To have said mechanism adapted to support loads and articles of considerable weight, as well as light articles. Third: To render said mechanism simple, durable, efficient and inexpensive. Fourth: To have said mechanism operative preferably by foot-power. I attain these objects by the mechanism, one form of which is illustrated in the accompanying drawings or by any mechanical equivalent or obvious modification of the same.

In the drawings Figure 1 is a horizontal section on the line C—D of Fig. 3. Fig. 2 is a horizontal section on the line A—B of Fig. 3. Fig. 3 is a vertical section, on the lines E—F of Fig. 1 and G—H of Fig. 2, of one form of my mechanism for supporting and hoisting loads and sundry articles, which mechanism is shown as broken away in the middle part thereof. Fig. 4 is a vertical section on the line I—J of Figs. 1 and 2, omitting the base. Fig. 5 is a side-elevation of my mechanism for supporting and hoisting loads and articles, shown in the same position as in Fig. 4, and omitting the springs 25, 26. Fig. 6 is a vertical section of another form of my mechanism, in the same position as Fig. 3, and Fig. 7 is a view of the same partly in elevation and partly in section, in the same position as Fig. 4; Figs. 6 and 7 show rolling members in raceways on both the front and rear edges of the keys, as hereinafter described. Figs. 8 and 9 are vertical sections of a modification of my mechanism, in the same respective positions as in Figs. 3 and 4, and showing a stationary gripping member, having the form of the movable gripping member of Figs. 3 and 4, and a movable gripping member having the form of the stationary gripping member of Figs. 3 and 4, as hereinafter more fully described.

Similar numerals and letters refer to similar parts throughout the several views.

11 is the base; 12 is a stationary column, which may be secured to the base in any suitable manner. 13 is a flange, secured to the upper end of said column 12, which flange is shown in Fig. 4 as connected to the box 14 of the stationary gripping member by means of the ears 14^a of said box 14 and the bolts 15. 16 is a movable column shown as inclosed by said stationary column 12 through part of the length of said movable column 16, which is out of contact with the inside of said column 12.

17, 17 are movable keys of the stationary gripping member, which keys 17 are shown in Figs. 3 and 8 as having their backs in sliding contact with the inside of the box 14 on the inclined ends thereof; the inner edges of said keys 17 are shown as having grooves or raceways, containing the rolling members 18 on both sides of said column 16, which rolling members may be either cylindrical as shown in Fig. 4, or spherical, if desired. The backs of the grooves or raceways, in which said members 18 are located, are shown as inclined to said column 16, which is shown in Figs. 1 and 2 as square in cross-section, but which may be of any other suitable shape. 19, 19 are trip rods, shown in Figs. 3, 4 and 5 as connected each at its upper end to one of said keys 17 by means of the studs 20 and at its lower end to the lever 21 by means of the pin 22; said lever 21 is shown in Fig. 5 as pivotally connected to the base 11 by means of the pin 23.

24 is the box of the movable gripping member, which is shown in Fig. 3 as extensibly connected to said box 14 by means of the springs 25, 26, shown in Fig. 3 as hooked on at their upper ends to the rings, formed at the ends of the lugs 24^b of said box 24, and at their lower ends to similar rings 14^b

of said box 14. 24^a are bosses, shown in Fig. 3 as formed on the sides of said box 24, at the lower end thereof, which bosses 24^a are adapted to be raised by the heads 17^a of the keys 17, for the purpose hereinafter described.

27, 27 are movable keys of the movable gripping member, which keys are shown in Figs. 4 and 8 as having their backs in sliding contact with the inside of said box 24 on the inclined ends thereof; the inner edges of said keys 27 are shown as having grooves or raceways, similar to those of the keys 17, and rolling members 28 in said grooves or raceways on both sides of said column 16.

29, 29 are connecting rods, shown in Figs. 3, 4 and 5 as secured at their upper ends to said keys 27, by means of the studs 30, and at their lower ends to the lever 31 by means of the pin 32; said lever 31 is shown in Fig. 3 as pivotally connected to the base 11 by means of the pin 33. 34 is a spring, which is shown in Fig. 3 as connecting said lever 31 to a beam 35, secured to the column 12 on the outside thereof. 36 is a similar spring shown in Fig. 5 as connecting the lever 21 to the beam 37, which is similar to the beam 35. The beams 35 and 37 may be connected to said column 12 sufficiently high to allow a suitable length for each of said springs 34 and 36.

