

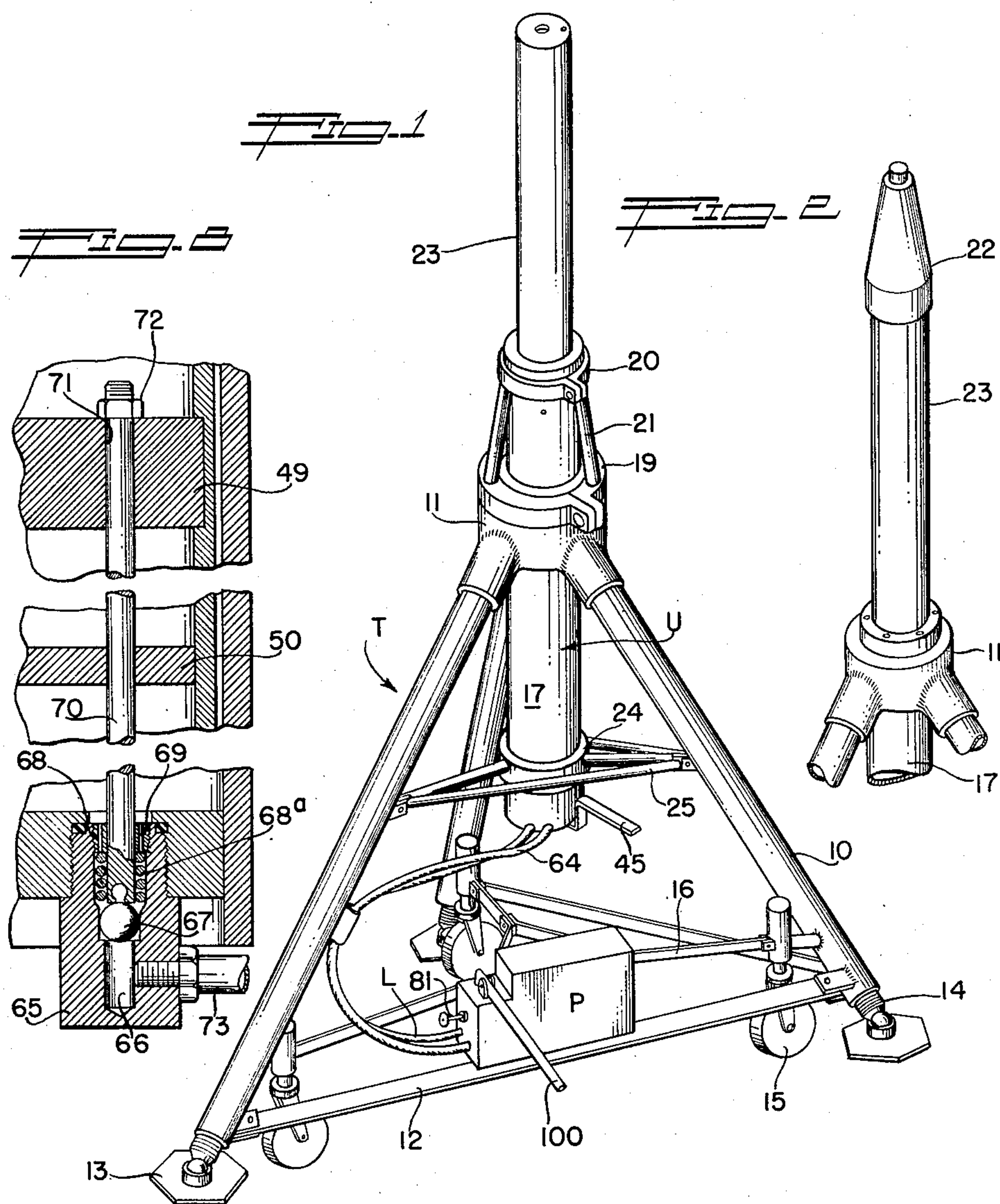
Feb. 6, 1951

S. R. HALL ET AL
HYDRAULIC INTERNAL LOCKING JACK

2,540,578

Filed Sept. 27, 1945

2 Sheets-Sheet 1



INVENTORS
STANLEY R. HALL
BY & EARL JELTER

George Sullivan
Agent

Feb. 6, 1951

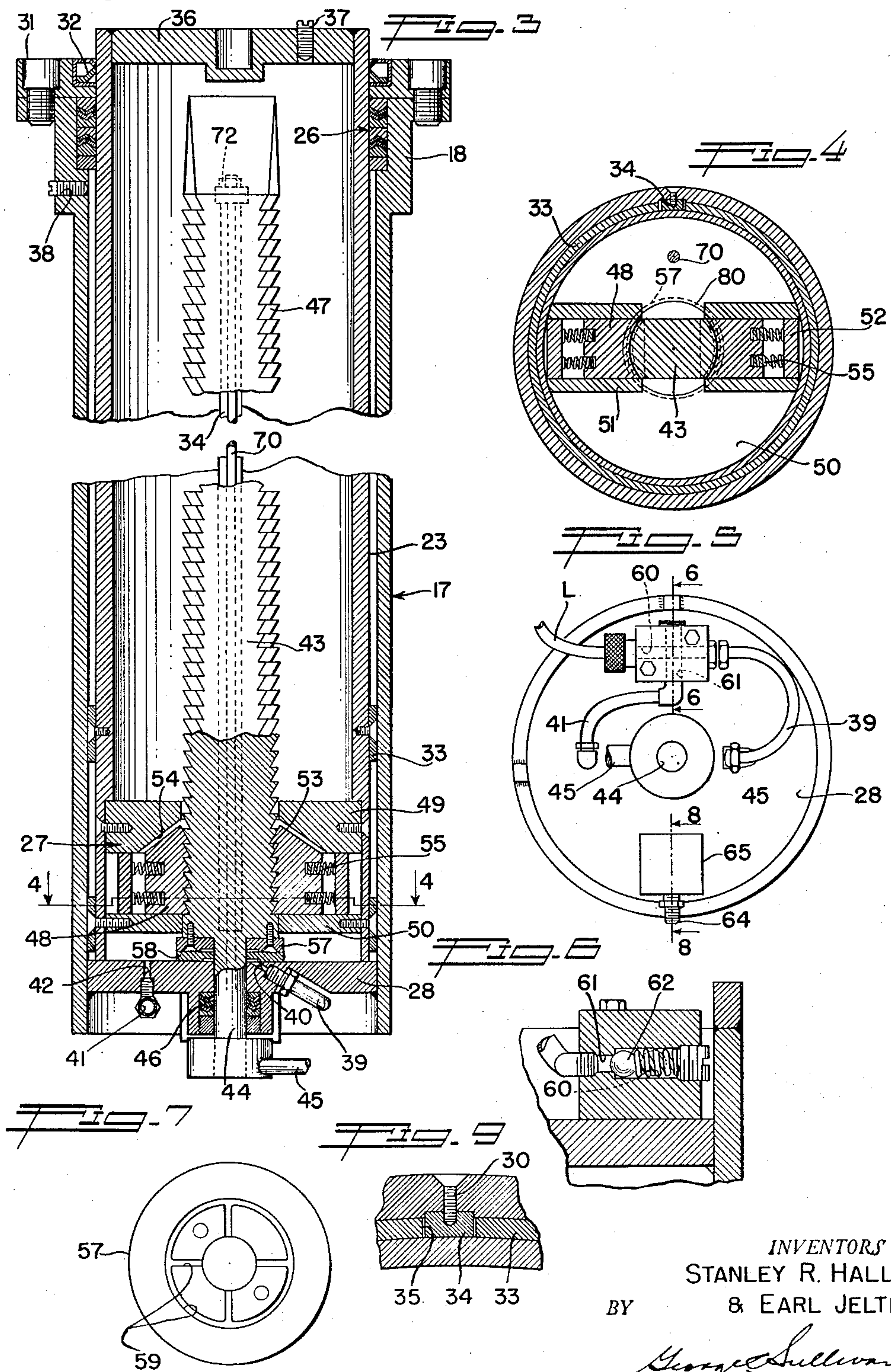
S. R. HALL ET AL

2,540,578

HYDRAULIC INTERNAL LOCKING JACK

Filed Sept. 27, 1945

2 Sheets-Sheet 2



INVENTORS
STANLEY R. HALL
& EARL JELTER

BY

George Sullivan
Agent

UNITED STATES PATENT OFFICE

2,540,578

HYDRAULIC INTERNAL LOCKING JACK

Stanley R. Hall, Burbank, and Earl Jelter, Glendale, Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Application September 27, 1945, Serial No. 618,894

10 Claims. (Cl. 121—40)

1

This invention relates to jacks, and relates more particularly to hydraulic jacks; that is, jacks operated by fluid pressure.

