United States Patent [19]

Carriere

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[54] **MOBILE SIDE-REACHING LIFTER**

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[22] Filed: **Mar. 6, 1974**

[21] Appl. No.: **448,467**

Related U.S. Application Data

[63] Continuation of Ser. No. 148,468, June 1, 1971, abandoned.

[52] **U.S. Cl.** **214/770;** 214/142

[51] **Int. Cl.²** **B66F 9/16**

[58] **Field of Search** ..... 214/770, 130 R, 131, 142, 214/77 R

[56] **References Cited**

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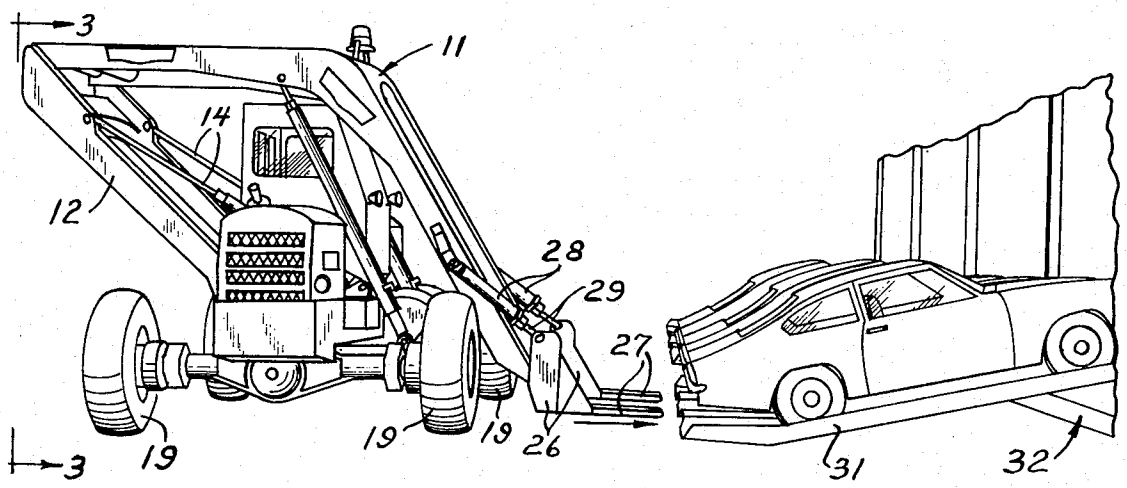
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[57] **ABSTRACT**

Lifting forks, or other material handling implement, can be hydraulically extended and retracted from the side of a vehicle. According to one valuable use, the vehicle moves along the length of a swing-panel automobile-carrying rail car, and at successive stops uses its reaching-lifting action to raise or lower a panel loaded with automobiles. The boom and reaching structure are approximately centered between the forward and rearward axles to nest between the wheels. This gives close-in ground-level operation, and divides the load approximately equally between the two axles. A counterweight is shifted during reaching for increasing its effectiveness.

