Sept. 20, 1971 C. P. HARRAH 3,606,246

JACK ASSEMBLY

Filed July 2, 1969

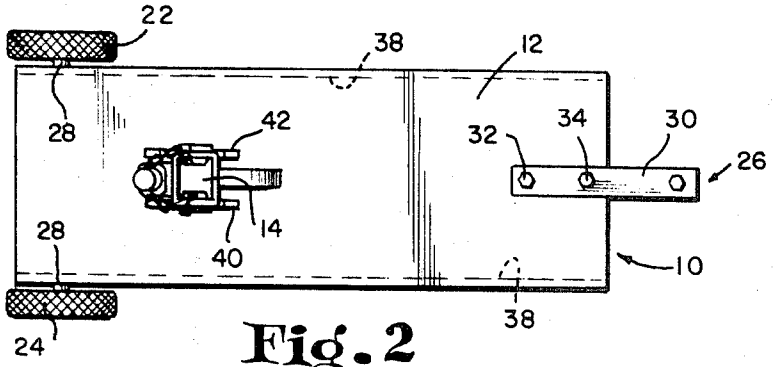


Fig. 2

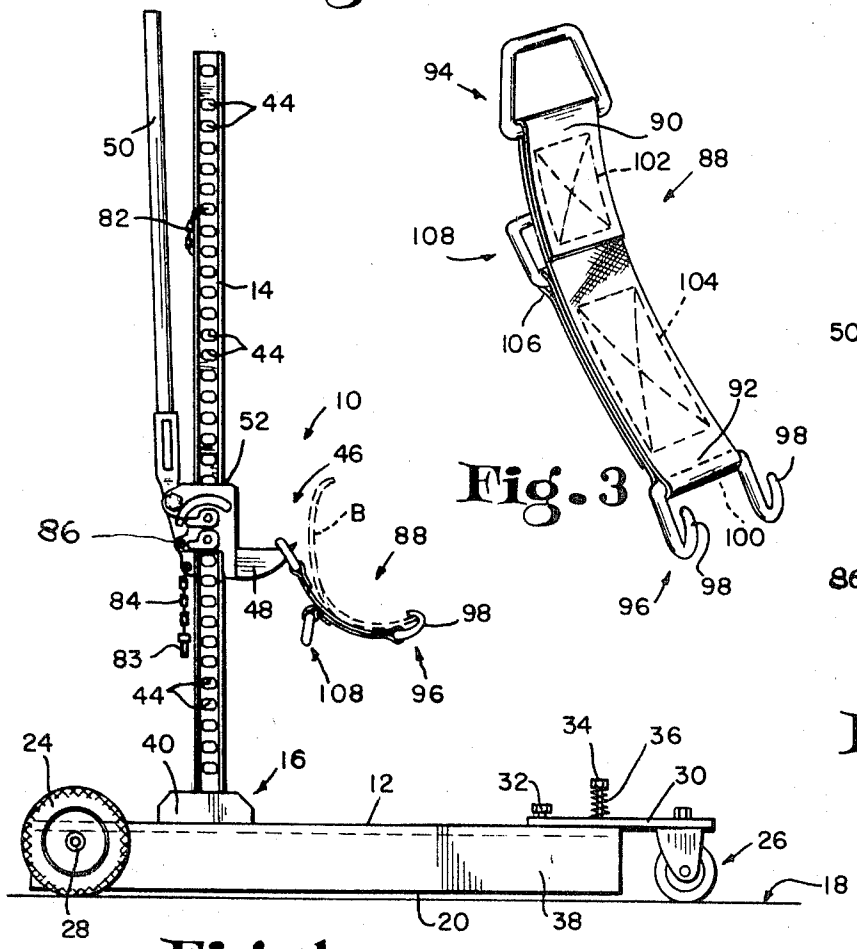


Fig. 1

Fig. 3

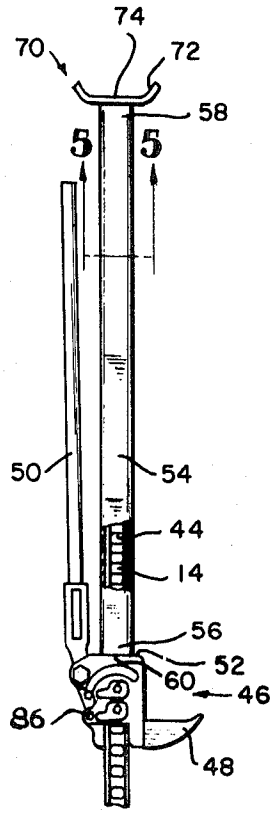


Fig. 4

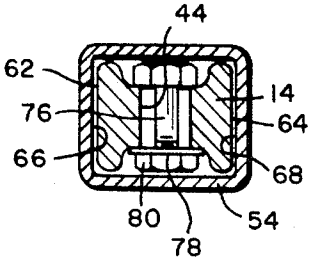


Fig. 5

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JACK ASSEMBLY

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U.S. Cl. 254—2B 16 Claims

ABSTRACT OF THE DISCLOSURE

A jack assembly comprising a platform, a jack standard rigidly connected to the platform and extending vertically upwardly therefrom, a lever-actuable lift frame arranged for vertical reciprocation on the standard, and wheel means for movably supporting the platform. The wheel means are preferably arranged yieldingly to support the bottom of the platform slightly above and out of contact with the surface on which the assembly is supported. A flexible lifting strap providing a pair of spaced apart hook-type fingers for engaging work is provided for connection with the lifting frame. A rigid sleeve is disposed telescopically over the upper end of the standard to rest directly on an upwardly and horizontally extending surface provided by the lift frame, which surface extends about the standard.

It is a primary object of my invention to provide a jack assembly which is light in weight, extremely mobile, and capable of lifting weights of, for instance, seven thousand pounds. My jack assembly, which preferably weighs approximately 50 pounds, includes wheel means arranged yieldably to support its base platform slightly above and out of contact with a floor or base surface. When a predetermined downwardly directed load is applied to the platform, the bottom of the platform rests directly on such a surface.

My jack assembly is extremely versatile. It can be used, with its flexible lifting strap, as a bumper jack for all types of automobiles. Further, it can be used, with its lifting sleeve or tube, to push upwardly on a device disposed, for instance, seven feet above the floor on which the jack assembly is supported.

