

June 2, 1970

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3,515,243

LIFT DEVICE

Filed May 6, 1969

3 Sheets-Sheet 1

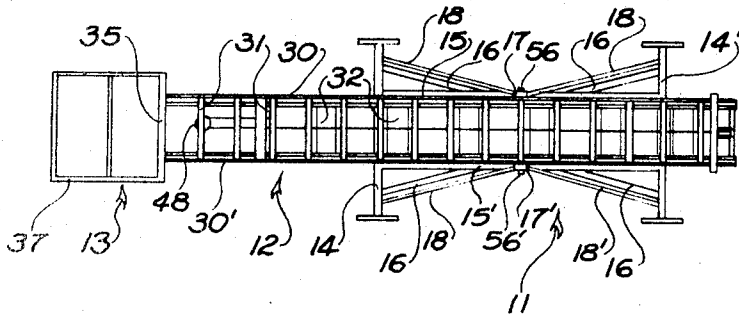


FIG. 1

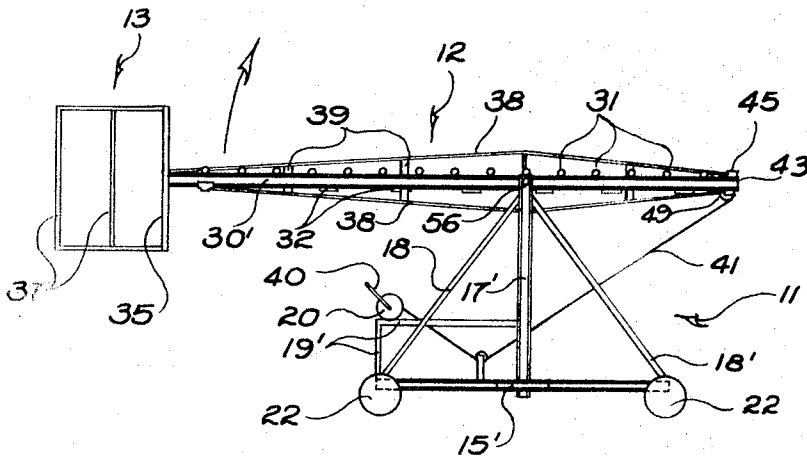


FIG. 2

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3 Sheets-Sheet 2

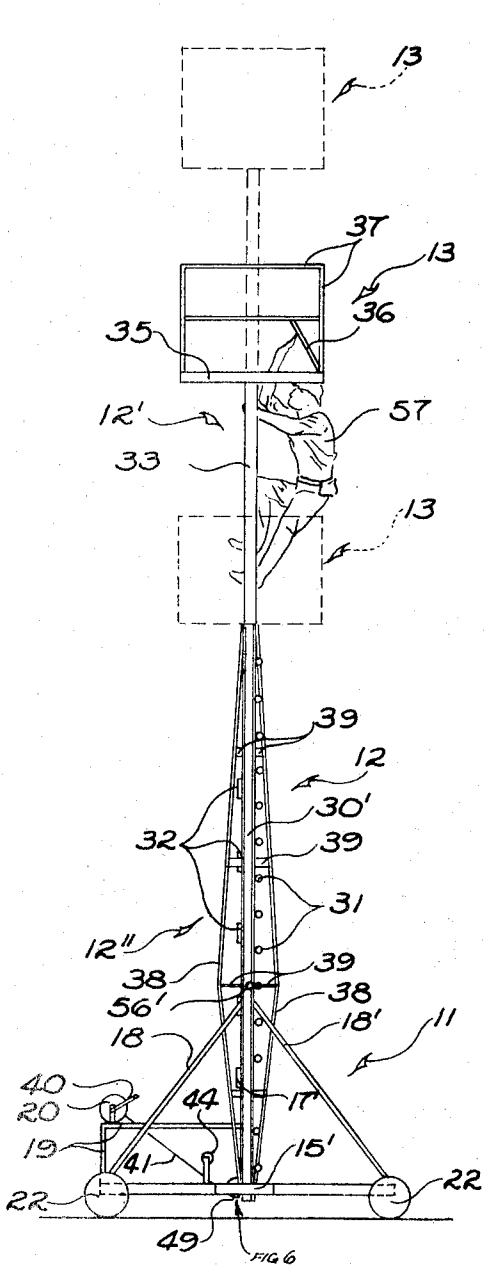


FIG 3

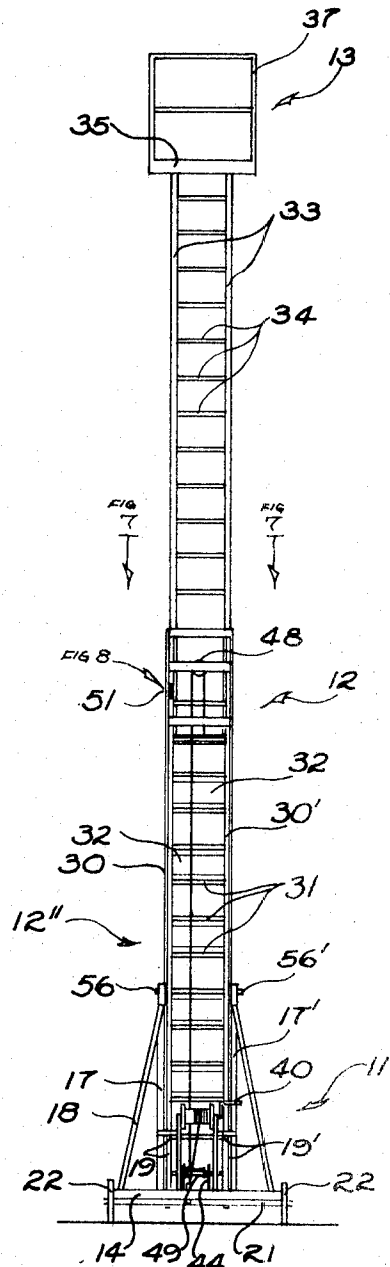