6 Claims, 3 Drawing Figures



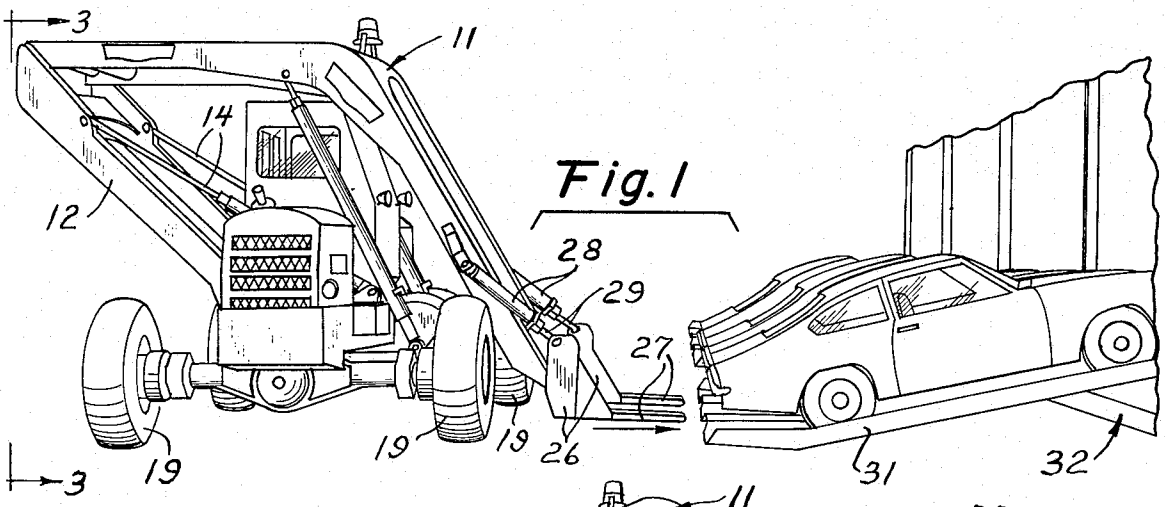


Fig. 1

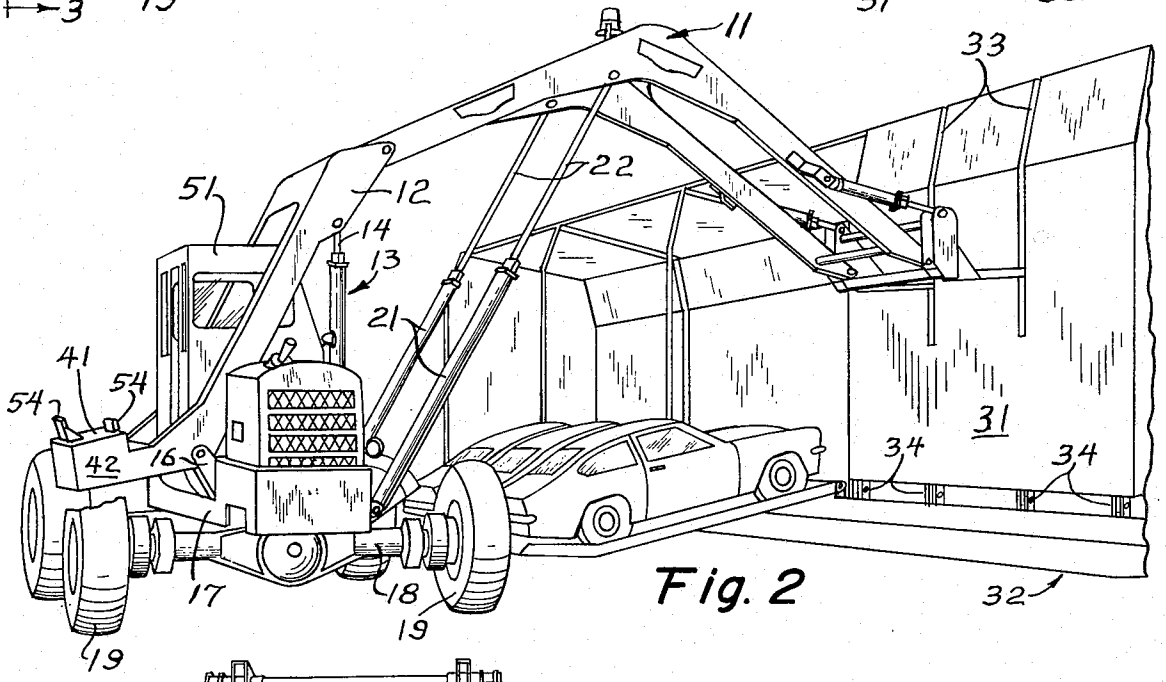


Fig. 2

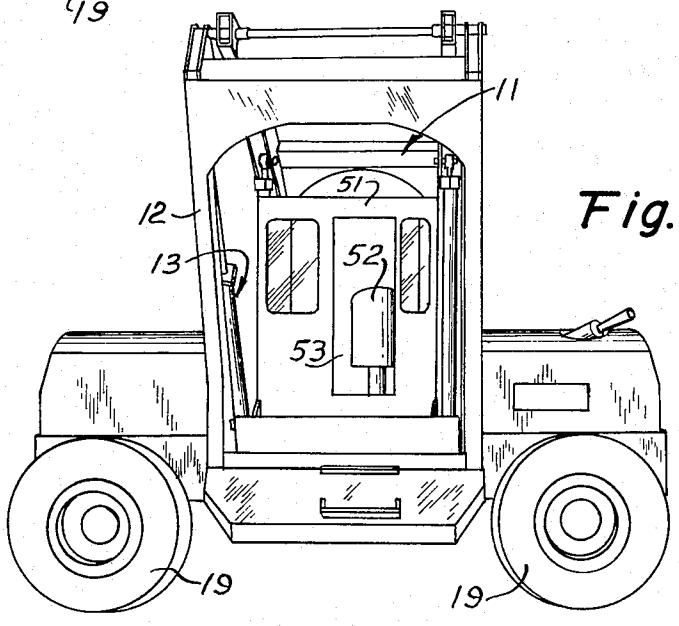


Fig. 3

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MOBILE SIDE-REACHING LIFTER

This is a continuation of application Ser. No. 148,468 filed June 1, 1971, abandoned upon the filing hereof.

