April 7, 1964 M. C. LUCKY 3,128,077

LOW PRESSURE BLOWOUT PREVENTER

Filed May 16, 1960 5 Sheets-Sheet 1

Fig. 9

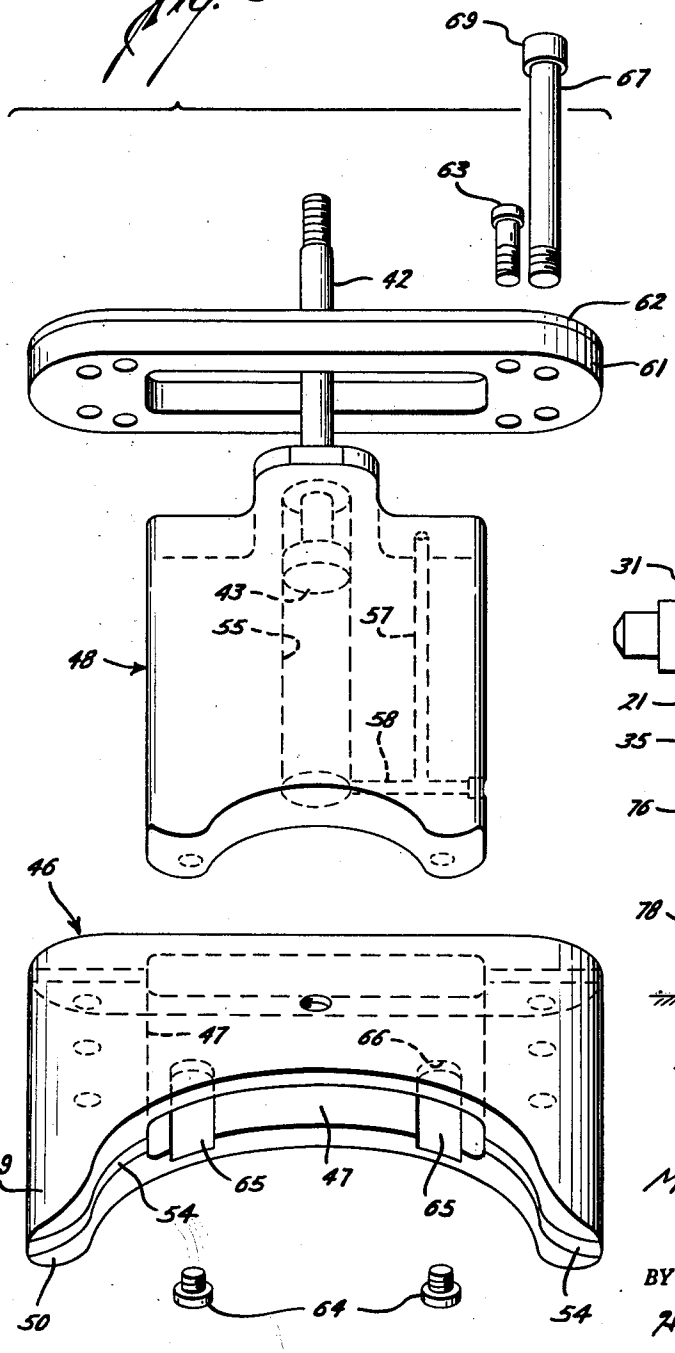
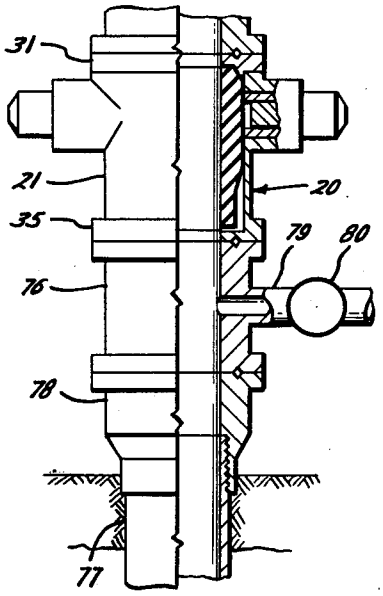


