June 19, 1962 H. HOROWITZ ET AL 3,039,791

TRICYCLES HAVING SYNTHETIC RESINOUS PORTIONS

Filed Oct. 21, 1960 4 Sheets-Sheet 1

Fig. 1

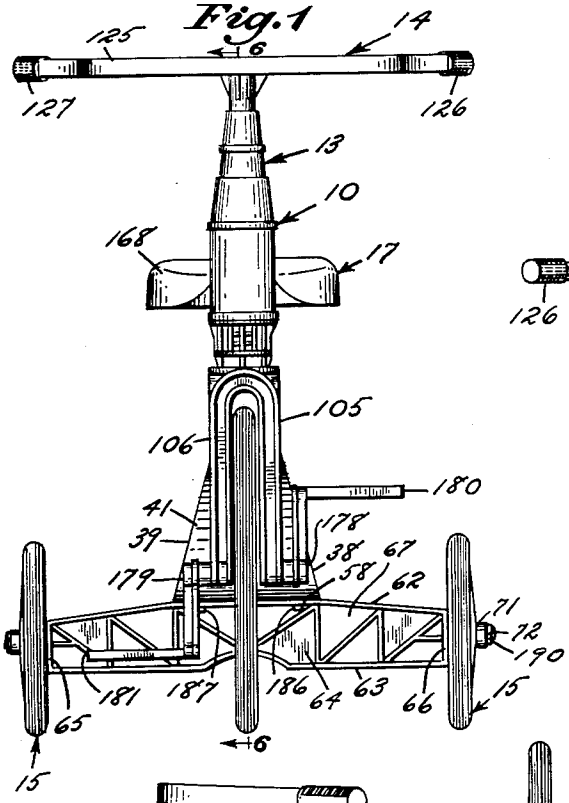


Fig. 2

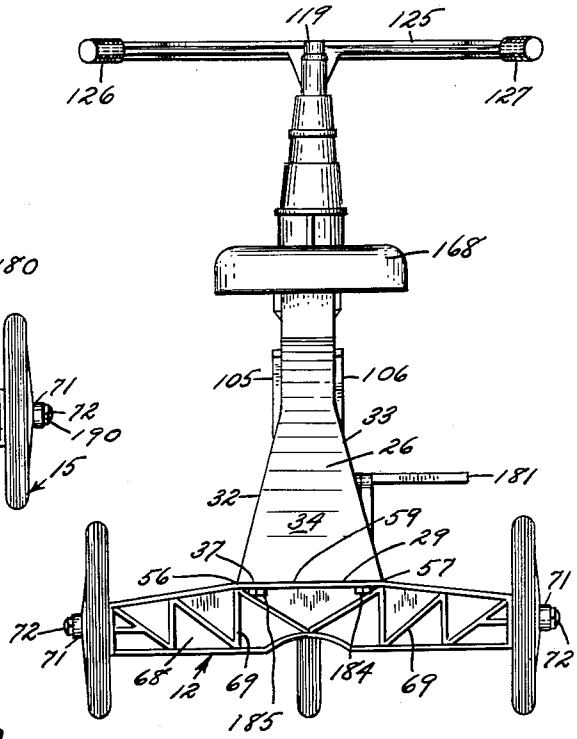
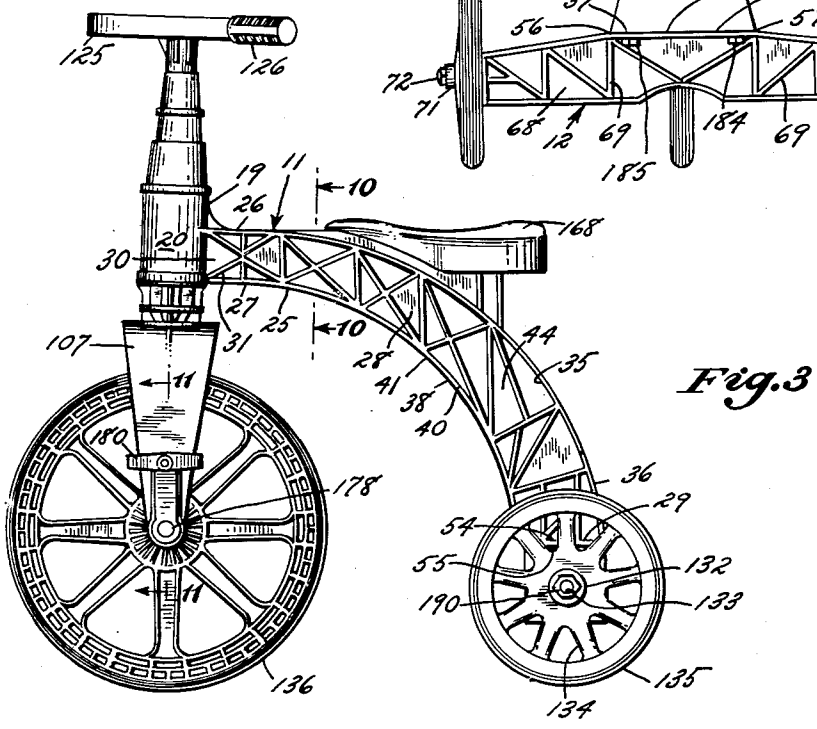


