March 11, 1969 C. L. BOSTON 3,431,793

SAFETY LOCK FOR PEDAL MECHANISMS

Filed Oct. 6, 1966 Sheet 1 of 3

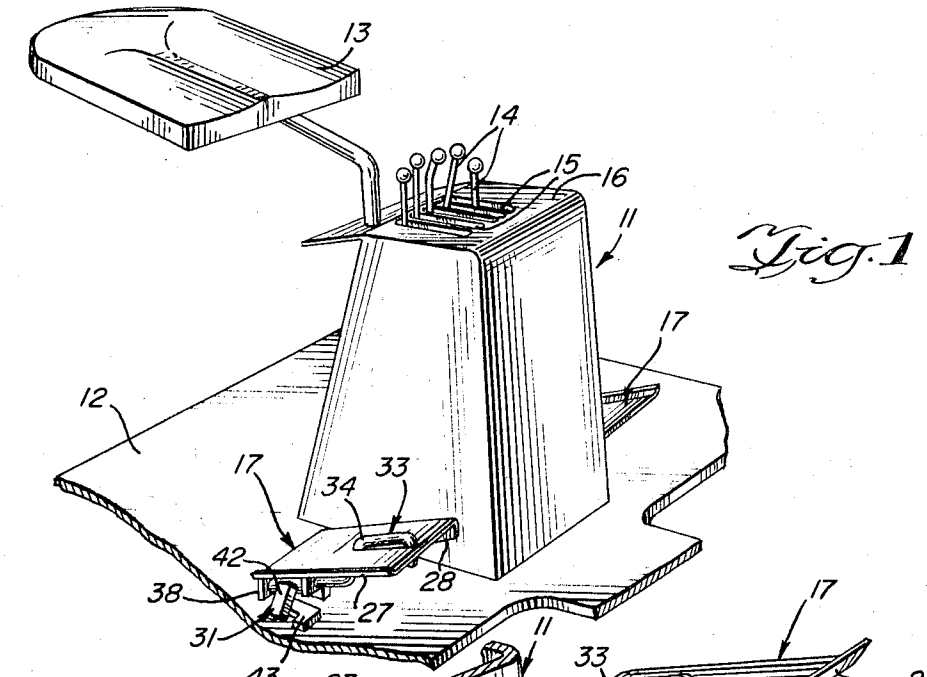


Fig. 1

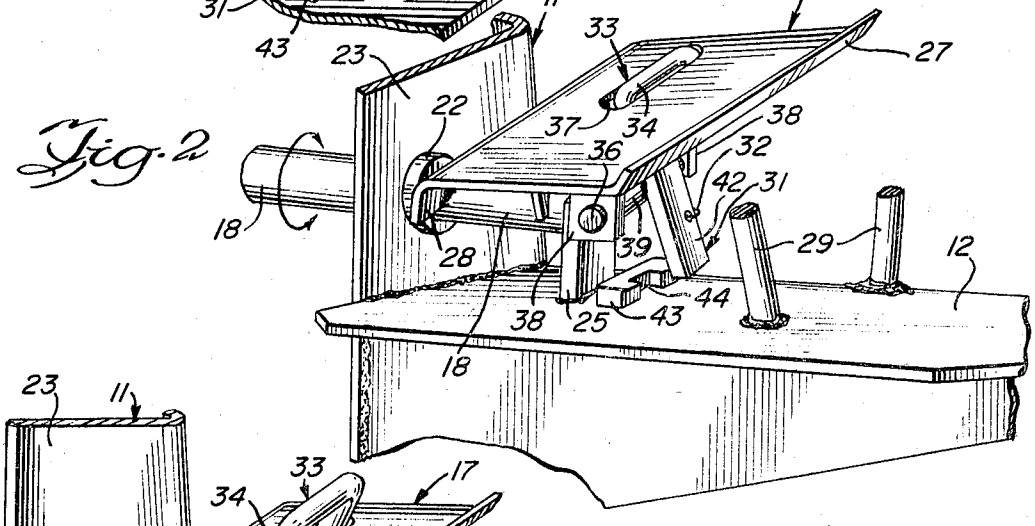


