Dec. 31, 1929. J. L. LUFKIN 1,741,323

MANHOLE GUARD

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Fig. 1.

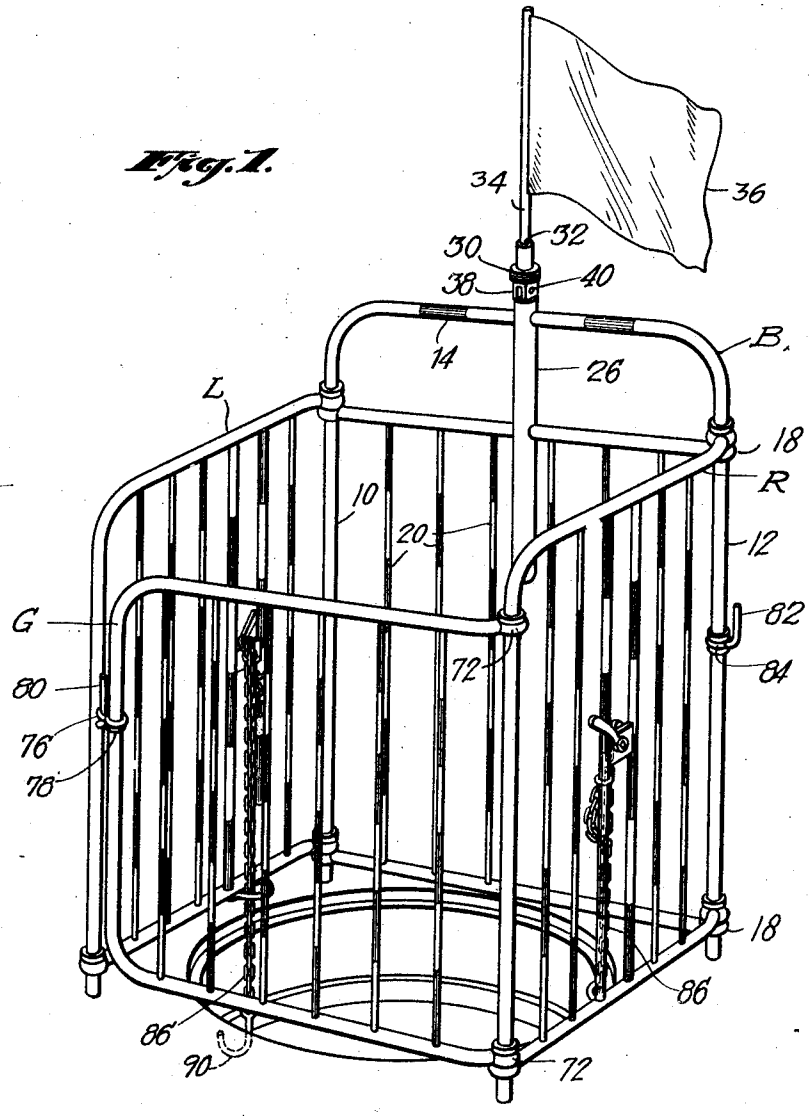
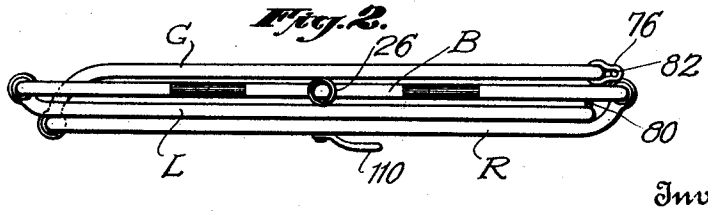


Fig. 2.



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Fig. 3.