Fig. 1



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LOW PRESSURE BLOWOUT PREVENTER

Filed May 16, 1960 5 Sheets-Sheet 2

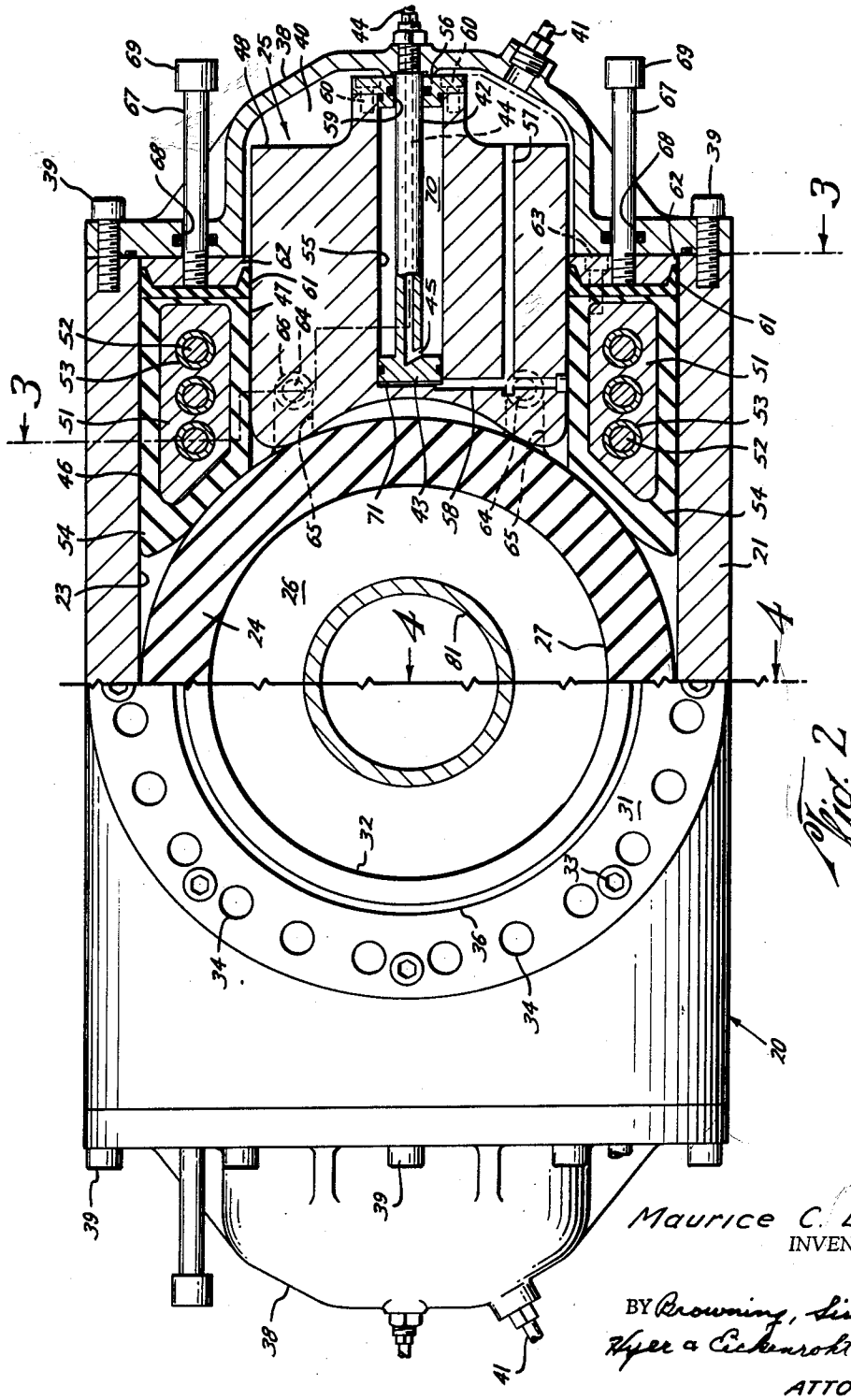


Fig. 2

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LOW PRESSURE BLOWOUT PREVENTER