INTRODUCTION

The invention of which this disclosure is offered for public dissemination in the event that adequate patent protection is available relates to an important departure from the field of mobile lifters (represented by front-end loaders, front-end reaching loaders, and fork-lift trucks). The departure is in mounting reaching-type material handling apparatus to perform its full operation in a sideward direction from a position centered between the front and rear axles of the vehicle. Forward movement of the vehicle is not used for entering the implement under the load, this being accomplished entirely by the sidewise reaching.

Sideward operation has some outstanding advantages. With no need to face the vehicle toward the load, time spent maneuvering the vehicle is often greatly reduced, and the space required for the maneuvering is also reduced.

There has been a class of reaching-loader superstructures which could have been adapted for sidewise loading, had anyone thought of the right way to use them and of the advantages in doing so. An example (which is the type here illustrated) is the super-structure of the now famous machine sold under the trademark CARY-LIFT by the owner of the present application, operating under LaTendresse U.S. Pat. No. 2,788,139. In this class of machine the forks or the like are carried at the front end of a boom which is pivoted to the top end of a reaching link. One set of hydraulic cylinders raises and lowers the boom, and another set of hydraulic cylinders swings the reaching link back and forth about its reaching axis at the lower end of the reaching link. This type of reaching action has been used very extensively for front end operations. In one form it has been sold with partial sidewise operation, this form being a swinging form, mounting the reaching mechanism on a turntable approximately over the front axle. with this swinging reaching action, the load was usually picked up in the front position similarly to the ordinary front end reaching loaders, but could be swung to the side for some types of operation. The location between the front wheels tended to restrict the utility of this machine by inhibiting ground level sideways operation. Side reach was used mainly for dumping.

According to the present invention, great advantages are achieved by giving up the front end type of operation entirely and mounting the reaching mechanism midway between the axles of the vehicle, for sideways reaching only, this location, and the adequate spacing between the front and rear axles, making practicable a reaching action at ground level. This location, preferably with suitable counterweighting, and an extra wide wheel base, also gives good lateral stability. Any sidewise load-handling operation tends to cause tipping of the vehicle, and without good lateral stability, only relatively light loads could be handled at the sides, especially with a reaching action.

Additional advantages and objects of the invention will be apparent from the following description and from the drawings.

DESIGNATION OF FIGURES

FIG. 1 is a pictorial view of one form of the invention chosen for illustration, illustrated in one of its most interesting uses. An automobile-carrying freight car has swinging panels on which the automobiles can be driven. The present invention is excellent for swinging the panels up or down.

FIG. 2 is a pictorial view of the structure shown in FIG. 1 with the side-reaching lifter swinging a panel.

FIG. 3 is a pictorial side view of the reaching lifter of FIGS. 1 and 2.

INTENT CLAUSE

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

GENERAL DESCRIPTION OF THE INVENTION

The general nature of the invention is made reasonably clear merely by comparing the position of the parts of the loader in FIGS. 1 and 2. In FIG. 1 the boom 11 has been retracted and lowered, while in FIG. 2 it has been reached and raised. The retracting and reaching is accomplished by a reaching link 12 and a pair of reaching cylinder units 13 each of which operates by extending its piston rod 14. The reaching link 12 is pivoted near its bottom end to brackets 16 upstanding from the vehicle frame 17 which is supported by axles 18 and wheels 19.

The boom 11 is pivoted to the reaching link 12 near the top end of the reaching link and the rear end of the boom 11 and is raised and lowered by cylinder units 21 each of which operates by projecting a piston rod 22. The cylinders of cylinder units 21 are pivoted to the chasis frame 17 and the piston rods are pivoted to the boom 11, the locations of the pivots being such that cylinder units 21 are generally parallel to reaching link 12, swinging as it swings.