FIG 4

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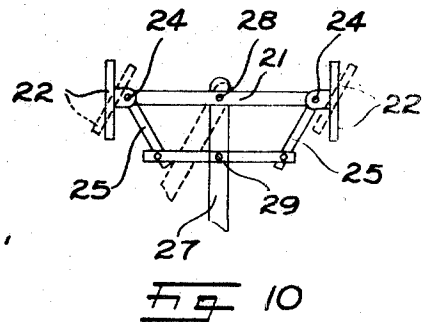
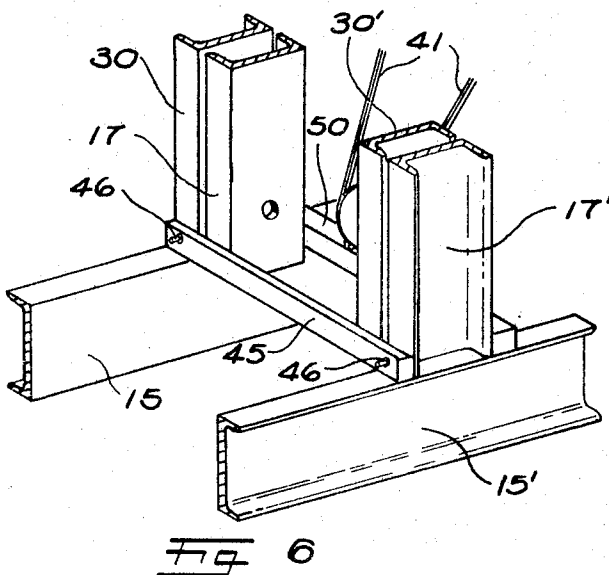
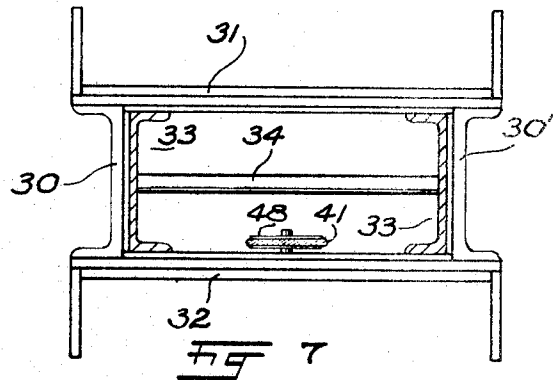
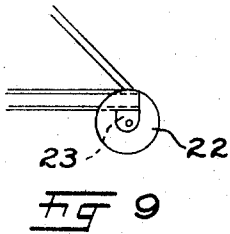
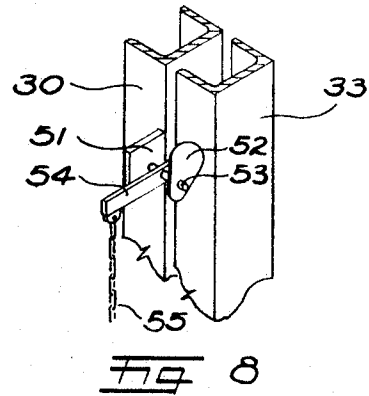
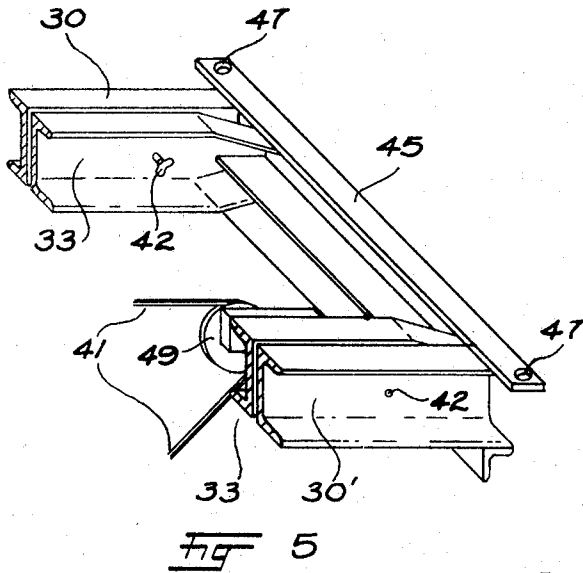
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LIFT DEVICE