Hydraulic jacks are employed extensively in many industries, being used in the aircraft industry, in railroading, in the automotive industry, etc. There is one feature of such jacks that has heretofore been the cause of considerable difficulty. In the event of fluid pressure leakage or failure with the jack ram in an extended position under load, the ram will retract with possibly serious consequences. This difficulty is also encountered in hydraulic rams and hoists employed to elevate automotive vehicles, etc. To insure against such accidental lowering of hydraulic jacks, it has been the practice to thread the outer part of the ram and to provide a nut thereon which may be adjusted against the upper end of the jack barrel to retain the ram in the elevated position. In other instances a pin is passed through one of several openings in the ram to engage the jack barrel and thus prevent collapsing of the jack. The thread, or the openings in the ram, materially weaken the ram against lateral loading and carry moisture and dirt into the jack cylinder upon lowering of the ram so that the hydraulic fluid soon becomes contaminated.

Other factors which have placed limitations upon the use of hydraulic jacks are the extensive cost of accurately machining both the internal surface of the cylinder and the external surface of the piston or ram, and the difficulty of maintaining a fluid-tight seal around the ram in situations where the jack is subjected to lateral loading.

It is an object of this invention to provide a hydraulic jack incorporating locking means for positively preventing accidental lowering or retraction of the ram in the event of fluid pressure failure or leakage, which locking means is entirely contained within the jack cylinder and remains therein throughout the full stroke of the jack. There are no elements of the locking means which extend from the cylinder to carry water or dirt back through the cylinder upon retraction of the ram, and there are no exposed parts subject to maladjustment or injury. Further, the lock means is at all times immersed in a bath of the hydraulic fluid.

It is another object of the invention to provide an internal locking hydraulic jack in which the locking means is automatic, serving to automatically lock the ram in any selected or required position. It is unnecessary for the operator to thread a nut into position or to insert a

2

safety pin. The only requirement is that the lock control lever be set in the locking position when the jack is put into operation.

Another object of the invention is to provide a jack of the character referred to in which the locking means cannot be accidentally released while the jack remains under load, and yet may be easily and quickly released when it is desired to lower the ram and its load. The loading of the jack resists manual operation of the control lever so long as the jack remains under load, but when it is desired to lower the load, the introduction of a small amount of fluid under pressure frees the lock mechanism so that the lever may be readily moved to the released position with a minimum of effort. The introduction of the fluid pressure to the cylinder to free the lock mechanism for release further serves to insure that the cylinder contains sufficient fluid to prevent a sudden forceful retraction of the ram under load.

Another object of the invention is to provide a hydraulic jack in which it is unnecessary to grind, hone or specially finish the internal surface of the cylinder to receive a sealed piston. The special accurate finishing of the jack cylinder has been a required item of cost in prior hydraulic jacks. In the jack of the present invention, the internal surface of the cylinder does not require careful or accurate machining, and the piston or ram carries no packing but merely moves through a suitable sealing means at the upper end of the cylinder. The positioning of the packing or sealing means at the upper end of the cylinder is especially advantageous because it is affected to a minimum extent by lateral loading and minor lateral displacement of the ram or piston with respect to the cylinder. Furthermore, the sealing means and wiping means at the upper end of the cylinder prevent the entrance of water into the cylinder.

A further object of the invention is to provide a locking hydraulic jack of the character above referred to that is simple and inexpensive to manufacture, and that is capable of embodiment in jack and hoist mechanisms of various proportions and types.

Other objectives and features of the invention will become apparent from the following detailed description of a typical preferred form of the invention illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of a jack of this invention associated with a supporting tripod;

Figure 2 is a fragmentary perspective view illustrating the manner in which the jack unit may be directly supported in the tripod;

Figure 3 is an enlarged vertical detailed sectional view of the jack unit removed from the tripod;

Figure 4 is a transverse detailed sectional view taken as indicated by line 4—4 on Figure 3;

Figure 5 is a bottom view of the jack unit;

Figure 6 is an enlarged fragmentary sectional view taken substantially as indicated by line 6—6 on Figure 5;

Figure 7 is an enlarged bottom view of the release thrust washer of the lock mechanism;

Figure 8 is a fragmentary sectional view of the ram limit mechanism showing the pawl carrier in the fully extended position; and

Figure 9 is a fragmentary transverse sectional view of the ram guiding means.