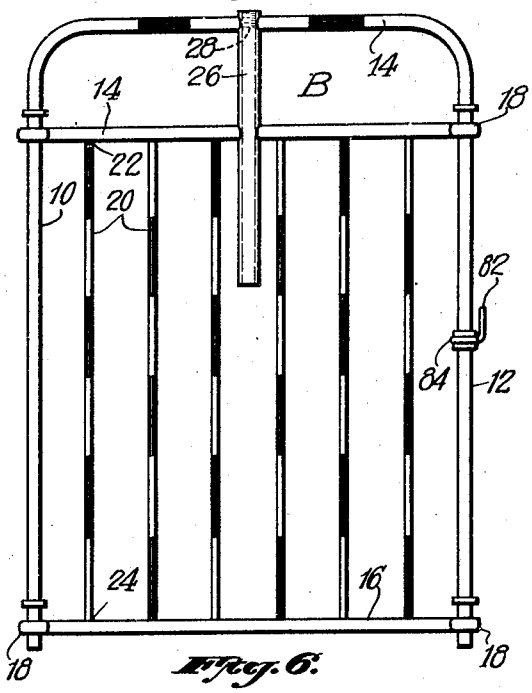


Fig. 5.



Fig. 4.

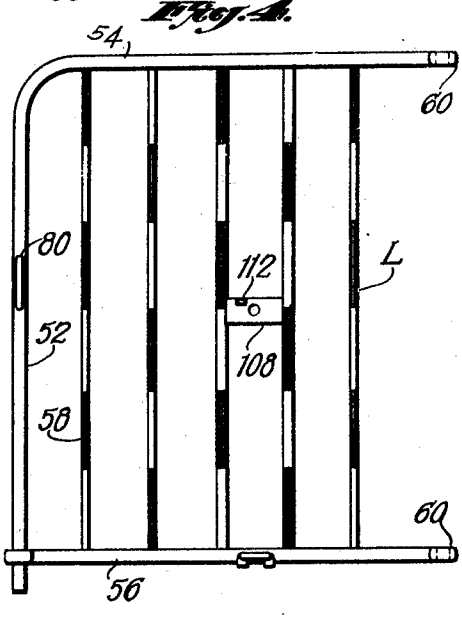


Fig. 6.

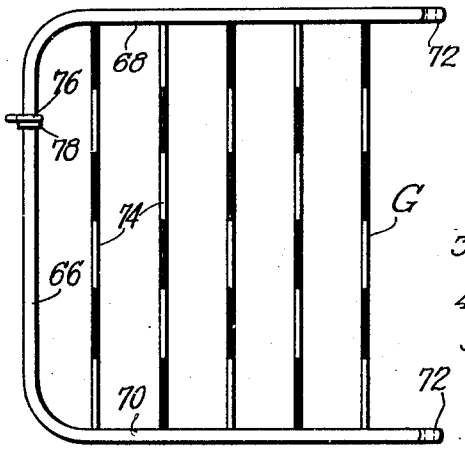


Fig. 8.

Fig. 9.

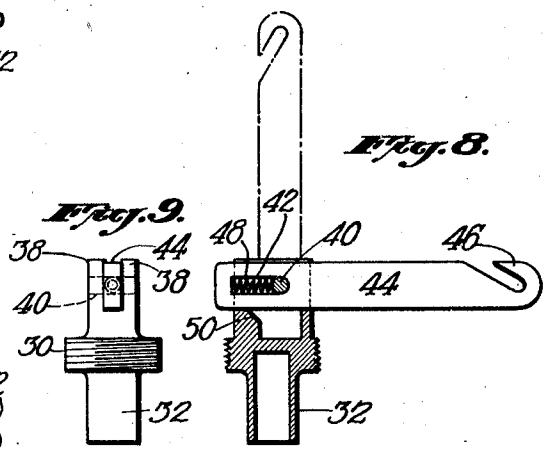
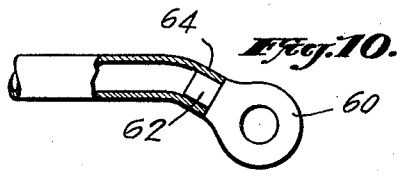


Fig. 10.