Fig. 2

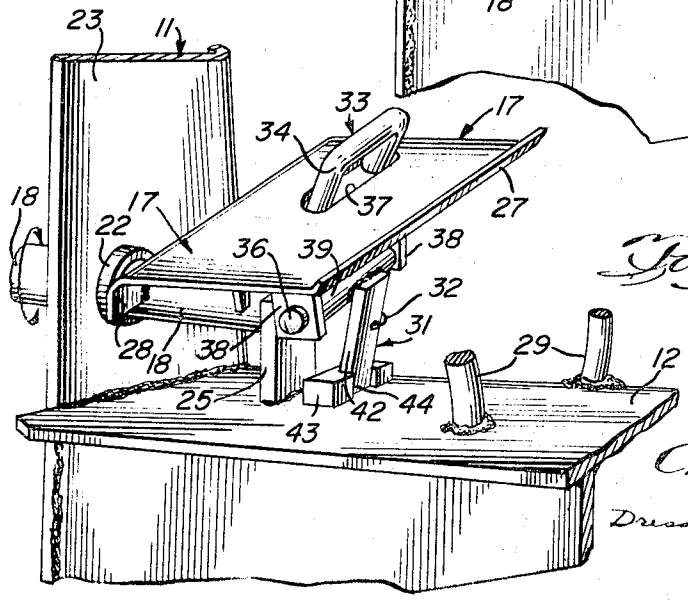


Fig. 3

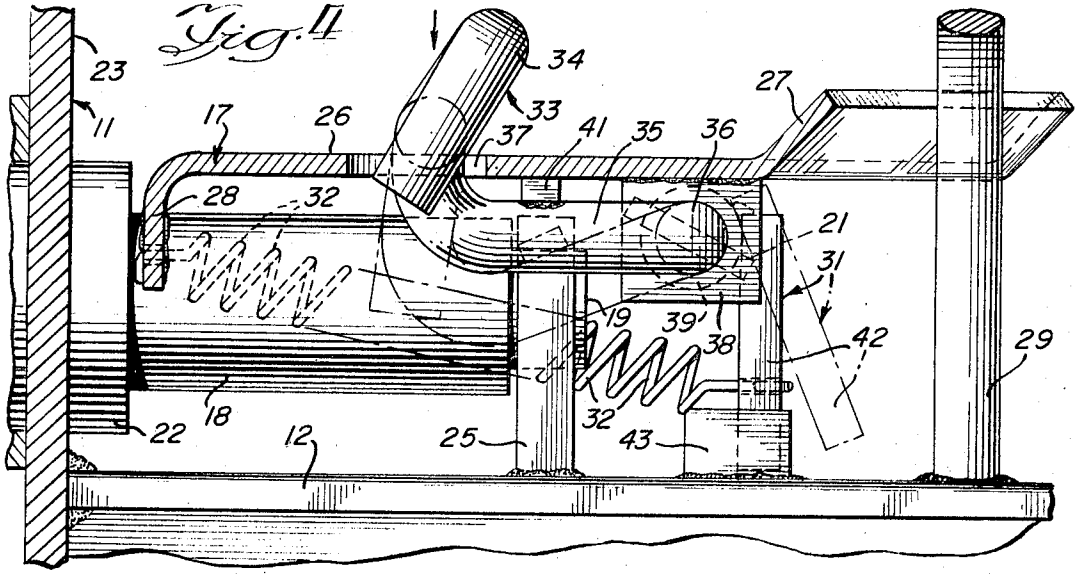
INVENTOR.
Charlie L. Boston
BY
Dressler, Goldsmith, Clement & Gordon
ATTORNEYS