The jack mechanism of this invention is adapted for embodiment in hydraulic jacks, hoists and the like, for use in the various industries, and is capable of modification to suit it for use in devices of different capacities and types. In the following description we will describe a typical form of the invention as embodied in a tripod jack useful in the aviation industry, it being understood that this is not to be construed as limiting either the scope or applicability of the invention.

In Figure 1 we have shown a tripod T for operatively supporting the jack unit U. This tripod includes three inclined legs 10 secured at their upper ends in a central collar or carrier member 11. Connecting braces 12 extend between the legs 10 adjacent their lower ends and ground-engaging pads 13 are secured to the lower ends of the legs by adjustable universal joints 14. Retractable casters 15 are carried by brace members 13 extending inwardly from the lower parts of the legs 10. We have shown a manually operable pump P supported in the lower portion of the tripod T for supplying the operative fluid pressure to the jack unit U. The conventional pump P illustrated has the usual operating levers 100 and a release or return valve operated by a handle 21 to allow the return of the fluid to the pump or its reservoir when the load is to be lowered. It is to be understood that the jack means of the invention may be employed in connection with any other suitable source of actuating fluid pressure.

The cylinder 17 of the jack unit U is provided at its upper end with a flanged head 18, (see Figure 3) by means of which the unit may be supported in the tripod T or other carrying structure. In Figure 1 there is shown an extension for mounting the unit U in an elevated position on the tripod. This extension includes a lower ring 19 engaged on the carrier member 11, and upper ring 20 and rods 21 extending between the two rings. The above mentioned head 18 of the jack cylinder 17 is supported in the upper ring 20 to be some distance above the normal top of the tripod. In Figure 2 we have shown the flanged head 18 directly engaged on the carrier member 11 of the tripod. In this case any suitable form of fixture or extension 22 may be provided on the upper end of the jack piston or ram 23. It may be preferred to provide the tripod T with a collar 24 for encircling the lower portion of the jack cylinder 17. The collar 24 is carried by suitable members 25 which extend inwardly from the legs 11. The lower supporting collar 24 assists in centering and steadying the jack unit U in the tripod.

The jack unit U of the invention includes the aforementioned cylinder 17 and ram 23, and fur-

ther includes means 26 for sealing the cylinder and ram, and a releasable locking means 27 for preventing accidental retraction of the ram.

It is a feature of the invention that the cylinder 17 may be a simple tubular member requiring a minimum of machining. A base or head 28 is suitably fixed and sealed in the lower end of the cylinder as by welding. The piston or ram 23 enters the upper end of the cylinder, and the cylinder and ram elements may be of approximately the same length. In accordance with the invention, the outside diameter of the ram 23 is appreciably smaller than the inside diameter of the cylinder, and the only required means for sealing about the ram is located in the head 18 of the cylinder. This sealing means 26 may be in the nature of Chevron type packing engaged between a shoulder in the cylinder 17 and a ring 31 secured to the flanged head 18 of the cylinder. A wiping ring 32 is recessed in the ring 31 to wipe the ram as it enters the cylinder and thus prevent the entrance of water and other foreign matter into the cylinder.

It will be observed that with the construction just described, it is unnecessary to accurately machine or finish the internal surface of the cylinder 17. However, the external surface of the ram 23 is machined or finished to properly cooperate with the sealing means 26. It is preferred to provide the ram with guide bushings 33 of brass, or the like, for cooperating with the cylinder 17. The guide bushings 33 are spaced apart on the lower portion of the ram 23 and are secured thereto by screws, or the like.

As will later become apparent, it is desirable to prevent rotation or angular displacement of the ram 23 with respect to the cylinder 17. The means for preventing such relative movement may take the form of a key 34 of square or rectangular transverse cross section engaged with a flat or groove in the internal surface of the cylinder. The key 34 may be secured to the cylinder by spaced screws 30, or the equivalent. The above mentioned guide bushings 33 of the ram 23 have gaps or openings 35 slidably receiving the key 34 and this cooperation prevents rotation of the ram 23 in the cylinder 17. The key 34 may extend throughout substantially the entire length of the cylinder 17.