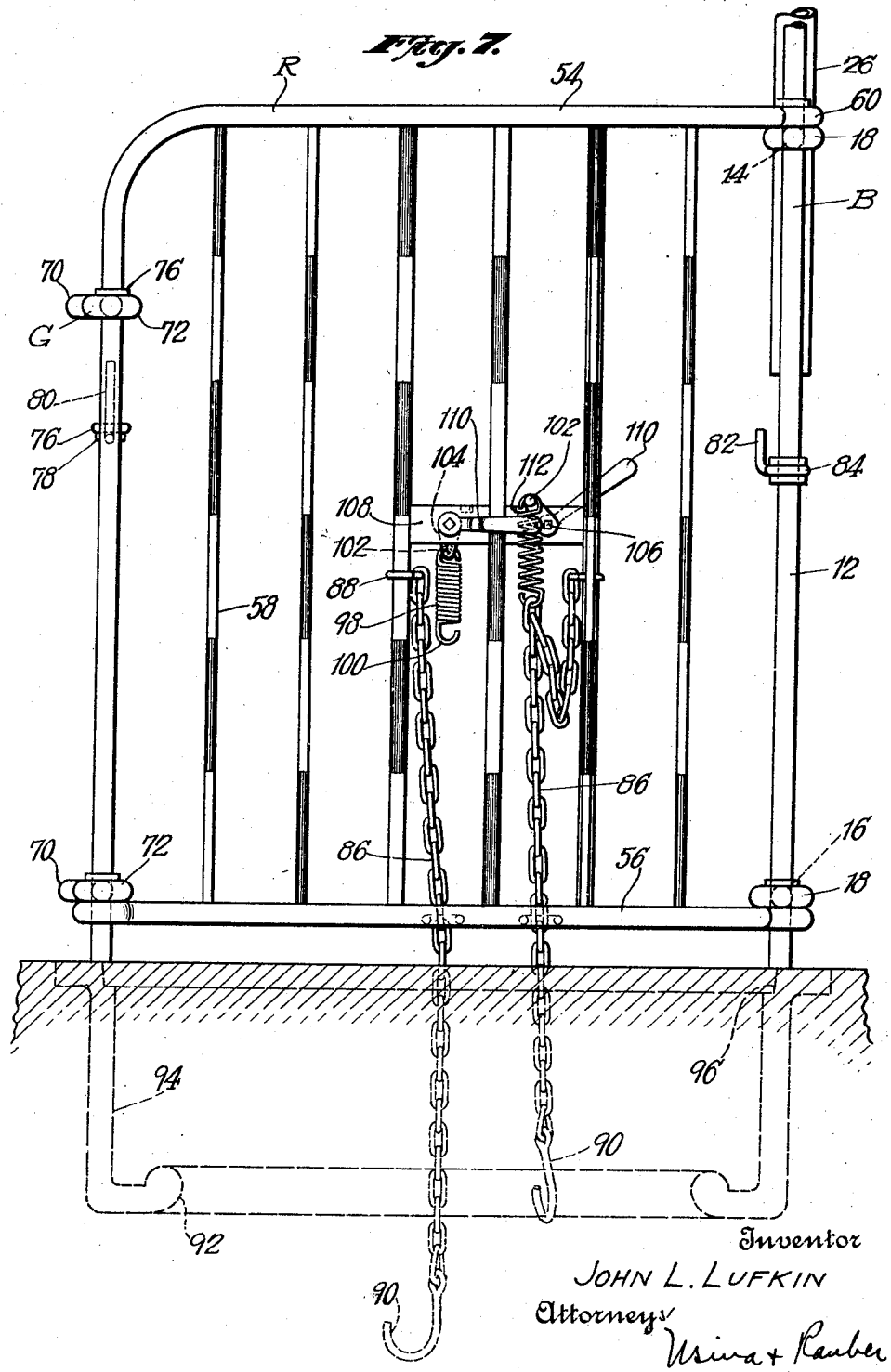
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Fig. 7.



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UNITED STATES PATENT OFFICE

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MANHOLE GUARD

Application filed March 2, 1929. Serial No. 343,989.

This invention relates to an improved form of manhole guard which can be readily collapsed into a comparatively thin flat form to facilitate transporting in motor vehicles or the like. The invention aims to provide such a collapsible guard with improved means whereby it can be easily and quickly anchored to a manhole structure.

The invention will be apparent from the following specification when read in connection with the accompanying drawings and the features of novelty will be defined with particularity in the appended claims.