The springs 34 and 36 cause the levers 31 and 21 respectively to pull on the connecting rods 29 and tripping rods 19 respectively. Said tripping rods 19 are transmitting the tension to the keys 17 of the stationary gripping member, which keys 17 are thereby jammed in between the inclined ends of the box 14 and the rolling members 18, which are thereby pressed against said column 16; the resistance to sliding of said column 16 between said rolling members 18 is increased as the component of the pressure upon its surface, normally thereto, increases, until this resistance to sliding is greater than the resistance to rolling, which is not rising in proportion to the normal pressure; hence, at a certain intensity of normal pressure, the column 16 will not slide any more, and, as it starts to roll down the members 18 are jammed down the inclined back of the grooves or raceways in the keys, thereby raising the normal pressure on said column 16 to such an intensity that the resistance to rolling becomes greater than the load on said column 16, which load is thereby supported in position; the magnitude of this load is only limited by the resistance of the rolling members 18 to crushing.

The keys 27 of the movable gripping member are shown in Fig. 4 as resting on the box 14 of the stationary gripping member, and the lower end of said box 24 of the movable gripping member is shown in Fig. 3 as not quite touching the heads of the keys 17; the box 24 is then jammed on to the keys 27 by the springs 25, 26, the tension of which springs produces the same effect on the rolling members 28, 28 as the tension of the spring 36 does on the rolling members 18, as above described.

When not interfered with, both gripping members are serving as supports for any load carried by the column 16, the upper end of which is shown as broken away.

When it is desired to raise the column 16, the pedal 31^a of the lever 31 is stepped upon, thereby raising the connecting rods 29, 29 against the tension of the spring 34; the keys 27, shown in Figs. 3 and 4, are thereby moved upwardly, raising with them the box 24 against the tension of the springs 25, 26, also the rolling members 28, 28, and the column 16, which is jammed between them.

It is evident from the drawings that the stationary gripping member will permit the column 16 to pass upward with some friction, the resistance to rolling being reduced as the members 18 are rolled up the inclined surfaces of the raceways, and the resistance to sliding being reduced as the normal pressure is reduced. When the pedal 31^a is relieved of pressure, the spring 36 quickly causes the key 17, shown in Fig. 3, with the rolling members 18 to act as hereinbefore described, and the column 16 is instantly seized by the stationary gripping member and held fast. The spring 34 also acts upon the lever 31, which in turn pulls the connecting rods 29, 29 downwardly, thereby bringing the keys 27, 27 down and on to the upper end of the box 14, on which they resume their position, as shown in Fig. 4; the box 24 is then brought down by its own weight, aided by the tension of the springs 25, 26, which jam said box 24 on to said keys 27, 27, thereby causing them to press on said rolling members 28, 28; said movable gripping member thereby also seizes said column 16 and holds it fast; and the operation of raising the column 16 a short distance may be repeated any desired number of times.

To release the column 16, and to allow it to fall, the pedal of the lever 21 is stepped upon, thereby causing the tripping rods 19 to lift the keys 17, 17, shown in Fig. 3, thereby releasing the rolling members 18 of the stationary gripping member; the heads 17^a of the keys 17, when lifted, also act on the bosses 24^a of the box 24, thereby lifting said box 24 off the keys 27, which are shown in Fig. 3 as kept down by the spring 34, acting through the lever 21 and connecting rods 29; this separation of the box 24 from the keys 27 causes the upper gripping member also to release the column 16.

In Fig. 3 a clearance is shown between the heads of the keys 17 and the bosses 24^a; this clearance is provided to insure the

tightening of said box 24 on said keys 27, irrespective of any imperfection of workmanship and material of said keys 27 and box 24.

To hoist the column 16 a considerable distance, the pedal 31 may be stepped upon a large number of times in succession; in this way a can of ashes may be raised about 15 feet or more, and a dumbwaiter may be raised about 100 feet, if desired; the lower end of the column 16 may then be inclosed in a suitable tube or casing passing through the sub-cellar, if there is any, or located in the ground as a tubular well.

For moving loads short distances horizontally, the base 11 may be placed on suitable wheels or casters; and the distance, through which the column 16 will be raised, will then be limited by the height of the column 12.

To lower the column 16 gradually, a number of light kicks may be given to the pedal 21 in quick succession, thereby starting and stopping the column 16 continually, until it reaches the desired position.