My preferred jack assembly comprises a platform providing a bottom, a jack standard rigidly connected to the platform and extending vertically upwardly therefrom, a lever-actuable lift frame arranged for vertical reciprocation on the standard, and wheel means for movably supporting the platform on a surface, such as a concrete floor of a garage. The wheel means are preferably arranged yieldingly to support the bottom of the platform slightly above and out of contact with such a surface so that, when a predetermined downwardly directed load is applied to the platform, the bottom will rest directly on the surface. It will be appreciated, therefore, that my jack assembly, in an unloaded condition, can be easily moved into position for performing a lifting operation. As soon as the jack is used to initiate the lift, the lifting force will be effective to push the bottom of the platform against the floor to provide a secure base from which to lift.

In order to lift all types of automobiles, I have provided a unique flexible lifting strap having a first end and a second end. The first end of this strap is provided with means for engaging the lifting hook provided by the lift frame of the jack assembly. The second end of the strap is provided with a pair of laterally spaced apart and downwardly extending fingers, the distal end of each finger being provided with a forwardly and upwardly turned hook portion. I have found that my laterally spaced apart, hook-type fingers provide a more secure engagement with certain types of automobile bumpers than has heretofore been achieved with a single hook. The conventional flexible straps with which I am familiar include a single hook for engaging and pulling upwardly on a bumper.

My preferred jack assembly also includes a rigid sleeve telescopically receiving the upper portion of the jack standard, the sleeve resting directly on an upwardly and horizontally extending surface of the lift frame. My sleeve and lift frame are constructed so that any downwardly directed forces applied to the sleeve are applied along the vertically extending axis of the standard. My sleeve and standard are constructed so that there is no tendency for the sleeve to rotate or rock about the vertical axis provided by the standard. The importance of this feature, from a safety standpoint, will be appreciated as this description progresses.

Other objects and features of my invention will become apparent as this description progresses.