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Fig. 4



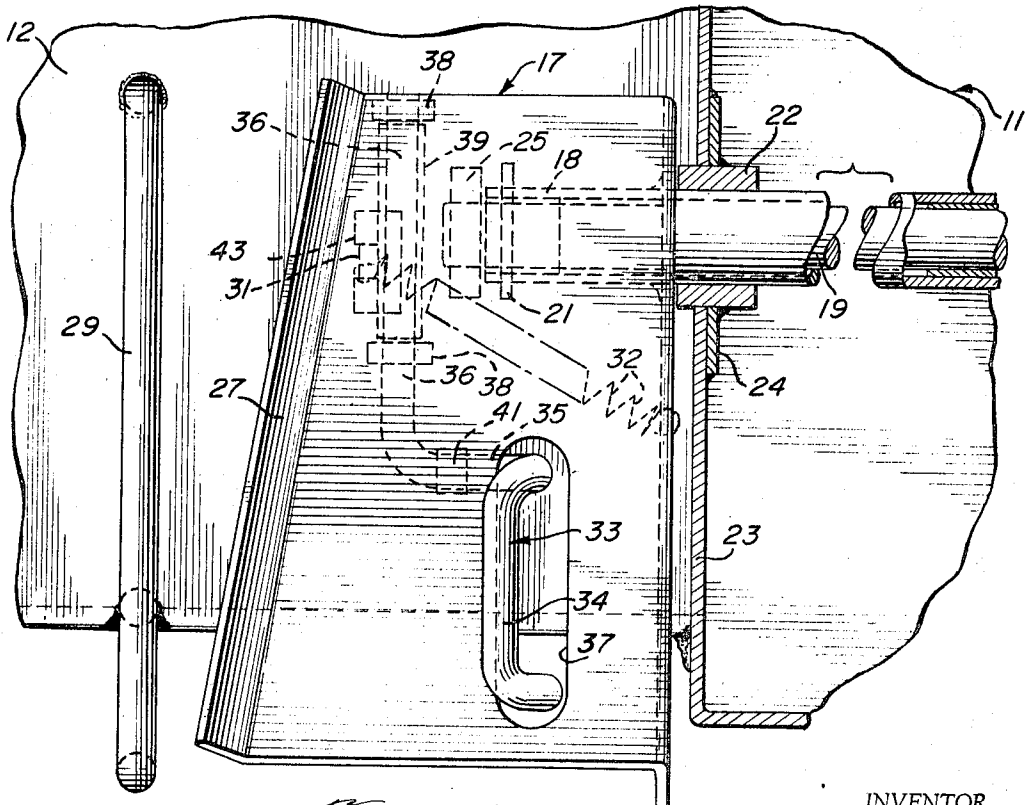


Fig. 5

INVENTOR.
Charlie L. Boston
BY
Dressler, Goldsmith, Clement & Gordon
ATTORNEYS

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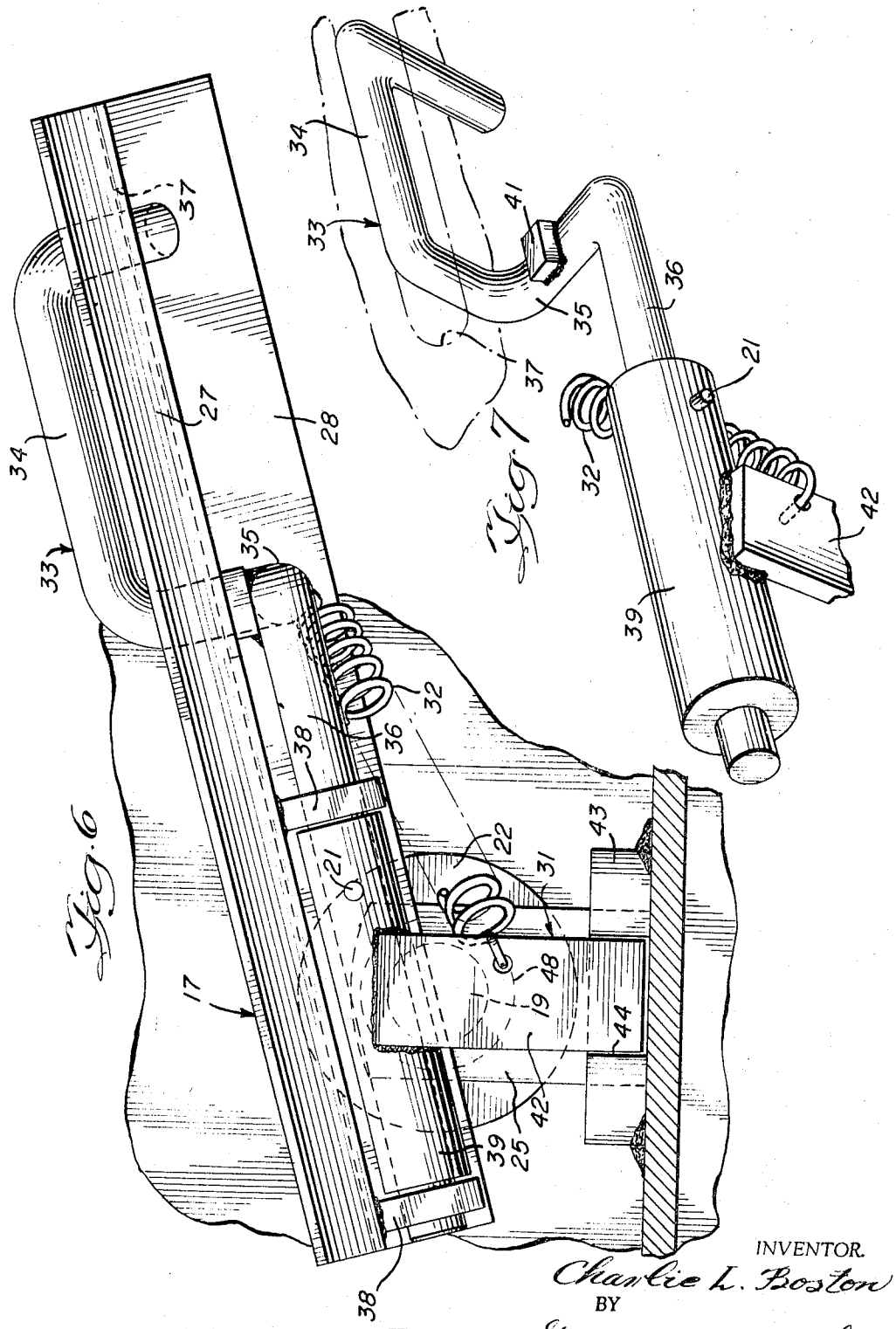


Fig. 6

Fig. 7

INVENTOR.
Charlie L. Boston
BY
Dressler, Goldsmith, Clement & Gordon
ATTORNEYS

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3,431,793

SAFETY LOCK FOR PEDAL MECHANISMS

Charlie L. Boston, Keokuk, Iowa, assignor to J. I. Case Company, a corporation of Wisconsin

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U.S. Cl. 74—512 5 Claims
Int. Cl. G05g 1/14

ABSTRACT OF THE DISCLOSURE

A safety lock for a foot-operated pedal having a treadle assembly, a portion of which extends through the pedal. The treadle operates a latch means for preventing operation of the pedal until the treadle is moved relative to the pedal. The latch means includes a block member that interengages with a locking member, which locking member is operated by the treadle to move it out of engagement to permit operation of the pedal.

This invention relates to a safety lock adapted to prevent accidental operation of pedal controlled mechanisms of the type in which pivotal movement of a single pedal causes a swing mechanism to swing from one poistion to another.

The swing mechanism on construction equipment, such as the boom on a backhoe, for example, is controlled by valves or switch means that are actuated by a pair of foot operated pedals. Accidental swinging movement of a boom may cause considerable property damage or personal injury, and the safety lock of the present invention prevents such accidental movement without interfering with the conventional operation of the mechanism.

In accordance with the present invention, each pedal is provided with a safety lock so arranged that both safety locks must be released before either pedal can be moved. The pedals are located so that the operator must be seated in the normal operating position in order to hold both safety locks in their released position.