Filed May 6, 1969

3 Sheets-Sheet 3



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3,515,243

LIFT DEVICE

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Filed May 6, 1969, Ser. No. 822,154

Int. Cl. E06c 5/04

U.S. Cl. 182—68

8 Claims

ABSTRACT OF THE DISCLOSURE

In abstract, a preferred embodiment of this invention is a frame supported platform which is extensible, when in an upright position, a distance almost double its original height and which will fold, when in retracted position, to a generally horizontal position for easier portability beneath low clearance obstructions.

This invention relates to lift devices and more particularly to foldable, extensible support frames for work platforms.

In the past, various types of extensible worker support means have been developed. This includes devices such as the well known extension ladder and refinements such as landings on the upper end of these type ladders. Other innovations have mounted these ladders on frames so that when they are in the collapsed stage, the ladder and its attached landing can be pivoted to a horizontal position. All of these prior known devices, however, have been unwieldy at best since complicated and time consuming auxiliary support legs must be manually placed in position and adjusted. Also separate motivating means have been needed to swing from horizontal to vertical position and to extend the ladder portion. Additionally, the prior known devices could not be used for work adjacent columns, posts, poles and other vertically disposed members because the base was too massive to allow the extended ladder and its landing to get juxtaposed to said members; and if the base was small enough, then support arms had to be adjusted and placed in position to prevent tipping thereby preventing the device from being readily movable as the work might require.

The present invention has been developed after much research and study into the above mentioned problems and is designed to provide a simple, inexpensive and yet highly efficient lift device with a single motivating means for pivoting the extensible frame and its associated platform from horizontally to vertically disposed positions and to extend said frame to any desired position between completely retracted and completely extended. This single motivating means also is used for retracting the extensible frame and for folding or pivoting the same from vertical to horizontal positions for easy transport below low clearance obstructions. The present invention further allows a worker to be placed in juxtaposed relation to a column or pole and then, as work requires, to be moved away therefrom without requiring any auxiliary support legs thereby eliminating all manual and mechanical adjustments. The present invention also provides a generally square platform centered on the end of an extensible frame to allow a worker to handle work in all directions without being limited by interfering structure as is encountered when using the landing type platform.