Fig. 3

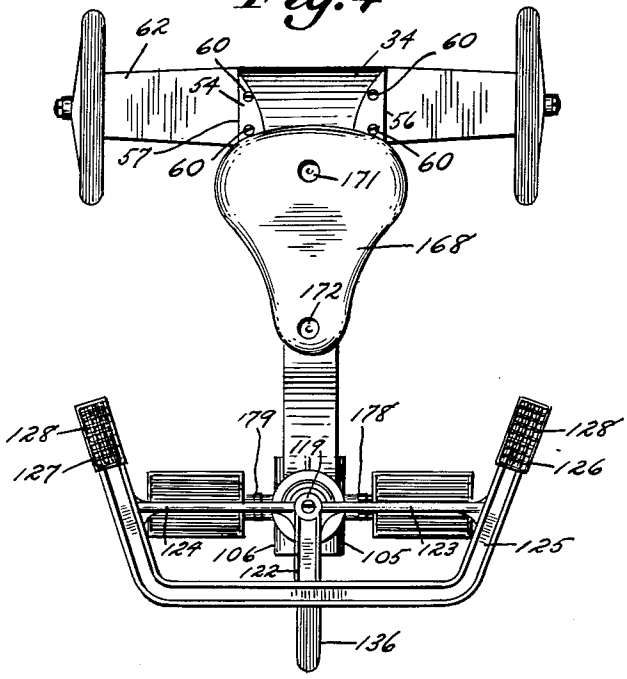


June 19, 1962 H. HOROWITZ ET AL 3,039,791

TRICYCLES HAVING SYNTHETIC RESINOUS PORTIONS

Filed Oct. 21, 1960 4 Sheets-Sheet 2

Fig. 4



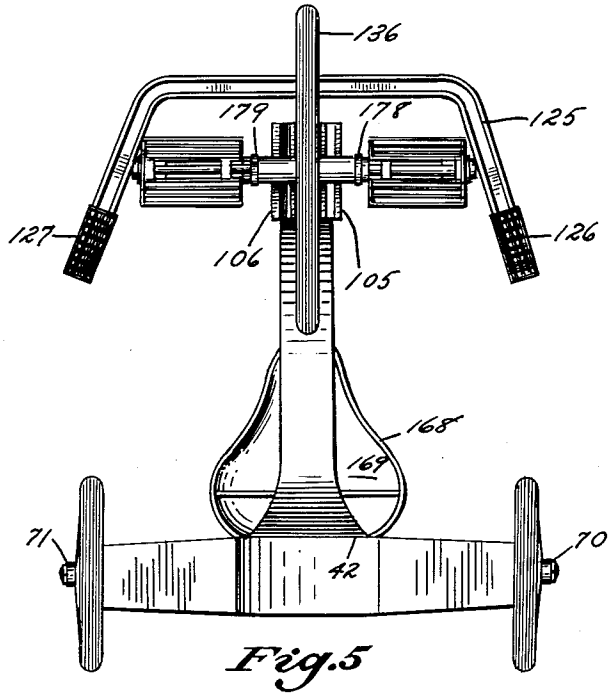


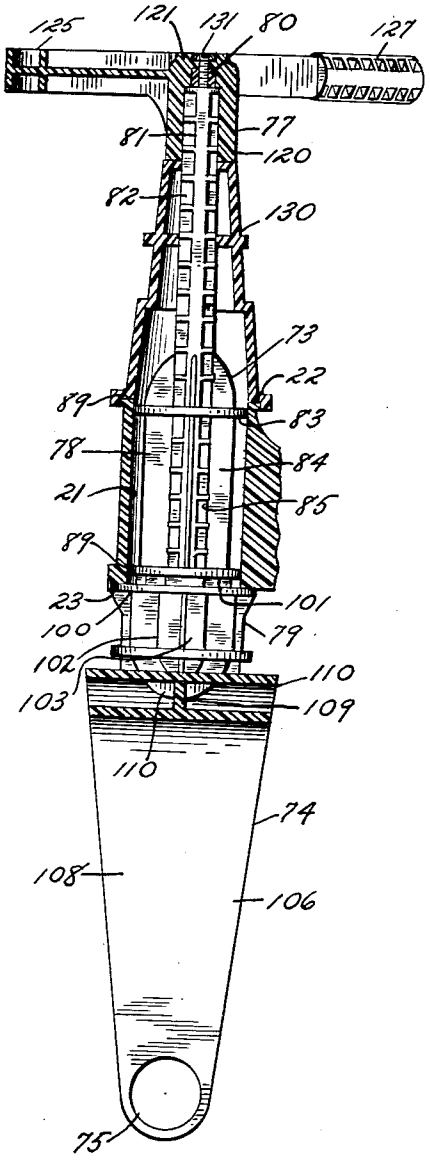
Fig. 5

June 19, 1962 H. HOROWITZ ET AL 3,039,791

TRICYCLES HAVING SYNTHETIC RESINOUS PORTIONS

Filed Oct. 21, 1960 4 Sheets-Sheet 3

Fig. 6



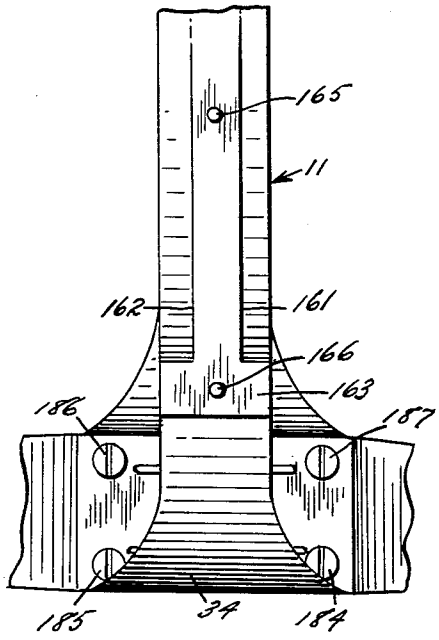


Fig. 7

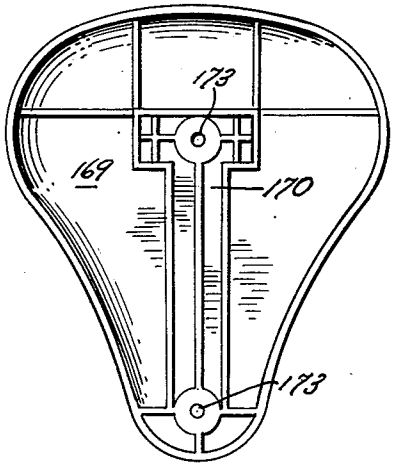


Fig. 8

June 19, 1962 H. HOROWITZ ET AL 3,039,791

TRICYCLES HAVING SYNTHETIC RESINOUS PORTIONS

Filed Oct. 21, 1960 4 Sheets-Sheet 4

Fig. 10

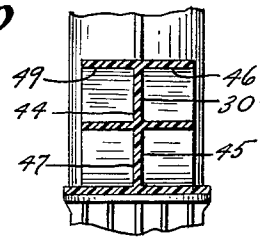


Fig. 9

Fig. 11

United States Patent Office 3,039,791 Patented June 19, 1962

3,039,791

TRICYCLES HAVING SYNTHETIC RESINOUS PORTIONS

Harry Horowitz, Brooklyn, and Abraham Schneiderman, Westbury, N.Y.
(both of 276 Nostrand Ave., Brooklyn, N.Y.)

Filed Oct. 21, 1960, Ser. No. 64,209
1 Claim. (Cl. 280—259)

This invention relates generally to the field of toy vehicles, and more particularly to an improved lightweight tricycle suitable for use by children who have reached the age of five years and younger.