The ram 23 may be a simple tubular part closed at its upper end by a cap 36. A port normally closed by a screw or plug 37 is provided in the cap or head 36 to permit the bleeding of air from the interior of the ram. A similar port 38 is provided in the upper wall of the cylinder 17 to communicate with the annular space between the cylinder 17 and the ram 23. The port 38 may be employed to bleed air from the cylinder 17, and if desired, may be equipped with a pressure responsive safety valve. In the arrangement illustrated, the port 38 is normally closed by a screw or plug. A pressure and return line L extends from the pump P. A line 39 communicates with a port 40 in the lower cylinder head 28 and a similar line 41 leads from a second port 42 in said head. The lines 39 and 41 are connected with the pump line L by a valve means to be later described. It will be observed that the cylinder and piston assembly of the jack unit U is of simple inexpensive construction.

The automatic locking means 27 is an important feature of the invention. The means 27 includes a rod or post 43 carried by the cylinder head 28 and extending vertically through the cylinder 17 to have its upper end adjacent to

5

the head 36 of the ram, assuming the ram to be in the fully retracted position of Figure 3. The post 43 is supported for angular movement or rotation, being provided at its lower end with a reduced stem 44 which rotatably passes through a central opening in the head 28. The bearing or washer means for rotatably supporting the post 43 on the head 28 will be later described. A shift lever or control lever 45 is secured to the lower end of the stem 44 to be readily accessible to the operator. The lever 45 is movable through about 90° to turn the post 43 between its operative and released positions. A packing gland 46 is provided in the cylinder head 28 to seal around the stem 44. The post 43 has one or more series of what we will term ratchet teeth 47. In the construction illustrated, there are two series of these teeth 47 formed on diametrically opposite sides of the post. The teeth 47 extend uninterruptedly throughout practically the entire length of the post. As best illustrated in Figure 4, the side portions of the post 43 in which the teeth 47 are formed, are cylindrically curved about the longitudinal axis of the post. Thus the teeth 47 are cylindrically curved. In the particular construction illustrated, the teeth 47 have flat horizontal upper faces and upwardly and outwardly pitched lower faces, it being understood that suitably spiralled teeth may be employed if preferred. The teeth 47 are of uniform dimensions and configuration, and the corresponding teeth in the two series occupy corresponding horizontal planes. The two diametrically opposite sides of the post 43 which are devoid of the teeth 47 are preferably machined to present flat vertical surfaces.

The locking means 27 further includes a pawl assembly associated with the piston or ram 23 and cooperating with the teeth 47 of the post 43. This assembly comprises a pair of pawls 48 and a cage for the pawls. The cage includes upper and lower disc-like plates 49 and 50 secured in the lower portion of the tubular ram 23 by screws, or the like. Round or cylindrical openings 80 in the plates 49 and 50 receive the flat sided post 43 in a manner to allow for the free circulation of fluid into and out of the hollow ram 23. Two pairs of spaced vertical plates 51 extend between and are secured to the horizontal plates 49 and 50 as by welding. As best shown in Figure 4, the plates 51 lie in parallel planes which are tangent to a circle concentric with the longitudinal axis of the jack. A vertical plate or backing member 52 extends between, and is secured to, the plates 51 of each pair of plates adjacent the wall of the ram 23. It will be observed that the cage just described is fixed to the ram 23 to travel therewith.

The pawls 48 of the locking means 27 are block-like elements carried in the above described cage to cooperate with the teeth 47 of the post 43. As illustrated in Figures 3 and 4, there are two opposing pawls, each having flat vertical sides guided by the plates 51 and a flat horizontal lower surface riding on the plate 50. The inner or active sides of the pawls 48 have serrations or teeth 53 for engaging with the teeth 47. Where the ratchet teeth 47 are horizontal as shown in the drawings, the same teeth 53 are cylindrically curved and horizontal, and are formed to have horizontal lower faces for cooperating with the upper faces of the teeth 47, and downwardly and inwardly inclined upper faces for engaging with the lower surfaces of the teeth 47. As seen in Figure 3, the teeth 47 and 53 are complementary

6

to have full mating engagement. The teeth 53 are adapted to slide or ratchet past the teeth 47 when the ram 23 moves upwardly, but lock with the teeth 47 to positively prevent downward movement of the ram. The upper cage plate 49 has downwardly and outwardly inclined surfaces 54, and the tops of the pawls 48 have correspondingly sloping faces which cooperate with the surfaces 54 to urge the pawls inwardly when load is imposed on the pawl assembly. Spring means are provided to urge the pawls 48 into engagement with the teeth 47 of the post 43. Sets of spaced helical springs 55 are arranged under compression between the member 52 and the rear faces of the pawls to yieldingly urge the pawls inwardly.