It is, therefore, an object of the present invention to provide, in a combination foldable and extensible lift means, a single motivating means for both pivoting and extending the device.

Another object of the present invention is to provide a generally hyperbolic or double trapezoidal shaped chassis for a lift device.

Another object of the present invention is to provide,

on the extended end of an extensible lift device, a generally square platform whereby work may be accomplished in all directions therefrom without restriction.

A further object of the present invention is to provide a fail safe retraction lock for the extensible portion of a foldable and extensible lift device.

An additional object of the present invention is to provide a foldable, extensible lift means having no removable or foldable legs, braces or supports.

Another object of the present invention is to provide a foldable, extensible lift means having a draw bar and steerable wheels whereby the device may be steeringly moved while a worker is on the platform attached to the extended end of the lift means.

Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings which are merely illustrative of the present invention.

In the drawings:

FIG. 1 is a top plan view of the lift device of the present invention when in the folded position;

FIG. 2 is a side elevational view of such device also in folded position;

FIG. 3 is a side elevational view of the lift device when unfolded and showing the positions of the platform when retracted, partially extended, and fully extended;

FIG. 4 is a rear elevational view of the lift device of the present invention in fully extended position;

FIG. 5 is an enlarged perspective view of the lower portion of the extensible part of the device when in the folded position shown in FIGS. 1 and 2;

FIG. 6 is an enlarged perspective view of the lower portion of the extensible section when locked upright;

FIG. 7 is a sectional view taken through lines 7—7 of FIG. 4;

FIG. 8 is an enlarged perspective view of the fail safe locking mechanism for the extensible frame;

FIG. 9 is a steering means for the wheels of the device; and

FIG. 10 is a caster type wheel for use with the device as a modification.

With further reference to the drawings, a support frame indicated generally at **11** operatively engages the extensible frame indicated generally at **12** which has attached thereto a platform indicated generally at **13**.

The support frame **11** includes a pair of parallelly disposed wheel support members **14** and **14'** and a pair of parallelly disposed central members **15** and **15'** fixedly secured between said wheel support members in a perpendicular relationship. Four lower brace members **16** are fixedly secured between the mid-section of the central members and the ends of the wheel support members. Thus it can be seen that the lower portion of the support frame forms a chassis that, when seen in plan view, generally resembles in outline of a pair of trapezoids with their narrower parallel sides juxtaposed to each other.

An axle such as that indicated at **21** may be fixedly secured to each of the wheel support members **14** and **14'** to rotatively mount wheels **22**.

If desired, a steerable wheel mounting at either one or at both ends of the support frame **11** can be accomplished by providing the axle **21** with steering knuckle pivots **24** fixedly secured to steering knuckle arms **25** which in turn are pivotably connected to tie rod **26** whose movement is controlled relative to the axle by tongue **27** which moves in relation to pivots **28** and **29** particularly as seen in FIG. 9.

In place of the axle **21**, a caster mount **23**, such as that shown in FIG. 10, may be functionally mounted at each end of each of the wheel support members so that the support frame may be readily moved in any surface direction.

The lower end of each of a pair of upright members 17 and 17' are fixedly secured to the center of central members 15 and 15' respectively. Extending from the upper portion of upright members 17 and 17' to the respective ends of the wheel support members 14 and 14' are pairs of upper brace members 18 and 18' respectively.

A pair of L-shaped winch support members 19 and 19' extend between and are fixedly secured to the rear wheel support member 14 and the upright members 17 and 17' respectively.

Adjacent the angular portion of the winch support members is mounted a winch 20 whose function will be hereinafter described in detail.

Relative to the extensible and retractable portion 12 of the lift device of the present invention, a pair of parallelly disposed outer members 30 and 30' are provided which are connected along one edge by rungs 31 and the other side by slats 32 to form lower portion 12''. Each of these outer members 30 and 30' are pivotably mounted intermediate their ends on the upper portion of upright members 17 and 17' by pivot pins 56 and 56' respectively. As will be noted from the figures, the location of these pins is approximately one-third of the longitudinal distance from end 43 of frame 12.