Filed May 16, 1960 5 Sheets-Sheet 3

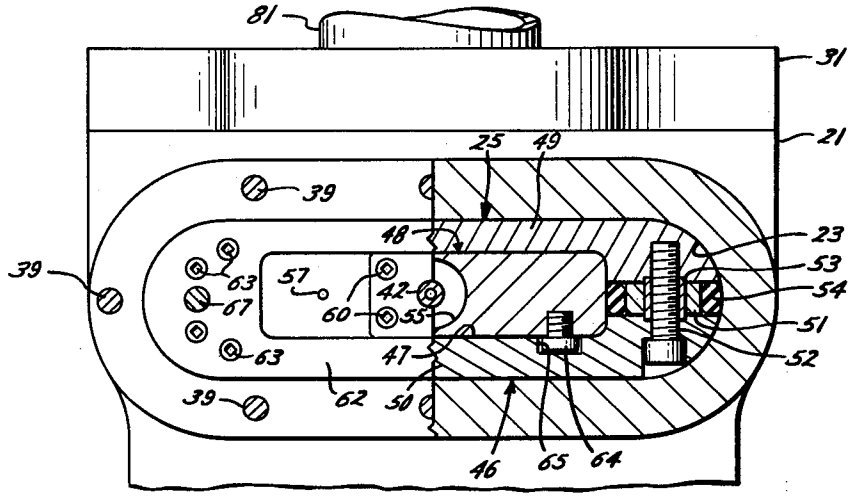


Fig. 3

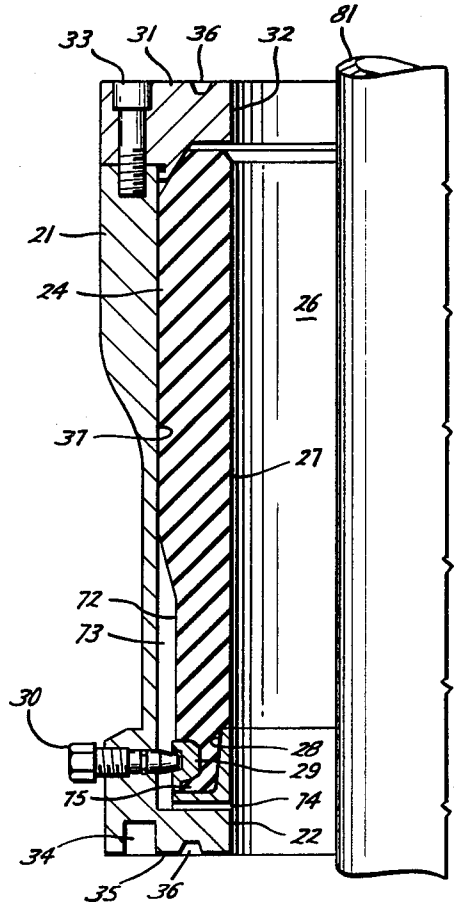


Fig. 4

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LOW PRESSURE BLOWOUT PREVENTER