Tricycles are generally well known in the art, the traditional type being manufactured from steel tubing, welded or otherwise interconnected to form a frame to which are attached a front steerable fork member, a pair of rear wheels, a saddle and a handlebar element capable of imparting motion to the forked member. Normally, propulsion is provided by attaching pedals to a wheel supported by the forked member. With the increased cost of labor in recent years, devices of this type presently sell for many times their former cost, thus making the device less attractive from the standpoint of the purchasing parent. Such devices, once purchased, are normally left by children in places where they will be exposed to the elements, and, where metallic construction has been employed, rust, damage due to bending, rot of the saddle element, and similar attrition render the useful life of such devices extremely short.

It is therefore among the principal objects of the present invention to provide an improved form of tricycle constructed almost entirely from injection molded synthetic resinous materials, which will substantially duplicate the more expensive less durable metal counterpart.

Another object of the invention lies in the provision of a tricycle constructed almost entirely of synthetic resinous materials, which will possess adequate mechanical strength roughly comparable with metal tricycles existing in the art, and with a considerable reduction in weight.

Another object of the invention lies in the provision of a synthetic resinous tricycle of the class described which may be assembled by a purchaser with only ordinary tools in the course of a few minutes, thus facilitating the packaging of the device for retail sale, and permitting subsequent disassembly should the purchaser desire to transport the device.

A further object of the invention lies in the provision of a tricycle possessed of the above advantages, in which the cost of fabrication is materially reduced as contrasted with metal counterparts, thus permitting consequent wide sale, distribution and use.

A further object of the invention lies in the provision of a tricycle which will be substantially rust-proof, having few metallic parts, which may be easily plated against rust, and which for the most part are shielded or enclosed by protective synthetic resinous members.

A feature of the invention lies in the fact that almost all of the components comprising the tricycle may be formed using simple injection molding from well known thermoplastic materials.

A still further feature of the invention lies in the fact that since all of the exposed components are of synthetic resinous material, the likelihood of scratching articles with which the device may come into contact is substantially reduced, thus permitting the device to be employed indoors as well as outdoors.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claim.

In the drawings, to which reference will be made in the

specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a front elevational view of an embodiment of the invention.

FIGURE 2 is a rear elevational view thereof.

FIGURE 3 is a side elevational view thereof.

FIGURE 4 is a top plan view thereof.

FIGURE 5 is a bottom plan view thereof.

FIGURE 6 is a vertical sectional view of the fork element as seen from the plane **6—6** in FIGURE 1.

FIGURE 7 is a fragmentary plan view with the saddle element removed.

FIGURE 8 is a bottom plan view of the saddle member.

FIGURE 9 is a fragmentary exploded view of the front wheel element.

FIGURE 10 is a vertical sectional view as seen from the plane **10—10** in FIGURE 3.

FIGURE 11 is a vertical sectional view as seen from the plane **11—11** in FIGURE 3.

In accordance with the invention, the device, generally indicated by reference character **10**, comprises broadly: a longitudinal frame element **11**, a transverse frame element **12**, a fork element **13**, a handlebar element **14**, rear wheel elements **15**, a front wheel element **16** and a saddle element **17**.

The longitudinal frame element **11** is formed as a single injection molding using a synthetic resinous material having high mechanical strength and a small degree of resiliency. We have found polystyrene to be particularly suitable, the same offering is good combination of high strength, light weight and reasonably low cost. The element **11** includes a fork-engaging hollow column **19** bounded by an outer cylindrical surface **20**, an inner cylindrical bore **21**, an upper edge surface **22** and a lower edge surface **23**. Extending rearwardly from the fork-engaging column **19** is a longitudinal column **25** including an upper planar member **26**, a lower planar member **27** and a vertical planar member **28** interconnecting the upper and lower planar members **26** and **27** along their principal axes to form an I-shaped cross section best seen in FIGURE 10 of the drawing. A horizontal planar member **29** interconnects the upper and lower planar members **26** and **27**. At the relatively forward portion **30** of the longitudinal column **25** and on either side of the vertical planar member **28** are a plurality of ribbed reinforcing members **31** which extend rearwardly in lesser degree to the horizontal planar member **29**.

The upper planar member **26** is bounded by a pair of outer edges **32** and **33** diverging in a rearward direction as well as an upper surface **34** and a lower surface **35**. The rear end **36** thereof terminates in an edge **37** at the point of interconnection with the horizontal planar member **29**.