To strengthen and brace the lower portion, stay members 38 are attached at their ends on each side of outer members 30 and 30' and are held in spaced relation thereto by a series of spreaders 39.

The area defined by the outer members 30 and 30', the rungs 31 and the slats 32 is adapted to slideably receive the extensible upper portion 12' of the extensible frame 12 and is composed of side members 33 and rungs 34. On one end of this portion of the extensible frame is fixedly secured platform 13 composed of flooring 35, part of which is hinged to form trap door 36, and a guard railing 37 fixedly secured around the periphery of said flooring.

Fixedly secured to the upper end of outer member 30 is a pawl mounting bracket 51. A pivot pin 52 is attached to bracket 51 and pivotably supports pawl 53 which is disposed adjacent one of the slide members 33. An arm is fixedly secured to said pawl and has attached thereto a line or chain 55. The weight of the pawl adjacent member 33 should be greater than the weight of the arm 54 and its associated chain 55 to assure contact with such member. If this weight is not adequate, a spring (not shown) can be added to bias the pawl against member 33. As is obvious from FIG. 8, member 33 is free to slide upwardly relative to member 30, but due to the binding action of the pawl, the reverse is not true.

When the lift device of the present invention is transported, it will ordinarily be in the position shown in FIG. 2. When it is desired to raise the device to an elevated position, the handle 40 of winch 20 is activated to wind in cable 41. Since the two slideable portions 12' and 12'' of the extensible frame 12 are pinned together by means such as bolts or wing nuts 42, as the cable moves in the direction indicated by the arrow in FIG. 2, the extensible unit and its attached platform will move in the direction of the second arrow in FIG. 2. This movement is the result of the cable 41 pulling the end 43 of extensible frame 12 downwardly as it passes under roller 44 and onto the drum portion of the winch 20.

As will be noted by comparing FIGS. 2 and 3, roller 44 is used during the initial swinging movement of the extensible frame 12 from horizontal to vertical positions but the last portion of this travel causes disengagement of cable 41 from such roller due to the lower position of pulley wheel 49. The purpose of this is to allow direct movement of the cable from pulley wheel 49 to the winch 20 without the added friction load of running under roller 44. This roller, of course, is necessary during the pivoting motion of the extensible frame to increase the angle of cable 41 from end 43 to reduce the power necessary to initiate downward movement.

As the winch continues to reel in cable 41, end 43 swings downwardly until the extensible frame 12 is in an upright or vertical position and cross member 45, which is fixedly secured between the two outer members 30 and 30' at end 43, is resting against upright members 17 and 17'. To secure the extensible frame in this upright position, bolts 46 are passed through openings 47 in the cross member 45 and through a portion of each of the uprights.

Once locked in the upright position by bolts 46, bolts 42 which hold the two main portions 12' and 12'' of the extensible frame together can be removed. Since cable 41 has its end secured to the lower portion of the slideable section 12' and passes over pulley wheel 47 mounted on one of the upper slats 32, around lower pulley wheel 48 mounted on cross member 49 secured between the outer members 30 and 30' at the lower end thereof, and onto winch 41, when such winch takes up the cable, the slideable portion of the extensible frame 12 will move upwardly in a manner similar to the extending of extension type ladders.

As the upper portion 12' of frame 12 moves upwardly, pawl 53 freely slides in contactive relation thereto. Once a downwardly movement of said upper portion begins, however, the binding action of the pawl between its adjacent slide member 33 and its pivot 52 will lock the upper and lower portions 12' and 12'' against retractive movement. This acts as a definite safety device should the cable 41 separate or winch 20 fail. It also prevents springiness in the platform 13 since cable will inherently have some stretch in it but the bind of the pawl will have little or no give.

Once the platform 13 has been raised to the desired altitude, the worker 57 climbs the rungs 31 and 34 to a point below the flooring 35. He then raises the trap door 36 and enters the platform 13 about which the railing 37 is disposed. The trap door 36 is then closed and the worker is free to proceed with his assigned duties in an unobstructed platform area.

If it is desired to move the platform, the worker can either come back down the rungs and roll the same to a new position or, in the alternative, a second worker can roll the lift device to the new position while the first worker remains on the platform.