Suitable structure by means of which the above mentioned and other advantages of the invention are attained will be fully described in the following specification, taken in conjunction with the accompanying drawings illustrating a preferred embodiment of the invention, in which:

FIGURE 1 is a perspective view showing a foot operated pedal with a safety lock embodying the invention;

FIGURE 2 is an enlarged fragmentary perspective view showing the safety lock in released position;

FIGURE 3 is a view similar to FIGURE 2, with the safety lock in latching position;

FIGURE 4 is an enlarged cross sectional view through the pedal, with the safety lock shown in released position in phantom;

FIGURE 5 is a top view, partly in elevation and partly in section, with the safety lock structure shown generally in phantom;

FIGURE 6 is an enlarged side elevational view of the safety lock; and

FIGURE 7 is an enlarged fragmentary detailed perspective view of the safety lock mechanism per se.

Referring to the drawings, a housing **11** projecting above a platform **12**, supports a seat **13** for the operator of the equipment, which, by way of example, can be a backhoe. A plurality of levers **14** extend through slots **15** in the top wall **16** of the housing within easy reach of the operator for manual control of the backhoe. A pair of pedals **17** are mounted on opposite sides of the housing for foot control of the swing mechanism for the backhoe. Both pedals may be easily reached by an operator sitting on the seat **13**. Each pedal is fixed to a sleeve **18** that is secured to a shaft **19** by a pin **21** (see

FIGURE 5). The sleeve is rotatably mounted in a bearing **22** extending through one wall **23** of the housing **11**. A plate **24** welded to the inner surface of the wall **23** helps support the bearing. The outer end of the shaft **19** is rotatably mounted in an aperture in the upper end of a post **25** projecting upwardly from the platform **12**.

One pedal is pivotally depressed to swing the boom in one direction, and the other pedal is pivotally depressed to swing it in the opposite direction. The pivotal movement of the pedals actuates switch means, or other equivalent structure for controlling the swing mechanism of the heavy construction equipment. The pedals on opposite sides of the housing are interconnected with the sleeve and shafts so that when either pedal is depressed, the other pedal moves upwardly, and neither pedal can move unless the other pedal is also free to move.

In conventional structures of the type with which the present invention is concerned, it is possible for either pedal to be pivotally depressed accidentally, thereby causing the boom to swing in one direction or the other without warning.

In accordance with the present invention, each pedal has a safety lock, hereinafter described, that holds it against pivotal movement in either direction. Both safety locks must be released before either pedal can be moved, and it is impossible to swing the boom by releasing one safety lock and applying pressure to the related pedal when the other pedal is not free to move. The safety locks are so positioned, relative to the pedals, that each safety lock is released when pressure is applied to the related pedal. Both of the pedals, and consequently the safety locks, are easily accessible to an operator sitting on the seat **14**, but the location of the housing between the pedals makes it virtually impossible for both of the safety locks to be accidentally released at the same time.

Each pedal comprises a flat plate **26** having its outer edge **27** inclined upwardly to keep the operator's foot from slipping off the pedal. A flange **28** depending from the inner edge of the pedal is welded to the sleeve **18**. A side rail **29** is mounted on the platform **12** adjacent the outer edge of the pedal to facilitate placement of the operator's foot relative to the pedal.

The safety lock for each pedal is so constructed that it is automatically released by the operator's foot as the operator attempts to depress the pedal. As seen by referring to FIGURE 4, the safety lock comprises a latch **31** for preventing pivotal movement of the pedal in either direction, a spring **32** urging the latch into latching position, and a treadle **33** for moving the latch out of latching position against the action of the spring. The treadle has a section **34** adapted to be engaged by the operator's foot, a second section **35** located under the plate **26**, and a third section **36** also located under the plate **26** and offset laterally from the first section by the second section. The plate **26** has a slot **37** through which the section **34** of the treadle projects to make it accessible to the operator's foot so that when the operator tries to press the pedal down, his foot encounters the section **34** of the treadle and depresses it, to release the latch, before foot pressure is applied against the pedal. Even after the treadle is depressed, the pedal will not move if the treadle on the other pedal is not also depressed.