To the accomplishment of the above and related objects, my invention may be embodied in the manner described in the following specification, attention being called to the fact, however, that the specific structure described is by way of illustration only and that changes may be made therein, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is an elevational view of my jack assembly;

FIG. 2 is a plan view of my jack assembly;

FIG. 3 is a perspective view of the lifting strap of my invention;

FIG. 4 is a fragmentary, partially sectioned, elevational view of the lifting tube or sleeve of my invention; and

FIG. 5 is a sectional view taken from FIG. 4 generally along the lines 5—5.

Referring now to the dawings, it will be seen that I have illustrated my jack assembly **10** as comprising a platform **12** on which a conventional jack standard **14** is mounted. The jack standard is connected to the platform as indicated at **16** to extend vertically upwardly therefrom.

In FIG. 1, I show my jack assembly **10** on a floor or surface as indicated at **18**, the bottom **20** of the platform **12** being supported just slightly above the floor **18**. I provide wheel means for movably supporting the platform **12**, the wheel means being arranged yieldingly to support the bottom **20** slightly above and out of contact with the floor **18** when the jack assembly **10** is in unloaded condition. When a predetermined load is applied to the platform **12**, the wheel means give to permit the bottom **20** of the platform to rest directly on the floor **18**.

In the illustrative embodiment, my wheel means comprise a pair of pneumatic or semi-pneumatic wheels **22, 24** disposed at opposite sides of the platform **12** adjacent its rear edge, each wheel **22, 24** being journal mounted on an axle bolt **28**. In this description and in the claims appended hereto, the terms "pneumatic" and "semipneumatic" are to be treated synonymously. It will be appreciated that the axle bolts **28** are merely illustrative and that any number of types of axle means may be used to journal mount the wheels **22, 24**. The internal pressure of the wheels **22, 24** is such that, when the jack assembly **10** is in an unloaded condition, the bottom **20** of the platform **12** is held just slightly above and out of contact with the floor **18**. This is best seen in FIG. 1. The structures of pneumatic wheels are well known and need not be discussed, in detail, in this description.

My preferred wheel means also includes a caster **26** which is conventionally swivelly mounted on the forward end of a member **30**, the rear end of which is connected to the forward portion of the platform **12** by a fastening element **32**. The fastening element **32** is arranged so that the member **30** can move slightly upwardly relative to the platform **12** and, therefore, I have provided another fastening element **34** and a spring **36** ar-

ranged yieldably to urge the member **30** downwardly against the upper surface of the platform **12** to hold the bottom **20** of the platform slightly above and out of contact with the floor **18**. The fastening element **34** may be a conventional bolt penetrating a through opening in the member **30** and threadedly engaging either a threaded hole in the platform **12** or a conventional nut disposed below the upper surface of the platform **12**. The spring **36** may be a conventional coiled compression spring. The fastening element **32**, the fastening element **34** and the spring **36** comprise means for yieldingly connecting the caster **26** or, more specifically, the member **30** on which the caster is mounted, to the forward portion of the platform **12**.

When a predetermined downwardly directed load is applied to the platform **12**, the wheels **22**, **24** and the spring **36** give to permit the bottom **20** of the platform **12** to rest directly on the floor **18**. It will be appreciated that this direct engagement of the bottom **20** with the floor **18** provides a stable base from which something, such as an automobile, may be lifted. In FIG. 1, I have illustrated in, phantom, an automobile bumper B. When the platform **12** is rolled under the bumper B and the lift frame is connected to the bumper as illustrated, as soon as an upwardly directed force is applied to the bumper, a downwardly directed force is, of course, applied to the platform **12**. I prefer that the bottom **20** of the platform **12** be held out of contact with the floor **18** until a downwardly directed force, in addition to the weight of the jack assembly and its accessories, is applied to the platform **12**.

My preferred platform **12** is an inverted, eight-inch steel channel member which is twenty-two inches long. The side flanges of this channel member are indicated at **38**. The bottom **20**, therefore, is defined by the lower edges of these flanges **38**.

I also prefer that the standard **14** be securely welded to the upper surface of the platform **12**. Thus, the connection indicated at **16** is a welded connection and includes a pair of brackets **40**, **42** disposed on opposite sides of the standard **14**, each bracket being welded to the platform as well as to the standard.

I prefer to use a conventional jack standard **14** which is provided with longitudinally equally spaced apart lug openings **44**. I then use a conventional lever-actuable lift frame **46** which is mounted on the standard for vertical reciprocation. The frame **46** provides a forwardly projecting lifting hook **48**. A lever **50** is conventionally operatively connected to the lift frame **46**. The structure of such lift frames is conventional and need not be discussed, in detail, in this description.