Whenever the job is finished or it is necessary to move the device of the present invention below low obstructions such as through door passages, etc., all that is necessary is for the worker to come down from the elevated platform, to pull release chain 55 to disengage pawl 53, and holding the same in such released position, play out cable 41 from winch 20 to allow the upper portion 12' of the extensible frame to slideably retract within the lower portion 12'' of such frame. This retraction, of course, is due to the weight of the upper portion.

When the platform is in the lowest position shown in dotted lines in FIG. 3, if lower obstructions are encountered, or for other reasons it is desirable to further reduce the height of the device, bolts 46 can be removed to allow pivoting from the vertical to horizontal position while bolts 42 are inserted to maintain the upper and lower portions of the extensible frame in relative fixed relation to each other. The cable 41 on winch 20 can then be further played out thereby allowing the pivoting movement to be accomplished due to the gravitational forces on the platform and upper portion of the extensible frame 12. Once the desired horizontal or slightly below horizontal position is reached for minimum height of the device, winch 20 can be locked thereby locking the relationship between the support frame 11 and the extensible frame 12.

If found necessary, chocks can be used to prevent the support frame 11 from rolling or, in the alternative, brakes of any one of a number of well known types can be installed to accomplish the desired results.

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From the foregoing specification and the drawings, it is obvious that the present invention has the advantage of being inexpensive to manufacture when compared to the prior art devices yet is structurally strong. It is also obvious that the present invention provides a versatile lift device with minimum height when folded, maximum height when extended, and yet is quick and simple to operate.

The terms "upper," "lower," and so forth have been used herein merely for convenience in the foregoing specification to describe the lift device and its parts as oriented in the drawings. It is to be understood, however, that these terms are in no way limiting to the invention since the device may obviously be disposed in different positions when it is used.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive and all changes coming within the meaning and equivalency range are intended to be embraced herein.

What is claimed is:

1. A lift device comprising: a chassis having four corners and being substantially narrower in its central portion than at its ends; wheel means mounted on said chassis in the area adjacent each of said corners whereby said lift device may be easily moved; at least one upright member fixedly secured to the central portion; an extensible and retractable frame composed of slideably connected upper and lower sections; pivot means pivotably connecting the upper portion of said upright member to the central portion of said lower section; and a single motivating means to both pivot said extensible frame from a generally horizontal to a generally vertical position about said pivot means and to slideably extend the length of said frame whereby an easily portable yet stable life device is provided which can be used juxtaposed to column type structures.

2. The device of claim 1 wherein at least two of the wheel means are steerable.

3. The device of claim 1 wherein at least two of the wheels are caster type.

4. The device of claim 1 wherein the pivot means pivotably connects the upper portion of said upright member to the lower section of said frame at a point approximately one-third of the longitudinal distance from one end of such section.

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5. The device of claim 1 wherein a platform is fixedly secured to one end of said upper section.

6. The device of claim 1 wherein a fail safe locking means is provided between the upper and lower sections of said frame when disposed in a vertical position to prevent retractive sliding motion between such sections.

7. The device of claim 5 wherein the locking means is a pawl pivotably connected to said lower section and biasingly resting against a portion of said upper section.

8. A lift device comprising: an elongated chassis having four corners and being substantially narrower in its mid portion than at its ends; wheel means mounted at each corner, at least two of which are directionally adjustable whereby said lift device may be easily moved; at least one upright member fixedly secured to the central portion; an extensible frame composed of slideably connected upper and lower sections; uni-directional, releasable locking means operatively connected between said upper and said lower portions whereby said extensible frame may be readily extended but not unintentionally retracted; pin means pivotably connecting the upper portion of said upright member to the lower section of said frame at a point approximately one-third of the longitudinal distance from one end of said section; a single motivating means to both pivot said extensible frame from a generally horizontal position to a generally vertical position about said pin means and to slideably extend the length of said frame whereby an easily operable and portable lift device of substantial stability is provided which can be used juxtaposed to column type structures.

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REINALDO P. MACHADO, Primary Examiner

U.S. Cl. X.R.

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