The cylindrical curvature of the teeth 47 and 53 allows the post 43 to be turned between the position where its teeth 47 are engaged by the pawl teeth 53 and the position where its flat faces oppose the pawls. The first named position of post 43 is the "locking" position where the pawls 48 serve to prevent downward or retrograde movement of the ram and the second named position is the "released" position where the ram 23 is free to travel with respect to the cylinder 17 and post 43.

The invention includes means whereby the introduction of fluid pressure into the cylinder 17 frees the post 43 for easy manual turning between the locking position and the released position, even though the jack may be under a heavy load. This means includes a bearing washer 57 secured to a shoulder on the post 43 at the upper end of the stem 44 and a bearing washer 58 engaged between the washer 57 and the upper face of the cylinder head 28.

The washer 57 is preferably of steel while the washer 58 is preferably of hard brass, or the like. The above described port 40, which is of a smaller capacity than the port 42, discharges into the cylinder 17 directly under the washer 58. The washer 58 is recessed or counterbored at this point to allow the fluid to reach the stem 44 which passes through the washer with some tolerance. The lower face of the bearing washer 57 has a pattern of channels 59 shown in Figure 7, which allows this fluid under pressure to enter between the engaging faces of the two washers 57 and 58. Assuming the jack to be under load, the sudden introduction of fluid pressure to the port 40 results in the delivery of fluid pressure to the channels 59 so that a film of fluid is provided between the faces of the washers. This film of liquid in effect "floats" the post 43 so that it may be easily turned to the released position. The introduction of fluid under substantial pressure between the faces of the washers 57 and 58 raises the post 43 to re-establish lubricant between the washers and thus free the post for easy manual turning. In this connection, it is to be observed that the interior of the ram 23 is filled with hydraulic fluid so that the entire lock means 27 is contained in a bath of the hydraulic fluid and this fact materially facilitates free turning of the post 43, even though the jack is under a heavy load. It is to be understood that the construction and relation of the lever 45 and the cylinder head 28 are such that the post is free for limited vertical movement so that the introduction of fluid under pressure to the cylinder 17 frees the post as just described, and the introduction of fluid for the purpose of operating the jack is not unduly restricted.

Means is provided to assure diversion of the

fluid pressure to the port 40 and thus facilitate easy turning of the post 43 as above described, while allowing the free rapid discharge of fluid from the cylinder 17 when the jack is to be retracted. The above mentioned lines 39 and 41, leading from the ports 40 and 42, respectively, extend to a check valve which is at the end of the pump line L. The check valve has a through port 60 leading directly from the line L to the line 39 of the port 40. A second port 61 of the check valve extends from the through port 60 to the terminal of line 41. A spring-urged ball 62 is arranged in the port 61 to cooperate with a seat therein and prevents pump pressure from flowing into the line 41 and port 42. Accordingly, fluid pressure from the pump P is obliged to travel to the port 40. However, upon release of the lock means 27 and retraction of the ram 23 the fluid pressure in the cylinder 17 unseats the valve 62, and the fluid from the cylinder returns through the larger port 42 and line 41 to the pump line L.

The invention includes a safety means for preventing over-travel of the ram 23. This safety or limit means includes a valve body 65 on the lower side of the cylinder head 28 and a line 64 extending from this body to the return side or reservoir of the pump P. The passage 66 of the valve body 65 contains a ball 67 seating inwardly against a seat therein to normally prevent the outward flow of fluid from the cylinder. A spring 68^a is engaged between the ball 67 and a guide nut 68 in the passage 66 to urge the ball to the closed position. Ports 69 in the nut 68 maintain the passage 66 in communication with the cylinder 17. A limit rod 70 is secured to the ball 67 and extends upwardly through the nut 68 into the cylinder 17. We have shown the rod 70 connected to the ball 67 by a ball or universal joint so that the ball 67 is free to center itself on the seat. The rod 70 slidably passes through openings 71 in the cage plates 49 and 50, and is provided at its upper end with a nut 72. The nut 72 is located adjacent the upper end of the cylinder 17. In the event that the ram 23 is projected an excessive distance, that is, beyond the intended limit of its upward movement, the plate 49 engages the nut 72 and lifts the rod 70 to raise the ball 67 from its seat. This allows fluid under pressure to return from the cylinder 17 to the pump or pump reservoir, and if the pump is further operated, the pumped fluid is merely bypassed through the passage 66 and line 73 back to the pump reservoir. Upon lowering of the ram 23, the spring 68 recloses the limit valve 67 to condition the jack for further operation.