The particular lift frame **46** which I use is provided with an upwardly facing, generally horizontal surface **52** extending about the standard **14**.

I provide a rigid lifting sleeve **54** which telescopically receives the upper portion of the standard **14**, the lifting sleeve having a lower end **56** and an upper end **58**. The lower end **56** of the lifting sleeve **54** is formed to provide a downwardly facing, generally horizontal surface extending about the standard **14** and uniformly contacting the upwardly facing surface **52** as best seen in FIG. 4. The lifting sleeve **54**, thus, rests directly on the lift frame **46** in such a manner as not to apply any forces tending to twist or to cock the lift frame on the standard **14**. A force applied vertically downwardly on the upper end **58** of the sleeve **54** will be directed vertically downwardly against the lift frame **46** and through the center of the lift frame. This manner of directing the forces applied to the lifting sleeve **54** to the lift frame **46** will significantly increase its wear life as well as significantly decrease the possibility of the lift frame binding or malfunctioning when the lifting sleeve **54** is being used.

My preferred lifting sleeve **54** is rectangular in cross-section as best seen in FIG. 5. Specifically, I prefer that the jack standard **14** provide a pair of oppositely facing,

parallel and vertically extending outer surfaces **62**, **64** and that the sleeve **54** provide a pair of oppositely facing, parallel and vertically extending inner surfaces **66**, **68**, the inner surfaces facing, respectively, the outer surfaces as illustrated in FIG. 5. The spacing between each inner surface **66**, **68** and its facing outer surface **62**, **64** is such that the inner surfaces cannot move significantly out of parallelism with the outer surfaces. Therefore, because of the facing relationship of the surfaces **62**, **64** and **66**, **68**, my lifting sleeve **54** will not twist or move about a vertically extending axis defined by the standard **14**. I prefer that the sleeve **54** be proportioned and designed loosely and telescopically to receive the standard **14** with clearances as suggested in FIG. 5 which is not to scale. I prefer to have the standard **14** constructed to be 2 inches wide with a ⅞ inch flange and a ⅜ inch web through which the holes **44** are provided. I prefer that the sleeve **54** have outside dimensions of 2½ inches by 1½ inches. The prevention of twisting motion of the sleeve **54** relative to the standard **14** does not require direct bearing contact between the surfaces **62**, **64** and **66**, **68**.

I prefer to provide a socket **70** on the upper end **58** of the sleeve **54**, the socket, in the illustrative embodiment, including a rigid member **72** welded directly to the sleeve and formed symmetrically to extend outwardly and upwardly from each side of a vertical plane extending through the center of the standard **14** and parallel to its outer surfaces **62**, **64**. The member **72** is preferably formed to provide an upwardly facing generally horizontal engaging surface **74** which is at least as large as and in vertical registry with the upwardly facing surface **52**.

The socket **70** is proportioned and designed to engage an axle of an automobile which is already lifted on a conventional hoist to raise the axle relative to the hoist. The member **72** is formed so that the weight of the axle will be applied to the upper surface **74** and, therefore, vertically against the upper surface **52** of the lift frame **46**.

I prefer that the length of the standard **14** and the lifting sleeve **54** be such that the socket **70** can be used to engage and lift an item, such as an axle, which is disposed, for instance, seven feet above the floor level indicated at **18**.

In order to prevent movement of the lift frame **46** above a predetermined height on the standard **14** when the sleeve **54** is being used, I prefer to extend a stop means through a lug opening **44** at a selected height on the standard **14**. In FIG. 5, I show a bolt **76**, washer **78**, and nut **80** with the shank of the bolt extending through an opening **44** to provide means for stopping the lift frame **46** at such an opening. It will be appreciated that any number of means may be placed on the standard **14** to prevent movement of the lift frame **46** above a specific point on the standard.

For the purpose of supporting the lever **50** and holding it against the standard **14** when the lift frame **46** is in its lowermost position, I have provided a small chain **82** formed in a loop to extend through one of the openings **44** as illustrated in FIG. 1. This chain, is mounted about 8 inches from the top of standard **14** and immediately above the bolt **76**, the chain being of such a size that it will fit between the standard **14** and the sleeve **54**.