In the drawings:

Fig. 1 is a perspective view of a guard illustrating a preferred embodiment of the invention;

Fig. 2 is a view showing the guard collapsed into a thin flat package to facilitate shipment;

Fig. 3 is a detail view of the rear section of the guard;

Fig. 4 is a detail view of one of the side sections of the guard;

Fig. 5 is a plan view of Fig. 4;

Fig. 6 is a detail view of a gate section of the guard;

Fig. 7 is a side elevation of the assembled guard showing it anchored in position over a manhole structure;

Figs. 8 and 9 are detail views showing a flag and lantern support carried by the rear section of the guard;

Fig. 10 is an enlarged view showing the construction of a hinge portion secured to the lateral members of the side sections and gate section.

The man hole guard shown and described herein aims to provide an effective device for insuring the safety of workmen as well as pedestrians. It is known that for sometime public utility companies have been coping with the problem of providing an effective guard for so-called manholes. Many public utility companies such as the electric power companies, telephone and telegraph companies employ extensive under ground cable systems. The cables are frequently enclosed in hollow ducts buried in the earth usually in groups of from 4 to 20 in a single duct line depending upon the character of service. Such duct systems require points of access at intervals. For this purpose under ground vaults or structures known in the art as manholes are provided at points from 2 to 500 feet apart. These vaults or manholes form working chambers within which access to the ducts and cables can be readily had by workmen. Each manhole is normally closed by a cover at the street level which is of such size as to permit the entrance and exit of workmen. The duct systems are usually built to run lengthwise of existing streets over which both vehicular and pedestrain traffic must be capable of maintenance without appreciable interruption. It is therefore necessary to provide a guard to prevent pedestrians from falling into the manholes or to prevent vehicles running foul of them. To meet this situation various kinds of make shift constructions have been used by power companies or other public utility companies having equipment buried below the street level to which access must be had.

However, none of the guards heretofore used have been entirely satisfactory nor fully adequate to provide the necessary protection. Some of the prior guards are merely held in place by their own weight. Others are adapted to be fitted to the manhole opening. It is unsatisfactory to have a guard fit within the opening because manholes in different parts of cities are different sizes and to secure a reliable fastening the guard must of necessity make a fairly accurate fit with the opening in the top of the manhole structure. In a practical sense it is quite impossible to provide guards to accurately fit different size manholes. To do so would be an extra burden on the workmen using such equipment.

To overcome the above difficulties my improved guard is so designed that a single size guard can be used in connection with the largest diameter of manholes as well as the smallest and all intermediate sizes and yet can be readily anchored so that it cannot be dislodged by accident. For anchoring the guard I provide a flexible member such as a chain or the like having a grapple hook on one end engageable with a fixed part of

the manhole structure, this chain or flexible member being connectable with a spring member which can be readily tensioned, a suitable manually actuated mechanism being provided for tensioning the spring member as will hereinafter more fully appear.

Referring in detail to the drawings the guard includes a back section B, right and left sections R and L respectively and a gate section G.

The back section comprises uprights 10 and 12 preferably formed of pipe or similar tubular material which are connected to one another at the top by a substantially horizontal bridge piece. Cross pieces 14 and 16 having fittings 18—18 secured in their ends form the top and bottom members respectively of a grillage or enclosure. This grillage includes a plurality of uprights 20 located at spaced intervals and welded at 22 and 24 respectively to the members 14 and 16. The eye pieces 18 are welded to the ends of the members 14 and 16 and several eye pieces encircle the uprights 10 and 12.

Welded or otherwise secured to the bridge pieces 14 and 15 I provide a pipe-like member 26. The upper end of this member is threaded as indicated at 28 for the reception of a fitting 30 having a thimble portion 32 formed at one end adapted to receive the staff 34 of the flag 36. The opposite end of the fitting is provided with bearing ears 38—38 which support stud 40 which passes through the slot formed in a lantern support 44 having a hooked end 46. A spring 48 is fitted between the pin 40 and one end of the slot 42 and serves to impositively hold the lantern support in the position shown in Fig. 8. The left extremity of the member 44 can yieldingly pass over an inclined shoulder 50 formed in the fitting 30. When the guard is used at night, a lantern is hung from the end 46 of the member 44 so as to act as a warning for all vehicles or pedestrians travelling in the vicinity of the guard. When guard is used during day time the member 44 is first swung vertically to the dotted position of Fig. 8 so that its axis coincides with the axis of the thimble portion 32. The member is then unscrewed from the pipe portion 26 and inverted from a position of Fig. 8 and screwed back into the pipe portion 36 with the thimble portion 32 uppermost for engagement with the staff of the warning flag.

The construction of the side members R and L is substantially identical and a description of one will suffice for both. The left side member is shown in detail in Fig. 4 wherein it will be seen that it comprises upright member 52, a top lateral member 54 and bottom lateral member 56. A number of upright spindles 58 are located between the members 54 and 56 and are welded thereto at spaced intervals. The members 54 and 56 are hingedly secured to one of the uprights of the back member B. In the embodiment shown each hinge connection is in the form of an eye piece 60 having a shank portion 62 which extends into an angularly disposed end 64 of each lateral member and is welded thereto.

The gate section G comprises an upright 66 and lateral top and bottom members 68 and 70 respectively. Secured to the ends of the latter are hinge members 72—72 formed of eye pieces of substantially the same form and size as those shown in Fig. 10. The gate includes a number of spaced upright spindles 74 which extend between the lateral members 68 and 70 and are welded thereto as shown.

The gate member G is hingedly mounted on the front upright of the right side section R, this upright passing through the eye pieces 72. A washer 78 is welded or otherwise secured to the upright 66. The lower eye 72 of the gate section rides freely on the fitting secured to the lower lateral member of the right end guard section R. For detachably locking the gate I provide a slip ring which is slidable on the upright 66 being retained against falling by means of the washer 78 welded to said upright. This slip ring is arranged to engage a gate stud 80 secured to the upright 52 of the left guard section L. When the guard structure is collapsed for shipment the slip ring 76 is adapted to be engaged with the prong 82 of a member 84 secured to the upright 12 of the back section B, see Figs. 1 and 2.

For anchoring the guard securely in position over a manhole I provide a flexible member having a grapple hook on one end thereof. Preferably means are provided for yieldingly holding the flexible member in engagement with a fixed part of the manhole structure and a device is provided whereby the yielding means can be readily put under tension.

As best shown in Fig. 7 the anchoring mechanism includes a flexible member such as a chain or the like indicated at 86 having one end secured to a ring 88 fastened to one of the spindles of a side member. A grapple hook 90 carried at the end of the chain is adapted to engage an inwardly extending flange 92 or any other suitable fixed part of the manhole structure. In many cases the manhole structure includes a ring-like casting such as that indicated at 94 this casting being provided with a seat 96 for accommodating the usual manhole cover.

For yieldingly holding the grapple hook in contact with a fixed part of the manhole structure I preferably employ a tension spring 98 having a hooked end 100 adapted to be engaged with one of the links of the chain 86. The opposite end of the spring 98 is pivotally secured to projection 102 formed on the free end of a crank 104. The crank 104 is provided with a trunnion por-

tion 106 which is pivotally mounted in a suitable hole formed in the bearing plate 108 bridging the space between two adjacent spindles and being welded at the ends thereto. The crank 104 is adapted to be turned by means of a handle 110 secured to the squared portion 106 of the crank so as to put the spring 98 under tension and thereby firmly hold the guard in position. The bearing plate 108 carries a stop 112 which is so located that movement of the crank is arrested after it is turned a short predetermined distance past dead center.

The anchorage mechanism above described is preferably duplicated for the sections R and L. The springs 98 are of sufficient strength to firmly hold the guard in position when they are tensioned by operation of the crank arm. In locked position the crank is thrown such a distance past dead center that the device is not apt to be disengaged. In fact considerable pressure is required to move the crank arm to released position, once it has been locked.

The length of the chain or flexible member is such that the hook 90 will reach the flange 92 of the largest size manhole flange. For intermediate sizes of structure it will be readily understood that the slack can be taken up by engaging the hooked end 100 of the spring with the appropriate link after which time the locking tension is secured by rocking the crank past dead center to the point where it engages the stop 112.

It is advantageous to make the side, back and gate sections all of straight, relatively flat form so that the entire structure can be readily collapsed into a thin package, which can be easily stowed away on a service truck so that a multiplicity of guards can be easily stowed and transported in a minimum amount of space. This is a marked advantage over former types of guards which have been formed of sections which are curved or part circular in plan.

Ingress and egress can be readily had by workmen because of the improved gate arrangement. Yet the simple locking means can be readily detached in case of emergency. It is also to be noted that the height of the gate is less than the height of the side of back members so that in any great emergency workmen can readily hurdle the gate if necessary. Those skilled in the art will appreciate the advantage of this as it is known that at times it is imperative for workmen to make a hurried escape from the underground manholes because of escaping gas and sometimes on account of an explosion or electrical failures under ground which are a hazard to the life of workmen engaged therein. The guard shown is conveniently made of stock size pipe which can be easily and cheaply fabricated and the fittings can be made of drop forgings or castings welded or otherwise secured to the pipe parts. In practice the parts are preferably galvanized to prevent rust. As an added guard feature the vertical parts or spindles of the guard are preferably striped with black paint or other contrasting colors so that the guard as a whole constitutes a conspicuous marker.

In some cases instead of using a gate section of the construction shown in Fig. 6 I may substitute a simple straight bar which would be pivotally mounted in relation to one of the uprights of either the right or left section R or L. Such a pivoted bar may have a hooked-over end adapted to engage a staple or eyelet section to the upright of the side section opposite that to which the bar is pivoted.

While I have described with great particularity the detailed construction of the embodiment of the invention illustrated, it is not to be construed that I am limited thereto since various modifications may be made by those skilled in the art without departing from the invention as defined in the appended claims.

I claim:

1. A manhole guard comprising a plurality of hingedly connected sections, respective anchorage members for at least two of said sections and tension members connecting the anchorage members with their respective sections.

2. A manhole guard comprising a plurality of hingedly connected sections, an anchorage member, and means yieldingly connecting said anchorage member with one of said sections.

3. A manhole guard comprising a plurality of hingedly connected sections, an anchorage member comprising a flexible element carrying a grapple hook, and a yielding connection between said flexible element and one of said sections.

4. A manhole guard comprising a plurality of hingedly connected sections, an anchorage member comprising a flexible element carrying a grapple hook, and a yielding connection between said flexible element and one of said sections and means for tensioning said yielding connection.

5. A manhole guard comprising a plurality of hingedly connected sections, an anchorage member comprising a chain having a grapple hook secured thereto, a spring having a hooked end for engagement with said chain and a crank pivotally mounted on one of said sections and having its free end pivotally secured to said spring.

6. A manhole guard comprising a plurality of hingedly connected sections, an anchorage member comprising a chain having a grapple hook secured thereto, a spring having a hooked end for engagement with said chain and a crank pivotally mounted on one of said sections and having its free end pivotally se-

cured to said spring, an operating handle for said crank and means for limiting the movement of said crank after it has moved a predetermined distance past dead-center.

7. A manhole guard comprising a rear section composed of a pair of uprights connected to a top bridge piece, a grillage located between said uprights, a pair of side sections each comprising a pair of spaced lateral members secured to an upright and a plurality of spaced spindles secured to said lateral members, respective hinge eyes encircling the uprights of said rear sections and secured to the ends of said lateral members, a gate section comprising an upright member having lateral members secured thereto, upright spindles secured to said lateral members hinge eyes secured to the lateral gate members and encircling an upright of one of said side sections.

8. A manhole guard having a warning signal support secured thereto including a fitting formed at one end with a thimble portion and at the other end with a lantern supporting member.

9. A manhole guard comprising a plurality of separate sections certain of said sections having eye fittings hingedly engaging an upright of an adjacent section, a gate member of less height than the other sections, means for hingedly securing the gate member to one of said sections and means for locking said gate member to an adjacent section.

In witness whereof, I have hereunto signed my name.

JOHN L. LUFKIN.