The lower planar member **27** is slightly shorter, in overall length, and is generally parallel to the upper planar member **26**, being bounded by outer edges **38** and **39**, an upper surface **40** and a lower surface **41**. The rearmost edge **42** thereof interconnects with the horizontal planar member **29**.

The vertical planar member **28** includes a left surface **44**, a right surface **45**, upper edges **46** and lower edges **47**, and forms with the upper and lower planar members **26** and **27** a left-hand channel **49** and a right-hand channel which are partially filled by the reinforcing members **31**.

The horizontal planar member **29** is generally rectangular in configuration, and is bounded by an upper surface **54**, a lower surface **55**, side edges **56** and **57**, as well as forward and rearward edges **58** and **59**, respectively. Screw-engaging holes **60** extend from the upper to the lower surface and provide means for engaging the transverse frame element **12**.

The transverse frame element **12** is also injection molded from polystyrene or similar material, and includes an upper planar member **62**, a lower planar member **63**, a vertical planar member **64** and end members **65** and **66**. A forward channel **67** and a rearward channel **68** contain reinforcing ribs **69** generally similar to the ribs **31**. Stud axle members **70** and **71** extend outwardly of the end members **65** and **66**, respectively, and provide means for mounting the rear wheel elements **15**.

The fork element **13** is also integrally molded, and includes a vertical column member **73**, a forked member **74** and bearing members **75**.

The vertical column member **73** includes an upper portion **77**, a column-engaging portion **78**, and a thrust-bearing portion **79**.

The upper portion **77** includes a non-circular handlebar element-engaging lug **80** and a cylindrical part **81** of cellular construction best seen in FIGURE 6. The cells **82** are of generally rectangular configuration, and are arranged so that their principal axes are parallel to the parting motion of the mold (not shown) in which the element **13** is formed. The column-engaging portion **78** is adapted to be fitted within the fork-engaging hollow column **19**, and includes a plurality of outer arcuate parts **83**, inner arcuate parts **84**, which are interconnected by reinforcing ribs **85**. A pair of bearing surfaces **89** support the lateral thrust exerted upon the fork element **13**. The thrust-bearing portion **79** includes a horizontal bearing part **100** having an upper surface **101** which engages the lower edge **23** of the column **19**. The part **100** is supported by a cellular structure **102** including vertical ribs **103**.

The forked member **74** is formed integrally with the column member **73**, and includes a left-hand clevis portion **105** and a symmetrical right-hand clevis portion **106**. The portions **105** and **106** are formed by a continuous outer wall **107** and a continuous inner wall **108** which are interconnected medially by a reinforcing wall **109**. Additional reinforcing ribs **110** are provided at the upper portion thereof, the same being disposed in vertical planes.

The bearing members **75** include a left-hand cylindrical portion **113** and a right-hand cylindrical portion **114**, the former having a relatively smaller bore **115**, and the latter a relatively larger bore **116**.

The handlebar element **14** is preferably formed from a softer more flexible synthetic resinuous material, as for example polyethylene. It includes a centrally disposed column-engaging member **119** having a lower cylindrical portion **120** and an upper non-circular socket portion **121**. Extending from the column-engaging member **119** is a longitudinally disposed brace **122** and a pair of transverse braces **123** and **124**. The handlebar **125** is molded integrally with the braces **122–124**, and includes integrally molded grips **126** and **127** having a cylindrical outer surface **128** of cellular construction. The handlebar element **14** is engaged upon the lug **80** using a single screw **131**, the remaining exposed portions of the column member **73** being covered by a cylindrical cover member **130** at the time of assembly.

The rear wheel elements **15** are substantially similar, each including an integrally molded axle-engaging member **132** having a bore **133** therein engageable upon an axle member **70—71**, a plurality of spokes **134** and a rim **135** which may simulate a tire.

The front wheel element **16** is constructed to facilitate assembly without the use of tools, and by those having only ordinary skills. It includes a front wheel member **136**, and an axle member **137**. The axle member **137** includes a centrally disposed front wheel-supporting portion **138**, first bearing portion **139** corresponding in diameter to the bore **116** and a second bearing portion **141** corresponding in diameter to the bore **115**. Disposed outwardly of the bearing portions **139** and **141** are a pair of lugs **142** and **143** of non-circular cross section, each including an outwardly extending tip **144** and **145**, respectively.