Further, I provide a safety pin **83** which is connected to the lift frame **46** by a chain **84** and which can be used to prevent downward movement of the lift frame. Specifically, after the lift frame is raised to a desired height, the pin **83** can be placed in a lug opening **44** to act as a stop preventing downward movement of the lift frame **46**.

My assembly also includes a flexible lifting strap **88** having a first end **90** and a second end **92**. The first end **90** is provided with means **94** for engaging the lifting hook **48** and the second end **92** is provided with a pair of laterally spaced apart and downwardly extending fingers **96**, the distal end of each finger being provided with a forwardly and upwardly turned hook portion **98**. In the illustrative embodiment, the means **94** is a trapezoidally shaped

metal loop for receiving and engaging the forwardly extending lifting hook **48**. Further, in the illustrative embodiment, the fingers **96**, are provided by forming a metal rod to have a straight central portion **100** from each end of which extends a finger.

The lifting strap **88** may be assembled by forming a flat strap of material and sewing it as indicated at **102** to provide a loop at the first end **90** securing the means **94** and forming and sewing the strap as indicated at **104** to provide another loop receiving the central portion **100** of the rod providing the fingers **96**. I prefer that the strap material be folded and sewn so as to provide another loop **106** for securing another means **108** for engaging the lifting hook **48**, this means **108** being disposed intermediate the ends **90**, **92** of the lifting strap. The means **108** may be identical to the means **90**.

When the lifting strap **88** is to be used with a smaller bumper, the means **108** is engaged with the lifting hook **48**. When the strap **88** is to be used with a larger bumper, such as illustrated in FIG. 1, the means **94** is engaged with the lifting hook **48**. By providing the two means **94**, **108**, I can select the effective length of the lifting strap **88**. I prefer that the length of the lifting strap **88** be approximately ten inches and that the distance between the end **92** and the loop **106** securing the means **108** be approximately five and one-half inches.

When the strap **88** is used with smaller bumpers, the means **108** is engaged with the lifting hook so that the lift frame can start lifting from the lowest possible position on the standard **14**. This feature is, of course, conducive to safety. When the lifting strap **88** is used with a larger bumper, such as indicated at B in FIG. 1, the means **94** is engaged with the lifting hook **48**.

I have found that the two laterally spaced apart, hook-type fingers **96** will permit the engagement of any type of automobile bumper. The fingers **96** are approximately two and one-half inches apart.

To prevent an overload and damage to the lift frame **46**, I have installed a shear pin **86** in the lift frame mechanism. This shear pin **86** has sufficient carbon content to shear when the load on the lift frame exceeds a predetermined figure.

What is claimed is:

1. A jack assembly comprising a platform providing a bottom, a jack standard rigidly connected to said platform and extending vertically upwardly therefrom, said standard being rigid and self supporting and connected to said platform only at and by its base, a lever-actuable lift frame arranged for vertical reciprocation on said standard, said lift frame providing a forwardly projecting lifting hook, and wheel means for movably supporting said platform on a surface, said wheel means being arranged yieldingly to support said bottom slightly above and out of contact with such a surface so that, when a predetermined downwardly directed load is applied to said platform, said bottom will rest directly on such a surface.

2. The assembly of claim **1** including a flexible lifting strap having first and second ends, said first end being provided with means for engaging said lifting hook, and said second end being provided with a pair of laterally spaced apart and downwardly extending fingers, the distal end of each finger being provided with a forwardly and upwardly turned hook portion.

3. The assembly of claim **2** in which said lifting strap is provided, intermediate its ends, with second means for engaging said lifting hook to provide means for shortening the effective length of said strap.

4. The assembly of claim **1** in which said lift frame provides an upwardly facing, generally horizontal surface extending about said standard, and including a rigid sleeve telescopically receiving the upper portion of said standard, said sleeve having a lower end and an upper end, the lower end of said sleeve providing a downwardly facing generally horizontal surface extending about said standard and uniformly contacting and resting upon said upwardly facing surface provided by said lift frame, said sleeve being vertically movable relative to said lift frame.