For very heavy loads, the keys 17 and 27 may have grooves or raceways with rolling members 18 and 28 also on the rear edges of said keys, which are in contact with the inclined ends of the boxes 14 and 24 respectively as shown in Figs. 6 and 7.

For very light loads and delicate work the springs 25, 26 may be connected at their lower ends to the keys 17, as shown in Fig. 6, instead of the box 14, thereby reducing the friction of the column 16, when the latter is passed upwardly through the stationary gripping member.

The rolling members 18 and 28 are shown in Figs. 3, 4, 6, 7 and 8 as being placed in pairs in each groove or raceway; the upper rolling member of each pair acts as a rider and tends to keep the lower rolling member in position. For this purpose the upper rolling members may be replaced by riders of any form other than round, if desired; for light loads these upper rolling members may be dispensed with, if desired; and for very light loads all the rolling members may be omitted and the keys 17 and 27 may then have no raceways.

The keys 17 and 27 are shown as acting in pairs in both gripping members; but one of each pair of keys may be omitted, if desired, or it may be made stationary in each gripping member, as in my patent on an "adjustable stand" issued Oct. 14, 1913, No. 1,075,323. The stationary gripping member of this application is an improvement over the mechanism of the said "adjustable stand," and it may be used without the movable gripping member, where it is desired only to support any load or article by the mechanism, without raising the same.

The movable gripping member alone may be used in some cases both for supporting and for raising loads and articles, without the coöperation of the stationary gripping member, if desired.

For light loads the springs 25, 26, may be dispensed with, and the weight of the box 24, shown in Figs. 3 and 4, made to produce the necessary pressure on the keys 27; the springs 25, 26, where used, may also be connected to any stationary part of my mechanism, such as the flange 13, instead of the box 14, if desired. The flange 13 may be dispensed with, if desired, and the box 14 connected direct to the column 12, as in my above patent on an adjustable stand.

The number of grooves or raceways and rolling members of the keys 17 and 27 may be increased for heavier loads and diminished for lighter loads, and the number may even be reduced to one, if desired. The number of keys in each of the gripping members may be increased, if desired, or reduced to one, as above described. The levers 21 and 31 may be employed as hand levers instead of foot levers, as shown in the drawings, and compound levers may be used for heavy loads, instead of the simple levers shown. The connecting rods 29, 29, and the tripping rods 19, 19 are shown as inclosed by the stationary column 12; but they may also be located outside of that column, if desired; the column 12 may also be done away with altogether, as when a suitable tripod or tall base is used in its place. The stationary gripping member may be made of the same form as the movable gripping member, or vice versa, as shown in Figs. 8 and 9. The column 16 may be made hollow, and one or both of the gripping members located inside thereof, if desired, the rolling members bearing against the interior of the column 16.

Many other changes could be made in the details and arrangement of parts of my mechanism for supporting and hoisting loads and sundry articles without departing from the main scope of my invention. I do not, therefore, restrict myself to the form of the design as shown in the drawings, but I intend to include also all mechanical equivalents and obvious modifications of the same.

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. In a mechanism for supporting and hoisting loads and sundry articles a movable column, adapted to carry a load, a stationary gripping member, a movable gripping member, a stationary column adapted to support said stationary gripping member, a base for said stationary column, a foot lever, adapted to actuate each of said gripping members, pivotally connected to said base, a means for connecting said foot levers to said gripping members, and a spring,

connected to each of said foot levers and adapted to return the same to its original position after each displacement thereof.

2. In a mechanism for hoisting loads and sundry articles a movable column adapted to carry a load, a movable gripping member, adapted to hoist said column, a stationary column adapted to support said gripping member, a base for said stationary column, a foot lever adapted to actuate said gripping member, pivotally connected to said base, a means for connecting said foot lever to said gripping member, and a spring connected to said foot lever and adapted to return the same to its original position after each displacement thereof.

3. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a gripping member comprising one or more tapered keys, a means for inclosing said key or keys, one or more raceways in said key or keys, rolling members in said raceways in contact with said column, a means for jamming said key or keys in said inclosing means and a means for releasing said key or keys.

4. In a mechanism for supporting loads and sundry articles a movable column, a gripping member, adapted to support said column, said gripping member comprising one or more tapered keys, a means for inclosing said key or keys, one or more raceways in said key or keys, rolling members in said raceways in contact with said column, riders on said rolling members, said riders being adapted to keep said rolling members in contact with said column, a means for jamming said key or keys in said inclosing means and a means for releasing said key or keys.

5. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a movable gripping member, comprising one or more tapered keys, one or more raceways in said key or keys, rolling members in said raceways, a box inclosing said key or keys, a means for jamming said key or keys in said box and a means for lifting said box, thereby releasing said key or keys.

6. A mechanism for supporting and hoisting loads and sundry articles comprising a movable column, a stationary gripping member, a movable gripping member, one or more tapered keys in each of said gripping members, a means for inclosing said key or keys in each gripping member, raceways in said keys, rolling members in said raceways, in contact with said column, a means for jamming said keys in said inclosing means and a means for releasing said keys.

7. A mechanism for supporting and hoisting loads and sundry articles comprising a movable column, a stationary gripping member, a movable gripping member, a support for said stationary gripping member, one or more tapered keys in each of said gripping members, raceways in said keys, rolling members in said raceways, a box inclosing the key or keys in each of said gripping members, the key or keys of the movable gripping member normally resting on the box of the stationary gripping member, and the keys of said stationary gripping member being adapted to lift the box of said movable gripping member, a means for jamming said keys in said boxes and a means for releasing said keys.

8. A mechanism for supporting and hoisting loads and sundry articles comprising a movable column, a stationary gripping member, a movable gripping member, a support for said stationary gripping member, a tapered key or keys in each of said gripping members, raceways in said keys, rolling members in said raceways, a box inclosing the key or keys in each of said gripping members, a spring for jamming the key or keys of each gripping member against said box and a means for releasing said keys against the force of said springs.

9. In a mechanism for hoisting loads and sundry articles a movable column, a gripping member adapted to hoist said column, said gripping member comprising two or more tapered keys located on opposite sides of said column, raceways in said keys, rolling members in said raceways in contact with said column, a means for inclosing said tapered keys, a means for jamming said tapered keys against said inclosing means and a means for releasing said keys.

10. In a mechanism for hoisting loads and sundry articles a movable column, a gripping member adapted to hoist said column, said gripping member comprising one or more tapered keys on the side or sides of said column and a means for inclosing said key or keys, a spring for jamming said key or keys against said inclosing means and a means for releasing said key or keys.

11. In a mechanism for hoisting loads and sundry articles a movable column, a gripping member adapted to hoist said column, said gripping member comprising one or more tapered keys and a means for inclosing said key or keys, a means for supporting said key or keys in position, a means for jamming said inclosing means on to said key or keys, a spring for bringing said key or keys down onto said supporting means, and a means for releasing said key or keys.

12. In a mechanism for hoisting loads and sundry articles a movable column, a gripping member adapted to hoist said column, said gripping member comprising one or more tapered keys and a means for inclosing said key or keys, a means for supporting said key or keys in position, a spring adapted to jam said inclosing means on to

said key or keys, a spring adapted to bring said key or keys down on to said supporting means, and a means for releasing said key or keys against the tension of said jamming spring.

13. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a gripping member adapted to hoist said column, a means for hoisting said gripping member and a support for said gripping member, said hoisting means being inclosed by said support.

14. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a stationary column, a movable gripping member, one or more connecting rods adapted to hoist said gripping member, said connecting rod or rods being inclosed by said stationary column.

15. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a movable gripping member, adapted to hoist said column, said gripping member comprising one or more tapered keys, a means for inclosing said key or keys, raceways in said key or keys, rolling members in said raceways in contact with said column, riders on said rolling members, said riders being adapted to keep said rolling members in contact with said column, a means for jamming said key or keys in said inclosing means and a means for releasing said key or keys.

16. In a mechanism for supporting loads and sundry articles a movable column, a gripping member adapted to support said column, said gripping member comprising one or more tapered keys, raceways in said key or keys, rolling members in said raceways, a box inclosing said key or keys, a means for jamming said key or keys in said box and a means for lifting said box, thereby releasing said key or keys.

17. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a stationary gripping member adapted to support said column, a movable gripping member adapted to hoist said column, one or more tripping rods adapted to actuate said stationary gripping member, one or more connecting rods, adapted to hoist said movable gripping member, and a support for said stationary gripping member, said support being adapted to inclose said tripping rods and said connecting rods.

18. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a stationary gripping member, a movable gripping member, a tapered key or keys in each of said gripping members, a box inclosing the key or keys in each of said gripping members, a means for jamming said keys in said boxes, a means for relieving the stationary gripping member and a means for simultaneously lifting the box of the movable gripping member, thereby releasing said keys.

19. In a mechanism for supporting and hoisting loads and sundry articles a movable column, a stationary gripping member, a movable gripping member, a support for said stationary gripping member, one or more tapered keys in each of said gripping members, a box inclosing the key or keys in each of said gripping members, the key or keys of said movable gripping member normally resting on the box of the stationary gripping member, a means for jamming the keys in said boxes, a means for releasing the keys of the stationary gripping member and a means for lifting the box of the movable gripping member, thereby releasing the keys inclosed therein.

20. In a mechanism for supporting and hoisting loads and sundry articles, a movable column, a stationary gripping member, a movable gripping member, one or more tapered keys in each of said gripping members, a box inclosing the key or keys in each of said gripping members, a support for the stationary gripping member and for the keys of the movable gripping member, a means for jamming said keys in said boxes, the key or keys of the stationary gripping member being adapted to lift the box of the movable gripping member, thereby releasing the key or keys contained therein, and a means for releasing the keys of the stationary gripping member.

21. In a mechanism for hoisting loads and sundry articles a movable column, a movable gripping member comprising one or more tapered keys, a box inclosing said key or keys, a means for jamming said key or keys in said box and a means for lifting said box, thereby releasing said key or keys.

22. In a mechanism for supporting loads and sundry articles a movable column, a gripping member adapted to support said column, said gripping member comprising one or more tapered keys, a box inclosing said key or keys, a means for jamming said key or keys in said box and a means for lifting said box, thereby releasing said key or keys.

23. In a mechanism for supporting loads and sundry articles a movable column, a gripping member adapted to support said column, said gripping member comprising one or more tapered keys, a means for inclosing said key or keys, raceways in said key or keys on opposite sides thereof, rollers in said raceways in contact with said column and said inclosing means, a means for jamming said key or keys in said inclosing means and a means for releasing said key or keys.

24. In a mechanism for hoisting loads and sundry articles a movable column, a movable gripping member comprising one or

more tapered keys, a means for inclosing said key or keys, raceways in said key or keys on opposite sides thereof, rollers in said raceways in contact with said column and said inclosing means, a means for jamming said key or keys in said inclosing means and a means for releasing said key or keys.

25. A mechanism for supporting and hoisting loads and sundry articles comprising a stationary gripping member, a movable gripping member, a tapered key or keys in each of said gripping members, a means for inclosing said key or keys in each of said gripping members, a means for jamming the key or keys in the inclosing means of the stationary gripping member, a spring or springs for jamming the inclosing means on to the key or keys of said movable gripping member, each of said spring or springs being connected at one end thereof to the key or keys of said stationary gripping member, a means for hoisting the movable gripping member, thereby also releasing the stationary gripping member, and a means for releasing the movable gripping member.

26. In a machine for supporting and hoisting loads and sundry articles a movable column, a stationary gripping member, a movable gripping member, a support for said stationary gripping member, a means for hoisting said movable gripping member and a means for simultaneously releasing both gripping members.

27. In a mechanism for supporting and hoisting loads and sundry articles a movable column, adapted to carry a load, a stationary gripping member, adapted to support said column, a movable gripping member, adapted to support and hoist said column, a means for lifting said movable gripping member and a means for releasing said stationary gripping member, thereby automatically releasing also said movable gripping member.

28. In a mechanism for hoisting loads and sundry articles a movable column adapted to carry a load, a movable gripping member adapted to hoist said column, a means for hoisting said gripping member and a means for automatically returning said gripping member to its lower position after each upward stroke by said lifting means.

29. In a mechanism for hoisting loads and sundry articles a movable column adapted to carry a load, a movable gripping member, adapted to support and hoist said column, a means for initially tightening said gripping member on to said column, a means for lifting said gripping member and a means for releasing said gripping member.

30. In a mechanism for supporting and hoisting loads and sundry articles a movable column adapted to carry a load, a stationary gripping member, adapted to support said column, a movable gripping member, adapted to support and hoist said column, a means for initially tightening each of said gripping members on to said column, a means for lifting said movable gripping member and a means for releasing said gripping members

ISRAEL BENJAMINS.