The axle member **137** is of composite construction, including a metallic core **146** for added strength. Disposed within the outer synthetic resinous portion **146'** are a pair of elongated troughs **147** and **148**, each disposed on opposite sides of the principal axis of the core **146** and commencing at opposite ends of the same.

Rotational motion is transmitted to the axle member **137** through a pair of metallic crank members **149** and **150**, each including an inner portion **151** engageable within a trough **147—148**, a laterally offset portion **152** and a foot-engaging portion **153**. The offset portions **152** are covered by plastic crank members **154** and **155**, each having a transverse bore **157** corresponding in cross section to the lugs **142—143** and a connecting channel **158** which partially encloses the offset portions **152**. A second transverse bore **157'** permits passage of the foot-engaging portion **153** of a crank member **149—150**, and mounts a pedal member **159**, preferably also of synthetic resinous molded construction.

As best seen in FIGURE 9, torque is transmitted through the metallic crank member to the corresponding plastic crank member, and then through a non-circular lug **142—143**. By positioning the inner portions **151** eccentrically with respect to the principal axis of the axle member **137**, it is impossible to assemble the front wheel element **16** without positioning the crank members in proper mutual relative position.

The saddle element **17** includes a saddle support member **161** molded directly upon the longitudinal frame element **11**. The saddle support member **161** includes a longitudinal portion **162** and a transverse portion **163** forming a T-shaped projection extending in an upward direction. Mounting tips **165** and **166** extend upwardly from the upper surface of the member **161** and through corresponding openings **173** in an integrally molded saddle member **17**. The saddle member **17** includes a conventionally contoured upper surface **168** and a lower surface **169** having a recess-forming member **170**, the cross section of which corresponds to the member **161**. The openings **171** and **172** are preferably counter bored to permit securing the same below the surface **168**.

Assembly of the device is facilitated by the use of push-on type fastening devices adapted to engage the relatively soft surfaces of the synthetic resinous components. The rear wheel elements **15** are engaged with the axle members **70** and **71** of the transverse frame element **12**, and push-on fasteners **72** installed projecting ends of the members **70** and **71**. Nuts and bolts **184**, **185**, **186**, **187** and **188** interconnect the planar member **29** with the upper surface of the transverse frame element **12**. The saddle element **17** may then be positioned upon the saddle support member **161**, with fastener elements installed at points **165** and **166**. The fork element **13**, as has been mentioned, is maintained in position by a single screw which also maintains the handlebar element **14**, and the front wheel element **16** is installed as indicated in FIGURE 9, fastener elements being employed at points **144**, **145**, **180** and **181**.

We wish it to be understood that we do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

We claim:

In a front wheel element construction for use in conjunction with a tricycle or similar device, a forked member having bearing-forming portions at each of two lower ends thereof, a composite axle member having a principal axis and including a metallic core portion and a synthetic resinous outer portion surrounding said core portion; said outer portion including first and second bearing surfaces engaging said bearing-forming portions, a wheel-engaging portion disposed between said first and second bearing surfaces, a wheel engaged upon said wheel-engaging portion, crank-engaging lugs on each end portion of said axle, there

being a first elongated trough in said axle extending parallel to and eccentrically disposed with respect to said principal axis of said axle extending from one of the lugs in a direction toward the other of said lugs, there being a second elongated trough symmetrically arranged in said axle and extending in an opposite direction from the other of said crank-engaging lugs; a pair of metallic crank members each having a trough-engaging portion, an axially off-set portion, and a foot-engaging portion, said trough-engaging portion of each of said crank members engaging one of said troughs, a pair of synthetic resinous crank members each having a channel therein and a socket communicating with said channel, said channel at least partially enclosing

an offset portion of one of said metallic crank members, said socket engaging one of said crank-engaging lugs.

References Cited in the file of this patent

UNITED STATES PATENTS

521,943	Weaver	June 26, 1894
1,216,273	Brigel	Feb. 20, 1917
1,469,884	Bried	Oct. 9, 1923
1,600,453	Corcoran	Sept. 21, 1926
1,987,404	Korte	Jan. 8, 1935
2,167,020	Anderson	July 25, 1939
2,937,035	Moll	May 17, 1960
2,944,833	Wintermantel et al.	July 12, 1960