In describing the operation of the jack, it will be assumed that the pump P and the jack unit U have previously been primed and conditioned for operation. When it is desired to operate the jack to elevate a load, the lever 45 is swung to the "lock" position so that the teeth 47 of the post 43 are brought into engagement with the pawl teeth 53. The pump P is then operated to supply fluid under pressure to the lower end of the cylinder 17 through the port 40 as above described. The introduction of this fluid displaces or forces the ram 23 upwardly and elevates the load. As the ram moves upwardly the teeth of the pawls 48 ratchet over the teeth 47. When the desired height is reached, pump operation is terminated. The pawl teeth 53 engaged with the teeth 47 positively prevent downward movement of the ram 23 and its load, even in the event of subsequent fluid pressure failure or leakage. Thus the lock means 27 automatically as-

sures retention of the ram and its load in the elevated position. The lock means 27 also serves to prevent sudden retraction of the load in the event of fluid pressure failure during operation of the pump and raising of the ram.

When it is desired to lower the ram 23 and its load, the pump P is put into operation for a short time, as by giving its operating lever a few strokes, to supply fluid pressure to the cylinder 17 through the port 40. As above described, this fluid pressure is directed in such a manner as to provide a film of liquid between the washers 57 and 58. This renders manual turning of the post 43 easy. The operation of the pump P for a short period also assures the provision of fluid in the cylinder 17 to replace any fluid that may have leaked out, thus avoiding the possibility that the ram 23 and its load may drop suddenly when the lock means 27 is released. Following or during the momentary operation of the pump P, the lever 45 is turned to the "released" position to move the teeth 47 out of engagement with the pawl teeth 53 and the handle 81 is operated to open the release or return valve of the pump P. This allows the ram 23 and its load to move downwardly and displace the fluid from the cylinder 17. The fluid is displaced through the port 42 and past the check valve 62 as above described, to return to the pump or its reservoir.

It will be seen that we have provided a simple dependable hydraulic jack embodying a lock means which is entirely contained within the jack cylinder to be permanently bathed in hydraulic fluid. There are no exposed lock parts subject to injury or maladjustment, and no lock parts which carry foreign matter into the jack cylinder. The lock means 27 is simple and easy to operate, and is positive in its action. The control lever 45 of the lock means is conveniently located, and it is unnecessary for the operator to climb or reach a lock means at the top of the jack cylinder as he is obliged to do in conventional jacks.

Having described only a typical preferred embodiment of our invention, we do not wish to be limited to the specific details herein set forth, but wish to reserve to ourselves any features or modifications that may fall within the scope of the following claims.

We claim:

1. In a hydraulic jack, or the like, two elements, one a cylinder, the other a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to cause one element to be moved to any one of a plurality of projected positions with respect to the other element, a member on one element having ratchet teeth, a pawl on the other element adapted to ratchet over said teeth during such projection of said projected element and cooperable with said teeth to prevent the return of said projected element from its projected position, said member and pawl being arranged and related for relative turning movement, and means for effecting such relative turning movement to disengage said teeth and pawl and thereby allow the return of said projected element.

2. In a hydraulic jack, or the like, two elements, one a cylinder, the other a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to cause one element to be moved to any one of a plurality of projected positions with respect to the other element, a turnable member extending longitudinally of one element and having ratchet teeth,

a pawl on the other element cooperable with said teeth to prevent the return of said projected element from its projected position, and means for turning said member to disengage its teeth from the pawl and allow the return of said projected element.

3. A hydraulic jack, or like device, including a cylinder, a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to project the ram therefrom, a post turnably carried by the cylinder to extend longitudinally therein, ratchet teeth on the post, a pawl carried by the ram for cooperating with the teeth to retain the ram in a projected position, and means for turning the post to disengage its teeth from said pawl.