The section **36** of the treadle is rotatably mounted in bearings **38** that are secured to the underside of the pedal. The section **36** serves as an axis about which the treadle moves pivotally to depress the section **34** to make it flush with the top of plate **26**. The downward movement of the treadle section **34** rotates the treadle section **36** in its bearings **38**. A collar **39** is pinned to the section **36** and rotates with it. The collar **39** fits between the bear-

ings 38 and prevents axial movement of the treadle section 36. The treadle section 35 has a stop member 41 secured thereto in position to limit the upward movement of the treadle so that the section 34 is always in position to be engaged by the operator's foot.

The structure of the latch 31 is very simple. It comprises a plate 42 welded to the outer surface of the collar 39 so as to move therewith, and a block 43 welded to the platform 12. The spring 32 has one end secured to the plate 42 and its other end secured to the flange 28 depending from the inner edge of the pedal. A notch 44 in one side of the block 43 has a length approximately equal to the width of the plate 42. The plate 42 is urged into the notch 44 by the spring 32 when the treadle is in its uppermost position. When the plate is in the notch it cannot move longitudinally of the block, and thus holds the pedal against pivotal movement in either direction. Rotation of the section 36 of the treadle moves the plate 42 out of the notch to release the latch from its latching position to permit pivotal movement of the pedal. The pivotal movement of the pedal moves the plate out of alignment with the notch so that the spring cannot pull the plate into the notch when the pedal is out of its initial position.

Although a preferred embodiment of the invention has been described in considerable detail, the description thereof is intended to be illustrative, rather than restrictive, as many details of structure may be modified or changed without departing from the spirit or scope of the invention. Accordingly, it is not desired to be restricted to the exact structure described.

What is claimed is:

1. Safety lock means for a pair of foot operated pedals mounted for pivotal movement about a common axis, said lock means comprising a pair of separate latches, means urging each of said latches into latching position, and separate foot operated means for independently moving each of said latches out of latching position, each of said latches holding one of said pedals against pivotal movement when in latching position, said pedals being interconnected whereby both pedals are held against pivotal movement when either latch is in latching position.

2. Safety lock means as recited in claim 1 in which each of said latches comprises a stationary block and a plate mounted for pivotal movement about an axis normal to said common axis, said block having an outer side parallel to the axis of said plate and a notch in said outer side, said plate having a width slightly less than the width of said notch and being in arcuate alignment therewith when the related pedal is in its initial position.

3. Safety lock means as recited in claim 2, in which said second mentioned means comprises springs each having one end fixed in spaced relationship to one of said plates and its other end to said one plate, each of said plates being operatively connected to one of said pedals, whereby pivotal movement of said pedals moves said plates out of arcuate alignment with said notches, thereby preventing said springs from moving said plates into latching position when said pedals are out of their initial position.

4. Safety lock means as recited in claim 1, in which each of said pedals has a slot, each of said latches comprises a stationary block having a notch in one side and a plate of approximately the same width as said notch, said plate being in arcuate alignment with said notch when the related pedal is in its initial position, and each of said foot operated means comprises a treadle having a first section projecting through said slot and a second section mounted for pivotal movement about an axis normal to said common axis, one of said plates being rigidly secured to the second section of one of said treadles, said first section being offset laterally from said second section in a direction away from the outer edge of the related pedal, whereby vertical movement of said first section toward its related pedal moves said one plate pivotally outwardly relative to said notch.

5. A safety lock for a foot operated pedal comprising a treadle having a first section projecting through an opening defined by said pedal and a second section rotatably supported by said pedal, latch means for preventing operation of said pedal until the first section of said treadle is moved relative to said pedal, including a stationary block defining a notch opening and a locking member interconnected with the second section of said treadle and adapted to be rotated thereby out of engagement with said notch when the treadle is depressed, and means for normally biasing said locking member into engagement with said notch for inadvertently preventing operation of said pedal.

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HALL C. COE, *Primary Examiner.*

U.S. Cl. X.R.

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