Filed May 16, 1960 5 Sheets-Sheet 4

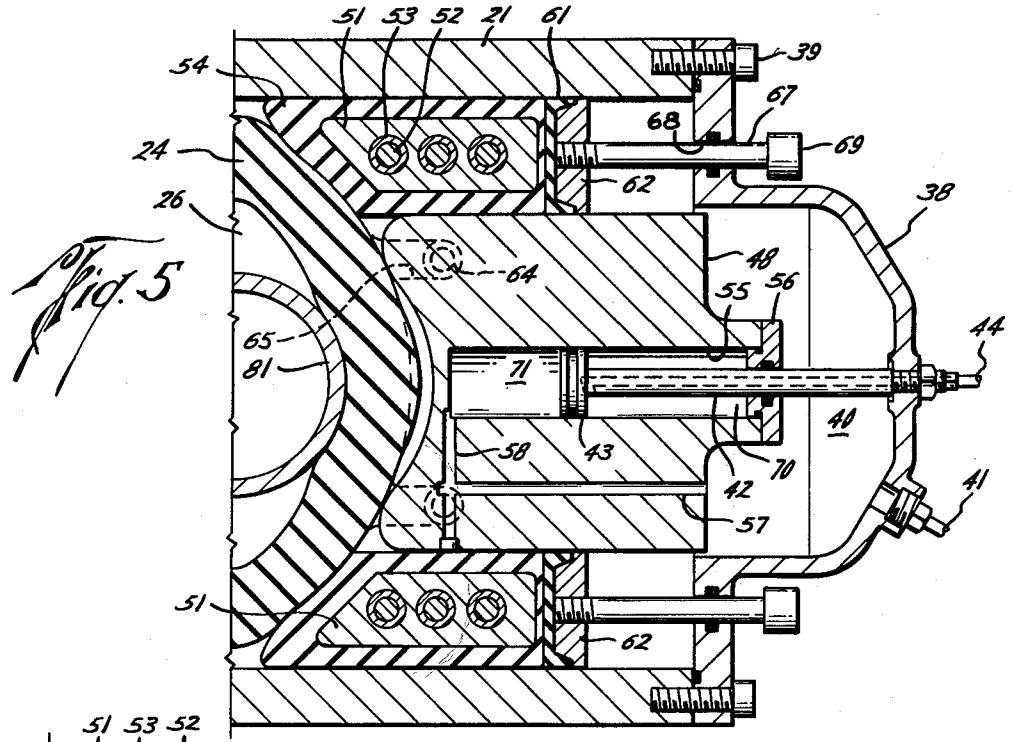


Fig. 5

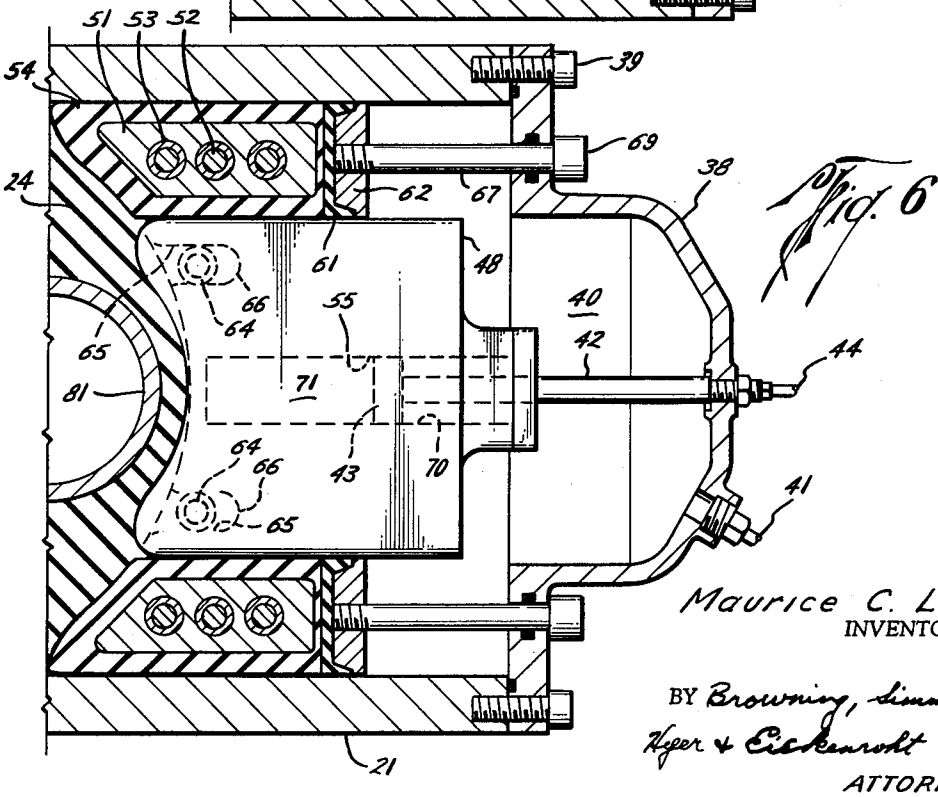


Fig. 6

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April 7, 1964 M. C. LUCKY 3,128,077

LOW PRESSURE BLOWOUT PREVENTER

Filed May 16, 1960 5 Sheets-Sheet 5

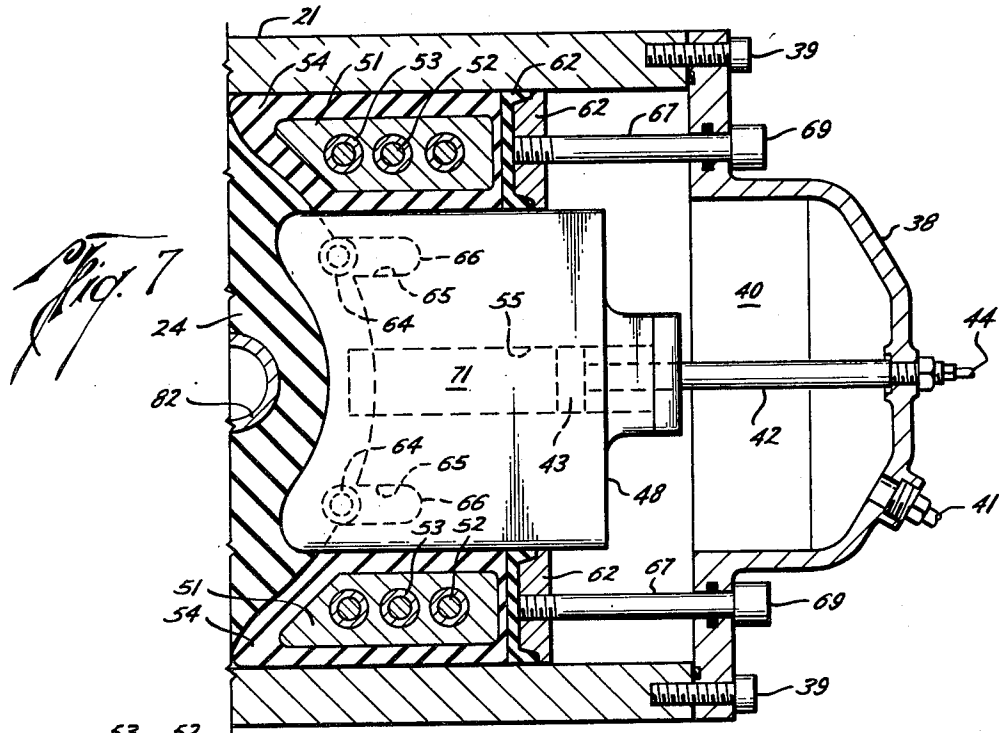


Fig. 7

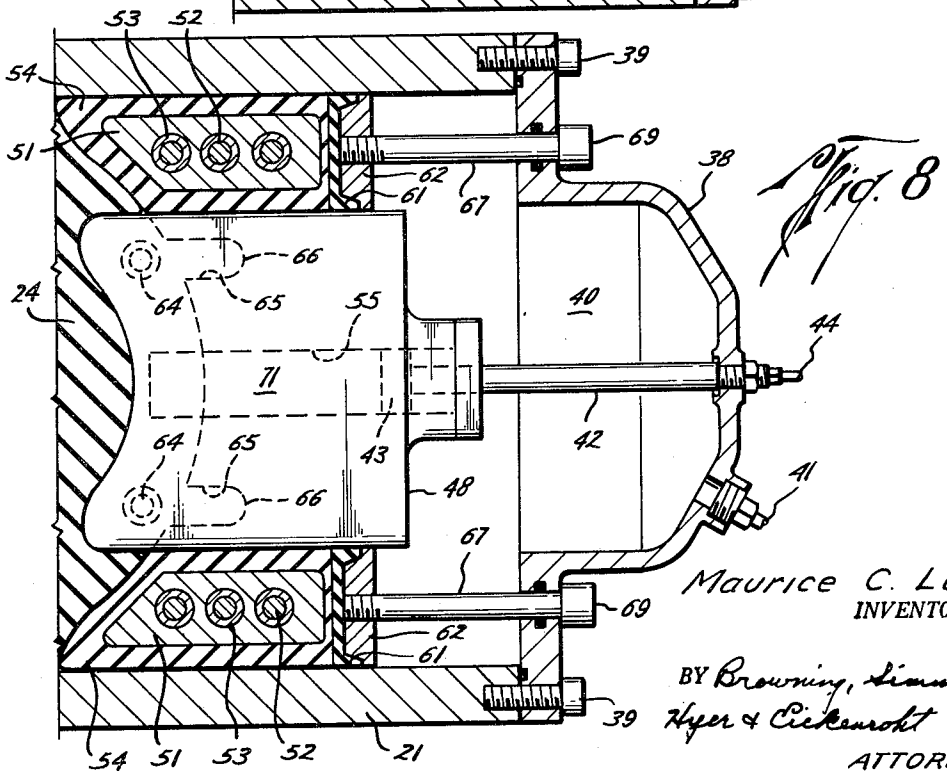


Fig. 8

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United States Patent Office

3,128,077

Patented Apr. 7, 1964

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LOW PRESSURE BLOWOUT PREVENTER

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Filed May 16, 1960, Ser. No. 29,236
9 Claims. (Cl. 251—1)

This invention relates to blowout preventers and in particular to a blowout preventer particularly well suited for controlling relatively low gas pressure in a well.

In recent years, improved drilling techniques and equipment have permitted increasingly deeper well penetrations which have introduced many problems not previously encountered. For example, deeper penetrations require the use of increasingly larger surface casings and larger number of inner casings. This, of course, requires that the larger bores necessary to accommodate the larger casings also must be carried to greater depths. As a result, relatively shallow gas pockets or gas traps are more frequently penetrated during the drilling operation while a large hole is still open at the mouth of the well, thereby exposing the well bore to the gas confined in the traps. Although the pressure of the gas in these traps may be relatively low as compared to the bottom hole gas pressure, still it may be sufficient to cause the well to blow unless some means of control is utilized.

It is desirable that a blowout preventer for controlling gas pressure in a well be capable of sealing the well off at the well head during all stages of the drilling operation. That is, it should be capable of effecting a seal about an object in the hole regardless of the size or shape of the object, and in addition, be capable of maintaining such seal by adjusting in use to permit the passage of enlargements or reduced portions of the object. Further, the blowout preventer should be capable of effecting a seal with itself when the hole is empty. In performing these functions, particularly in modern large bore well drilling operations, a blowout preventer may be called upon to pass or seal about an object in the hole that may range in size from a few inches, as in the case of a kelly, and up to 20 inches, or even larger, as in the case of large casings. On the other hand, when the hole is empty, the blowout preventer must bridge across the large bore in the surface casing to effect a seal with itself.

Blowout preventers of this "universal" type presently known and used are generally of the type shown in the patent to Knox 2,609,836 and the patent to Stone 2,287,-205. These blowout preventers have many undesirable characteristics and in use, particularly in deep well drilling operations, are difficult and expensive to handle and operate.

Blowout preventers are usually mounted on the well in the space between the rotary table or derrick floor and the top of the surface casing. It is preferable to keep this space, called the "cellar," as shallow as possible, and, for all practical purposes, the height of the space is fixed once the rig is in position and the surface casing is set. Because of the limited size and difficult working conditions in the cellar, each piece of equipment, including blowout preventers, to be mounted therein should be as small in size and light in weight as possible. However, presently known blowout preventers such as those above referred to are characterized by their extremely large size and heavy construction. This inherent features makes these blowout preventers objectionable in ordinary drilling operations, and in the case of deep well drilling or other drilling operations, utilizing large surface casings may make their use impractical. That is, when these presently known blowout preventers are sufficiently large in bore to be capable of passing casings, drill bits and the like as large as 20 inches, or even larger,

their overall size and weight make them difficult to install and use in the limited space available in the cellar.