At the forward end of the boom 11 a load handling unit 26 is pivoted to the booms. In the illustrated form, the load handling unit has forwardly projecting arms 27 commonly called forks. The load handling unit 26 and its forks 27 can be tilted with respect to the boom by one or more cylinders or cylinder units 28 each of which operates a piston 29.

All of the cylinder units referred to are preferably double acting. It might seem that cylinders 21 could be single acting, but as a matter of conventional safety it is better for them to be double acting and provided with safety valves which will not let the boom be lowered except when pressure hydraulic fluid is supplied to the upper ends of these cylinders.

With the motor in the position of FIG. 1, having its forks 27 at ground level and fully retracted, hydraulic fluid can be supplied to cylinder units 13 to cause a slight reaching forward of the forks 27 so that they pass under loading panel 31 of freight car 32 on which three automobiles have been driven and fully secured. Ideally, the underside of panel 31 is provided with grooves 33 which facilitate the entry of forks 27 under the panel 31, even though the panel 31 at its free edge rests di-

rectly on the ground or pavement so that no ramp is needed for the cars to be driven onto the panels.

With the forks **27** projecting under the panel **31**, hydraulic fluid can be supplied as required to cylinders **13** and **21** to swing panels **31** about their pivotal supports **34** so that the panel is raised and closed. When all of the panels on the two sides of the freight car have thus been raised and closed, the cars within the freight car are thoroughly protected against tampering during transit.

As seen in FIG. **1**, the retracted boom lies between the front and rear wheels **19**. This nesting action can be quite important in providing the desired length of reaching action without losing lateral stability. Lateral stability is further improved by having an exceptionally wide "gauge", the lateral distance between the wheels **19** on one axle being relatively great. This is true as to both axles, of course. Heretofore comparable stability has usually required outriggers which would be pressed down hydraulically outside of the wheels. Avoiding outriggers is desirable because they would reduce the overall speed of operation. With the wide wheel base or guage, the vehicle can be driven along the length of the freight car, stop for each panel when the forks **27** are aligned with the under-slots **33**, and the panel lifting operation begun without any delay for operation of outriggers.

Another aid toward stability is the provision of a heavy counterweight **41** carried by an outwardly projecting portion **42** forming an extension of the reaching link **12** and so located that as reaching link **12** swings in the reaching direction the counterweight will swing in the opposite direction to become more effective.

With rubber-tired wheels **19** as illustrated, the pair on at least one axle must be steerable. Where no use is contemplated other than that illustrated, some owners may prefer to substitute flanged wheels and run the vehicle on tracks.

The operator's cab **51** is perhaps best seen in FIG. **2**. The driver's seat **52** therein preferably faces sidewise, although it can swivel if extensive vehicle movement is contemplated. Access to cab **51** may be through a rear doorway **53**. When the reach link **12** is retracted, steps **54** are in a convenient position for the operator to climb into the doorway **53**.

As is seen more clearly in FIG. **3** the superstructure comprising the reach link **12** and the boom **11** is centered between the two axles of the vehicle so that its load is borne equally by front and rear axles. This desirable location is made possible by the fact that the loading and reaching action are at the side of the vehicle exclusively, there being no front end loading by this vehicle. This fact also does away with any turntable, and with various problems accompanying turntables.

ACHIEVEMENT

The side-reaching vehicle of this invention opens the way for many uses for which prior loaders or material handling vehicles were ill-suited or totally unusable. For raising successive automobile-carrying panels as illustrated, maneuvering a front-end machine would be almost prohibitively expensive of time and space. For yard use with narrow aisles, front-end machines tend to be useless. Even with wide aisles, they may be unable to find sufficient room for carrying long poles and the like, and are often inefficient in having to be maneuvered to face each pile for pick-up or stacking. For all of these uses the present side-reaching lifter is ideal.

I claim:

1. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon, comprising a chassis having a frame provided with front and rear wheels, a load-handling unit, reaching and raising means carried by the frame, for manipulating the load-handling unit, characterized in that:

said reaching and raising means is mounted on the frame in a manner fixed as to direction to reach outwardly in a given direction sideways and comprises an upstanding reach link pivoted at its bottom to the frame near one side thereof, reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction, a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between and nearly intermediate the front and rear wheel on said other side, lift cylinder means for raising the boom and cooperating with the reach link to give the boom a reaching action at lowered and elevated positions;

the load-handling unit being carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position; and

said operator's cab having therein a seat for the operator which, at least during operation of the reaching and raising means, faces sideways in the direction the boom extends; said cab being at times straddled by the reach link and having a doorway opening sidewise of the vehicle through the reach link.

2. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon comprising a chassis having a frame provided with front and rear wheels, a load-handling unit, reaching and raising means carried by the frame, for manipulating the load-handling unit, characterized in that:

said reaching and raising means is mounted on the frame in a manner fixed as to direction to reach outwardly in a given direction sideways and comprises an upstanding reach link pivoted at its bottom to the frame near one side thereof, reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction, a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between and nearly intermediate the front and rear wheel on said other side, lift cylinder means for raising the boom and cooperating with the reach link to give the boom a reaching action at lowered and elevated positions;

the load-handling unit being carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground

level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position; and

said operator's cab having therein a seat for the operator which, at least during operation of the reaching and raising means, faces sideways in the direction the boom extends; said cab being at times straddled by the reach link and having a doorway opening sidewise of the vehicle through the reach link; the reach link being constructed to include a step at an intermediate point of its lower portion below the doorway for entering the doorway through the reach link.

3. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon, comprising a chassis having a frame provided with front and rear wheels, a load-handling unit, reaching and raising means carried by the frame, for manipulating the load-handling unit, characterized in that:

said reaching and raising means is mounted on the frame in a manner fixed as to direction to reach outwardly in a given direction sideways and comprises an upstanding reach link pivoted at its bottom to the frame near one side thereof, reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction, a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between and nearly intermediate the front and rear wheel on said other side, lift cylinder means for raising the boom and cooperating with the reach link to give the boom a reaching action at lowered and elevated positions;

the load-handling unit being carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position; and

said operator's cab having therein a seat for the operator which, at least during operation of the reaching and raising means, faces sideways in the direction the boom extends; said cab being at times straddled by the reach link, the reach link extending substantially above the cab to provide a great amount of reaching action and to provide good clearance.

4. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon, comprising a chassis having a frame provided with front and rear wheels, a load-handling unit, reaching and raising means carried by the frame, for manipulating the load-handling unit, characterized in that:

said reaching and raising means is mounted on the frame in a manner fixed as to direction to reach outwardly in a given direction sideways and comprises an upstanding reach link pivoted at its bottom to the frame near one side thereof, reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction, a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between and nearly intermediate the front and rear wheel on said other side, lift cylinder means for raising the boom and cooperating with the reach link to give the boom a reaching action at lowered and elevated positions;

the load-handling unit being carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position;

said operator's cab having therein a seat for the operator which, at least during operation of the reaching and raising means, faces sideways in the direction the boom extends; and

a counterweight carried by the reach link in a position to swing away from the direction of reach as the reach link swings toward the direction of reach.

5. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon, comprising a chassis having a frame and front and rear rotary mobile support members; an upstanding reach link pivoted at its bottom to the frame near one side thereof about an axis fixedly parallel to the line of vehicle movement to give a reaching action in a sidewise direction; reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction; a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending near a point intermediate between the front and rear rotary mobile support members on said other side; lift cylinder means for raising the boom;

said lift cylinder, boom, and reach link being constructed to give a short reaching action at a lowered position, and thereafter to follow an arc, initially steeply upward about on axis spaced beyond the boom;

a load-handling unit carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position; and

said operator's cab having therein a seat for the operator which, at least during operation of the boom, faces sideways in the direction the boom extends.

6. A mobile reaching lifter according to claim **5** including an operator's cab facing sideways in the direction the boom extends, and at times straddled by the reaching link.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,913,767

DATED : Oct. 21, 1975

INVENTOR(S) : Russell F. Carriere

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

At the bottom of column 6 to follow claim 6, add the following claim:

-- 7. A mobile reaching lifter comprising a chassis having a frame and front and rear wheels, a work-engaging implement, reaching and raising means carried by the frame, for manipulating the work-engaging implement, characterized in that:

said reaching and raising means comprises a reach link pivoted at its bottom to the frame near one side thereof, and a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between the front and rear wheel on said other side;

said mobile reaching lifter including an operator's cab facing sideways in the direction the boom extends, and at times straddled by the reaching link; said cab having a doorway opening through the reaching link, the reaching link being constructed to include a step at an intermediate point of its lower portions below the doorway for entering the doorway. --

Signed and Sealed this

tenth Day of *February 1976*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks