W. H. SMITH.

BEET HARVESTER.

APPLICATION FILED JULY 31, 1914.

1,140,202.

Patented May 18, 1915.

3 SHEETS—SHEET 1.

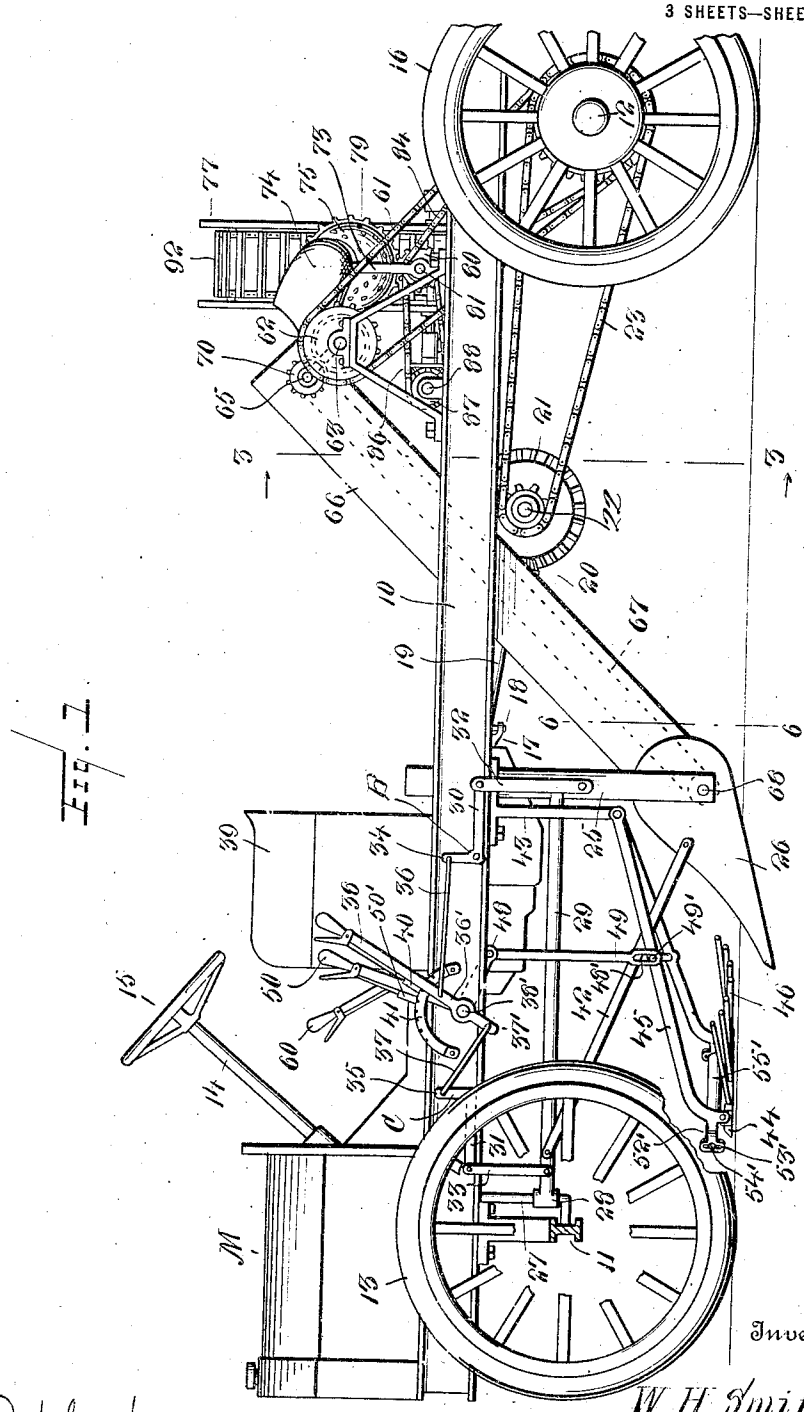


Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

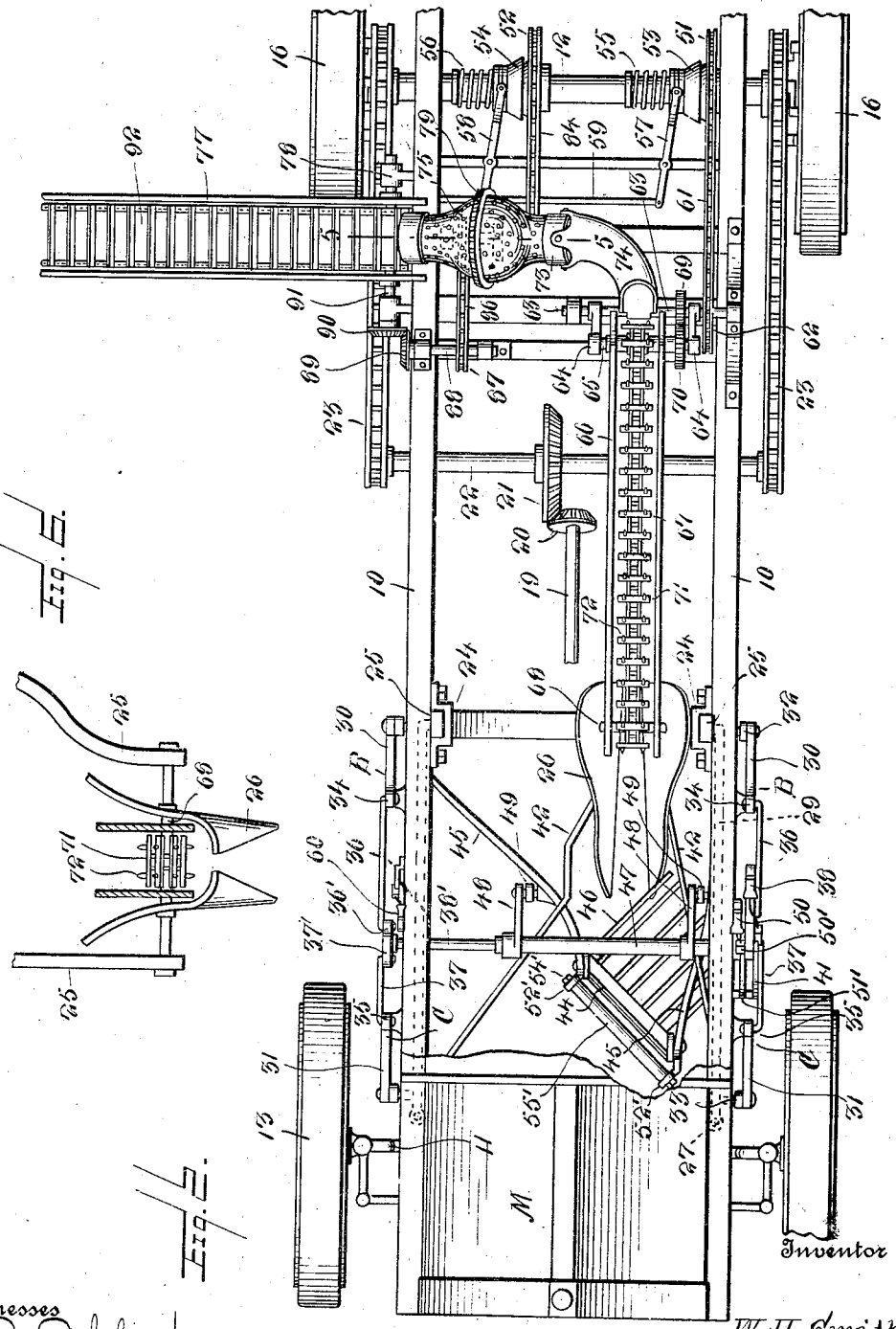


Fig. 2.

Fig. 3.

Witnesses

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3 SHEETS—SHEET 3.

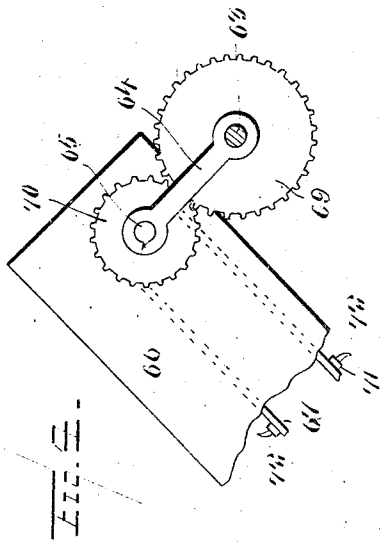


Fig. 3.

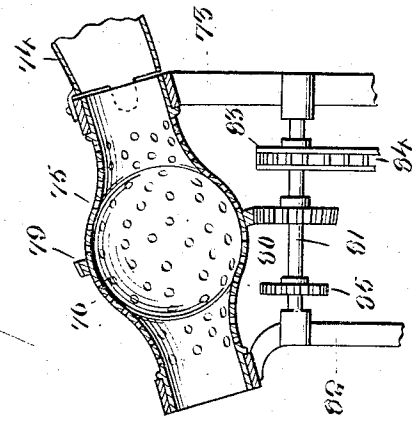


Fig. 5.

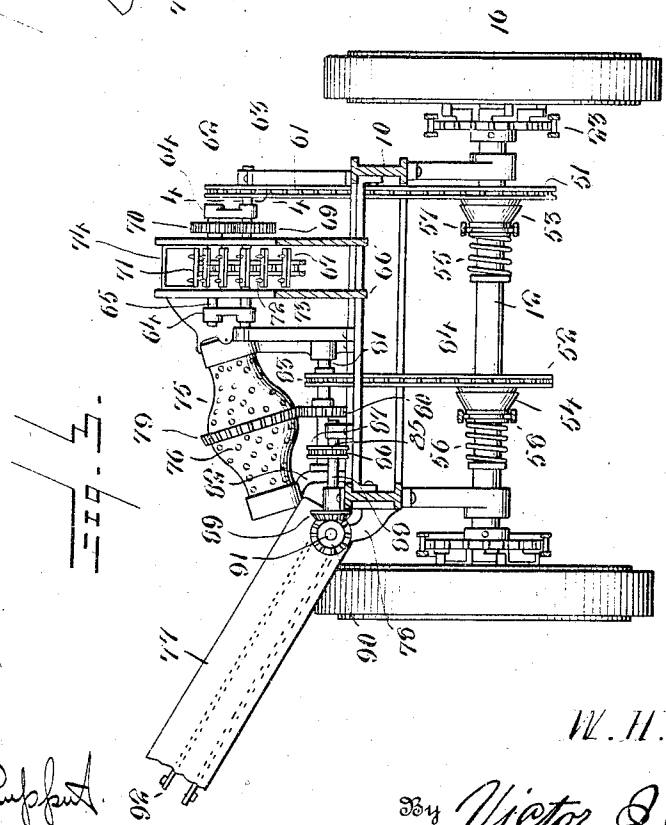


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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BEET-HARVESTER.

1,140,202. Specification of Letters Patent. Patented May 18, 1915.

Application filed July 31, 1914. Serial No. 854,338.

To all whom it may concern:

Be it known that I, WILLIAM H. SMITH, a citizen of the United States, residing at Joliet, in the county of Carbon and State of Montana, have invented new and useful Improvements in Beet-Harvesters, of which the following is a specification.

This invention relates to machines for harvesting sugar beets, and it has particular reference to a motor propelled and driven organized machine for topping the beets, lifting the same from the ground, elevating them to a cleaning device and discharging them through said cleaning device upon a conveyer, whereby they are carried to some suitable receptacle, such as the box of a wagon driven alongside the machine.

A particular object of the present invention is to simplify and improve the general construction and operation of the component parts of the device.

A further object of the invention is to simplify and improve the construction and operation of the cleaning device and the parts operating in conjunction therewith.

With these and other ends in view which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the claims may be resorted to when desired.

In the drawings,—Figure 1 is a side elevation of a machine constructed in accordance with the invention. Fig. 2 is a top plan view of the same with parts broken away. Fig. 3 is a transverse sectional view taken on the line 3—3 in Fig. 1. Fig. 4 is a sectional detail view taken on the line 4—4 in Fig. 3. Fig. 5 is a sectional detail view taken on the line 5—5 in Fig. 2. Fig. 6 is a sectional detail view taken on the line 6—6 in Fig. 1.

Corresponding parts in the several figures are denoted by like characters of reference.

The frame of the machine which is substantially rectangular in shape and which includes side members 10 is supported on front and rear axles 11, 12, the front axle being provided with steering wheels 13 forming part of a steering equipment which includes a steering rod 14 having a hand wheel 15. The rear axle 12 which is supported for rotation is provided with ground wheels 16 which are connected with the axle by ordinary clutch or pawl and ratchet means, not specifically shown. Supported on the frame above the front truck is a motor M which may be of any ordinary internal combustion type and which includes a driven line shaft 17 which is connected by a knuckle joint 18 with a transmission shaft 19, the latter being connected by bevel gearing 20, 21 with a counter shaft 22 which is thus driven and from which motion is transmitted by chains 23 to the respective ground wheels. The latter, it will be understood, when the machine moves in a forward direction, will serve to rotate the axle 12, but the axle will remain stationary when the machine is moved in a rearward direction. Differentials and other well known aids to the proper transmission of power may be utilized when desired, but as such expedients are well known, it is not necessary to illustrate or to particularly describe the same.

The side members of the frame are provided with keepers 24 affording guides for vertically slidable bars or limbs 25 that serve to support the beet lifters 26. At each side of the machine, adjacent to the front axle, is mounted a bracket or guide member 27 supporting a vertically slidable sleeve 28 which is connected by a bar 29 with one of the limbs 25. Bell cranks B, C, which are fulcrumed on the side members 10 of the frame, are provided with approximately horizontal arms 30, 31 which are connected by means of links 32, 33, respectively, with the limbs 25 and with the connecting bars 29 adjacent to the front ends of the latter. The approximately vertical arms 34, 35 of the bell cranks B, C are connected by means of links 36, 37 with radial arms 36′, 37′ extending in opposite directions from a rock shaft 38′ having a hand lever 38 which is fulcrumed in convenient proximity to the operator whose seat 39 is supported on the frame. The hand lever 38 is provided with a stop member 40 engaging a rack segment 41 whereby the parts may be retained in

adjusted position. It will be readily seen that by means of the hand lever the plows or beet lifters 26 may be vertically adjusted in ground engaging position or above the ground, as may be required. The construction of the beet lifters is reinforced by means of braces 42 connecting said lifters with the connecting bars 29 near the forward ends of the latter, said braces serving to assist in retaining the beet lifters in adjusted position and also in transmitting draft from the forward portion of the connecting bar 29 to the said lifters which will thus be readily dragged through the soil. The lifters may be of any convenient and well known construction that will enable them to lift the beets from the ground and transfer them to conveying mechanism to be presently hereinafter described.

Supporting members in the nature of brackets 43 serve for the attachment of a topping device which comprises a diagonally disposed knife or cutter 44 having rearwardly extending arms 45 which are pivotally connected with the brackets 43. From the back of the knife or cuter extend obliquely disposed guide rods 46 over which the tops severed or detached by the cutter will be discharged laterally at one side of the machine and out of the path of the lifters. A tubular rock shaft or sleeve 47 which is mounted for oscillation on the rock shaft 38′ is provided with radial arms 48 with which the upper ends of links 49 are connected, the lower ends of each of said links being provided with a slot 48′ engaged by a pin 49′ connected with and extending from one of the arms 45. The tubular rock shaft is also provided with a hand lever 50, whereby it may be rocked or oscillated, said lever being provided with a conventional stop member 50′ engaging a segment rack 51′ indicated in Fig. 2, and whereby the parts may be retained at various adjustments. The arms 45 have extensions 52′ that project forwardly of the knife or cutter 44, said extensions being provided with vertical slots 53′ wherein a shaft 54′ is mounted in such a fashion that it may be vertically adjusted within the limits of said slots. The shaft 54′ carries a roller 55′ which constitutes a gage roller and which by riding over the portions of the beets that project above the ground will raise or lower the knife or cutter so that the tops will be evenly detached from the roots without danger of waste. It will be readily seen that the slots 48′ in the links 49 will permit the cutter to rise and fall within sufficient limits to accomplish the desired results. The topping device may, however, by manipulating the lever 50, be raised to an inoperative position when desired. The length of the slots 48′ is so proportioned that the blade or cutter 44 will ordinarily be supported a short distance above the ground to avoid dulling the edge thereof by contact with the soil.

The rear axle 12 is provided with sprocket wheels 51, 52 capable of being connected therewith for rotation by spring actuated clutches 53, 54, said clutches being operable against the tension of their respective actuating springs 56, 56 by means of shipping levers 57, 58 which are connected together by a cross bar 59, the later being operatively connected through intermediate connecting rods and bell cranks with a hand lever 60 that is fulcrumed in convenient proximity to the seat of the driver who by means of said lever may simultaneously actuate the two clutches, thereby disconnecting the sprocket wheels 51, 52 from the axle which will then rotate idly in the hubs of the sprocket wheels. The sprocket wheel 51 transmits motion through a chain 61 to a sprocket wheel 62 on a counter shaft 63, which latter supports a pair of links 64 affording bearings for a shaft 65 on which the upper end of a conveyer casing 66 is mounted. The endless conveyer 67 is guided over the shaft 65 and also around a shaft 68 near the lower end of the casing. The shafts 63 and 65 are provided with intermeshing spur wheels 69, 70, whereby motion in the proper direction will be transmitted through the shaft 65 to the endless conveyer. It will be observed that the links 64 and the shaft 65 combine to constitute a yoke whereby the upper end of the conveyer casing is supported for movement in an arc about the axis of the shaft 63, and it will also be seen that motion will be transmitted uninterruptedly to the conveyer in any position of the conveyer casing through the medium of the intermeshing spur wheels 69 and 70, one of which is carried by the shaft 63, while the other moves concentrically about said shaft and is, therefore, constantly in mesh with the first mentioned spur wheel. The shaft 68 at the lower end of the conveyer casing is extended through the lifters 26 and through the limbs 25 supporting said lifters with which the conveyer casing will thus be connected so as to occupy the same relative position at various adjustments of the lifters. It follows that the conveyer will operate uninterruptedly at various vertical adjustments of the lifters with respect to the ground.

The endless conveyer 67 may be of any suitable and convenient construction, but it has been shown as comprising an endless chain provided with cross bars or slots 71, the latter having hook-shaped prongs 72 that serve to engage the beets as they are lifted from the ground and to carry the same to the upper end of the conveyer casing.

An upright 73 rising from the frame serves to support one end of the tubular el-

bow or arcuate chute 74, the other or receiving end of which is overhung by the conveyer casing 66, so that the beets elevated by the conveyer will be discharged into said chute and be guided through the latter, being discharged thereby in a lateral direction. The discharge end of the chute 74 communicates with one end of a drum 75 which is supported for rotation in an inclined position transversely of the frame of the machine, said drum being provided with tapering ends, as clearly seen in Fig. 5, and the walls thereof being foraminous, as also best seen in said figure. This drum constitutes a scouring or cleaning device, whereby clay and dirt adhering to the beet roots will be detached and permited to sift through the numerous openings or apertures 76, the beets being discharged at the lower end of the drum on to a conveyer, the casing of which, 77, is supported on brackets 78, see Fig. 3. The scouring drum 75 is provided with an annular gear 79 slightly beveled, as shown, and meshing with a pinion 80 on a shaft 81 which is supported for rotation on the uprights 73 and 82 which support the rotary scouring drum.

The shaft 81 has a sprocket wheel 83 which is connected by a chain 84 with the sprocket wheel 52 on the rear axle from which it receives motion when the machine is in operation. The shaft 81 also carries a sprocket wheel 85 connected by a chain 86 with a sprocket wheel 87 on a counter shaft 88 which is connected by bevel gearing 89, 90 with the shaft 91 which in conjunction with the bracket 78 supports the inner end of the conveyer casing 77, and over which the endless conveyer operable in said casing and a portion of which is seen at 92 in Fig. 3 is guided.

As will be seen from the foregoing description, taken in connection with the drawings hereto annexed, the improved machine will serve to sever the tops from the beets and to discharge said tops laterally with respect to the machine; to lift the beets; to elevate the latter; to discharge them through the tubular elbow 74 into the scouring drum 75 where the beet roots are cleaned from impurities adhering thereto, and, finally, to discharge the roots from the scouring drum on to the conveyer 92, whereby they will be carried to some suitable receptacle. The entire machine is of simple construction; it is propelled, and its moving parts are all actuated by a motor mounted on the frame of the machine and which may be an ordinary internal combustion motor of simple and inexpensive construction. It is obvious that while in the accompanying drawings a machine has been shown which is adapted to operate on a single row of beets, the various instrumentalities of the machine may readily be multiplied so as to enable one machine to operate on two or more rows of beets simultaneously, thereby saving time and labor.

Having thus described the invention, what is claimed as new, is:—

1. In a beet harvester, a wheel supported frame, a pair of lifting members, a shaft extending through the lifting members, and limbs connected with said shaft and guided on the frame for vertical movement.

2. In a beet harvester, a wheel supported frame, a pair of ground engaging beet lifting elements, a shaft extending transversely through said lifting elements, limbs connected with the shaft and guided on the frame for vertical movement, a sleeve supported for vertical movement in advance of each of the limbs, a bar connecting said sleeve with the limb, an inclined brace connecting the bar with the lifting element associated with the limb, and means for effecting vertical adjustment simultaneously of the front and rear ends of the bar to thereby vertically adjust the lifting element.

3. In a beet harvester, a wheel supported frame, a pair of lifting elements, a shaft extending transversely through said elements, limbs connected with the shaft and guided on the frame for vertical adjustment, means for effecting vertical adjustment of the limbs and the lifting elements, and the conveyer casing having one end supported on the transverse shaft.

4. In a beet harvester, a wheel supported frame, a pair of lifting elements, a shaft extending transversely through the latter, limbs connected with said shaft and guided on the frame for vertical adjustment, an obliquely disposed cutter supported in advance of the lifting elements, and obliquely disposed guides extending from the back of the cutter substantially at right angles to the latter.

5. In a beet harvester, a pair of vertically adjustable beet lifting elements, a shaft extending transversely through the same, a conveyer casing supported at its lower end on said shaft, and means for movably supporting the upper end of the conveyer casing.

6. In a beet harvester, a pair of vertically adjustable beet lifting elements, a shaft extending transversely through said elements, a conveyer casing supported at its lower end on said shaft, means for movably supporting the upper end of the casing including a cross shaft extending therethrough, a driven shaft, and links connecting said driven shaft with the cross shaft, intermeshing gears on the driven shaft and the cross shaft, and an endless conveyer guided over the cross shaft and the transverse shaft on which the lower end of the conveyer casing is supported.

7. In a beet harvester, a frame, a pair of

beet lifting elements supported for vertical adjustment, a transverse shaft extending through said elements, a conveyer casing supported at its lower end on said transverse shaft, a movably supported driven shaft on which the upper end of the conveyer casing is supported, and a conveyer guided over the shafts supporting the lower and upper ends of the casing, said conveyer including an endless element having slats provided with beet engaging hooks.

8. In a beet harvester, a wheel supported frame, a pair of beet lifting elements, a shaft extending transversely through said elements, limbs connected with the shaft and guided on the frame for vertical movement, bars extending forwardly from the limbs and having their front ends guided for vertical movement, braces connecting the bars with the lifting elements, a conveyer casing supported at its lower end on the transverse shaft, a movably supported shaft extending transversely through the upper end of the conveyer casing, means for driving said shaft, and a conveyer guided over said shaft and over the shaft extending transversely through the lifting elements.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. SMITH.

Witnesses:
H. A. CARMONY,
E. C. MARVIN.