5. The assembly of claim **4** in which said standard is provided with a pair of oppositely facing, parallel and vertically extending outer surfaces and in which said sleeve is provided with a pair of oppositely facing, parallel and vertically extending inner surfaces, said inner surfaces facing, respectively, said outer surfaces, and the spacing between each inner surface and its facing outer surface being such that said inner surfaces cannot move significantly out of parallelism with said outer surfaces.

6. The assembly of claim **5** including means providing a socket on the upper end of said sleeve, said socket providing means including a rigid member formed symmetrically to extend outwardly and upwardly from each side of a vertical plane extending through the center of said standard and parallel to its said outer surfaces, the member providing an upwardly facing, generally horizontal engaging surface which is at least as large as and in vertical registry with the upwardly facing surface provided by said lift frame.

7. The assembly of claim **1** in which said wheel means includes pneumatic wheels, the internal pressure of which is sufficient to hold said bottom out of contact with such a surface until such a predetermined load is applied.

8. The assembly of claim **1** in which said wheel means includes a pair of side wheels disposed adjacent the rear of said plaftorm and a caster disposed adjacent the front of said platform, and yieldable means connecting said caster to said platform.

9. The assembly of claim **1** in which said wheel means includes a pair of wheels disposed adjacent the rear of said platform and on opposite sides thereof and a caster disposed adjacent the front of said platform, a member extending forwardly from said platform, said caster being connected to the forward end of said member, and yieldable means connecting the rear end of said member to said platform, said wheels being pneumatic wheels, the internal pressure of said wheels and said yieldable means being effective to hold said bottom out of contact with such a surface until such a predetermined load is applied..

10. The assembly of claim **4** in which said standard is provided with conventional, longitudinally spaced apart lug openings, and including stop means extending through one of said openings to limit the upward movement of said lift frame.

11. The assembly of claim **6** in which said wheel means includes a pair of wheels disposed adjacent the rear of said platform and on opposite sides thereof and a caster disposed adjacent the front of said platform, a member extending forwardly from said platform, said caster being connected to the forward end of said member, and yieldable means connecting the rear end of said member to said platform, said wheels being pneumatic wheels, the internal pressure of said wheels and said yieldable means being effective to hold said bottom out of contact with such a surface until such a predetermined load is applied.

12. The assembly of claim **11** including a flexible lifting strap having first and second ends, said first end being provided with means for engaging said lifting hook, and said second end being provided with a pair of laterally spaced apart and downwardly extending fingers, the distal end of each finger being provided with a forwardly and upwardly turned hook portion.

13. A jack assembly comprising a platform providing a bottom, a vertically lifting jack mechanism mounted on said platform and wheel means for movably supporting said platform on a surface, said wheel means being arranged yieldingly to support said bottom slightly above and out of contact with such a surface so that, when a predetermined downwardly directed load is applied to said platform, said bottom will rest directly on such a surface, said wheel means including pneumatic wheels, the internal pressure of which is sufficient to hold said

bottom out of contact with such a surface until such a predetermined load is applied.

14. The jack assembly of claim **13** in which said wheel means includes a pair of pneumatic side wheels disposed adjacent the rear of said platform and a caster disposed adjacent the front of said platform, and yieldable means connecting said caster to said platform.

15. A jack assembly comprising a lifting hook arranged for generally vertical reciprocation and a flexible lifting strap having first and second ends, said first end being provided with means for receiving and engaging said lifting hook, and said second end being provided with a pair of laterally spaced apart and downwardly extending fingers, the distal end of each finger being provided with a forwardly and upwardly turned hook portion.

16. A jack assembly comprising a vertically extending standard, a lift frame arranged for vertical reciprocation on said standard, said lift frame providing an upwardly facing generally horizontal surface extending about said standard, and a rigid sleeve telescopically receiving the upper portion of said standard, said sleeve having a lower end and an upper end, the lower end of said sleeve providing a downwardly facing generally horizontal surface extending about said standard and uniformly contacting and resting on said upwardly facing surface provided by

said lift frame, said standard being provided with a pair of oppositely facing, parallel and vertically extending outer surfaces and said sleeve being provided with a pair of oppositely facing, parallel and vertically extending inner surfaces, said inner surfaces facing, respectively, said outer surfaces, and the spacing between each inner surface and its facing outer surface being such that said inner surfaces cannot move significantly out of parallelism with said outer surfaces.

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