4. A hydraulic jack, or like device, including a cylinder, a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to project the ram therefrom, a post turnably carried by the cylinder to extend longitudinally therein, ratchet teeth on the post, a cage on the ram, a pawl having teeth and carried in the cage in a manner to have its teeth engage the teeth of the post to retain the ram in a projected position, and manual means for turning the post between a position where its teeth are engageable by the teeth of the pawl and a position where its teeth are clear of the pawl teeth.

5. A hydraulic jack, or like device, including a cylinder, a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to project the ram therefrom, a post turnably carried by the cylinder to extend longitudinally therein, ratchet teeth on the post, a cage on the ram, a spring urged pawl in the cage for cooperating with the teeth of the post to prevent retraction of the ram from a projected position, the pawl being adapted to ratchet over the teeth of the post during projection of the ram, and means for turning the post between a position where its teeth cooperate with the pawl and a position where its teeth are clear of the pawl.

6. A hydraulic jack or like device comprising a cylinder, a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to project the ram therefrom including port means communicating with the cylinder, a longitudinally extending turnable post in the cylinder, ratchet teeth on the post, a pawl carried by the ram engageable with the teeth to retain the ram in a projected position, means for manually turning the post to release its teeth from the pawl and allow retraction of the ram, and means for facilitating such turning of the post when the jack is under load including two thrust bearing members having engaging faces which support the post for rotation, and means for directing fluid under pressure from said port means between said surfaces to provide a film therebetween.

7. A hydraulic jack or like device comprising a cylinder, a ram operable in the cylinder, means for introducing fluid under pressure into the cylinder to project the ram therefrom including port means communicating with the cylinder, a longitudinally extending turnable post in the cylinder, ratchet teeth on the post, a pawl carried by the ram engageable with the teeth to retain the ram in a projected position, means for manually turning the post to release its teeth from the pawl and allow retraction of the ram,

and means for facilitating such turning of the post when the jack is under load including two thrust bearing members having engaging faces which support the post for rotation, at least one of said faces having fluid channels, and means for directing fluid under pressure from said port means to said channels to provide a lubricating film of fluid between said faces.

8. A hydraulic jack comprising a cylinder, head means on one end of the cylinder, a ram operable in the cylinder and projectable from its other end, a post rotatably secured to the head and extending axially into the cylinder, an axial row of ratchet teeth on the post, means for introducing fluid under pressure into the cylinder to project the ram, a pawl carried by the ram to ratchet past the teeth during such projection of the ram and cooperable with the teeth to prevent retraction of the ram, and means for turning the post to move said row of teeth out of cooperation with the pawl and thereby allow retraction of the ram.

9. A hydraulic mechanism comprising a cylinder, a head on one end of the cylinder, a ram operable in the cylinder and projectable from the other end thereof, a post turnably secured at the head and extending axially into the cylinder and ram, an axial row of ratchet teeth on the post, an axially extending untoothed surface on the post adjacent said row of teeth, means for introducing fluid under pressure into the cylinder to project the ram, a pawl carried by the ram to cooperate with the teeth to prevent retraction of the ram, and means for turning the post to move said row of teeth out of engagement with the pawl and to move said surface into alignment with the pawl and thereby allow retraction of the ram.

10. A jack including a cylinder, head means at one end of the cylinder, a ram operable in the cylinder and adapted to extend from the other end thereof, means for introducing fluid under pressure into the cylinder to move the ram through said other end of the cylinder, a post carried by the head means for turning movement and extending axially into the cylinder, axially extending rows of ratchet teeth on opposite sides of the post, untoothed surfaces on the post between said rows, pawls on the ram cooperable with the rows of teeth to hold the ram in an extended position, and means for turning the post to move the rows of teeth out of engagement with pawls and to bring said surfaces into alignment with the pawls so the ram may retract.

STANLEY R. HALL.
EARL JELTER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,740,683	Gartin	Dec. 24, 1929
1,962,459	Ostlund	June 12, 1934
2,288,511	Bratz et al.	June 30, 1942
2,333,274	Scannell	Nov. 2, 1943
2,341,542	Grime	Feb. 15, 1944

FOREIGN PATENTS

Number	Country	Date
211,847	Germany	July 13, 1909