Another objectionable feature of presently known blowout preventers is the high operating energy required to effect a seal under various drilling and sometimes even completing conditions. The seal element in these devices consists of a massive annulus of rubber molded about rigid reinforcing elements. This massive rubber seal is relatively rigid and must be deformed and extruded inwardly to effect a seal about an object in the hole, or with itself if the hole is empty. It is well known that the energy required to accomplish this operation is high, and of course, increases rapidly as the bore of the blowout preventer increases in size. In the case of deep well operations requiring blowout preventers having large bores, the high operating energy necessary for these large units makes the use of presently known blowout preventers expensive and otherwise objectionable to the point of being impractical, particularly during the early stages of the drilling operation when the pressures to be controlled are relatively low. In addition, since the rubber in the massive seal must be distorted or deformed to such a high degree in effecting seals under various conditions, the life of the seal element is relatively short and must be replaced frequently. This is extremely difficult to accomplish because of the size of the unit and the close working conditions in the cellar. In addition, it is a costly operation to the operator not only because of the labor required but also because of the cost of the replacement seal itself. The cost of the seal itself is high because of the necessary inclusion of molded-in metal inserts in the seal.

An object of this invention is to provide a blowout preventer that will obviate the foregoing difficulties and disadvantages.

Another object of this invention is to provide a blowout preventer that is relatively small and light with respect to known devices of this type, yet is rugged in construction and inexpensive to manufacture, install and operate.

Another object of the invention is to provide a blowout preventer that requires a relatively low amount of operating energy.

Another object of the invention is to provide a blowout preventer having a seal element which has a relatively long life as compared to seals in presently known devices of this type.

Another object of the invention is to provide a blowout preventer of practical size, weight and operating energy which is capable of sealing off a well to prevent blowouts during all stages of drilling operations, particularly in deep well drilling operations which require the use of relatively large diameter casings.

Another object of the invention is to provide a blowout preventer wherein the seal element is subjected to a relatively small amount of deformation when the preventer is operated to seal about an object in the well bore or with itself when the bore is empty.

Another object of the invention is to provide a low pressure blowout preventer wherein the seal element and operating rams are of unique construction and cooperate in a novel manner such that the deformation of the seal is relatively small when the seal is moved from a non-sealing position to a sealing position by engagement of the rams, even though the radial movement of the seal may be relatively great as in the case of sealing off an open hole in a well having a surface casing of large diameter.

Another object of the invention is to provide a low pressure blowout preventer of practical and desirable size and weight, and having low operating energy requirements, which is nevertheless capable of passing large

diameter objects in and out of a well or of effecting a seal about such objects including square and hex kellys, during any stage of the drilling operation, or with itself if the hole is empty.

Another object of the invention is to provide a compound ram so constructed as to be particularly well suited for use in connection with a blowout preventer according to the foregoing objects.

Another object of the invention is to provide a compound ram according to the preceding object having laterally adjacent parts movable in telescoping relation with respect to one another whereby the outer ram part operates to center an object in the bore through the blowout preventer and provide initial engagement between the seal means and object in the bore, and the inner ram part is subsequently movable further inwardly with respect to the outer ram part to deform the seal means into sealing engagement with the object, or with itself if the bore is empty, when the compound ram is extended.

Another object of the invention is to provide a compound ram according to the preceding object wherein a releasable engagement is provided between the inner and outer rams whereby the outer ram is carried from the extended to the retracted position by the inner ram, when the compound ram is retracted.

Other objects and advantages are inherent and will become apparent upon a consideration of the specification, claims and attached drawings.

These and other objects are accomplished, in the practice of this invention, by providing a blowout preventer in which a seal means extends along the bore of the preventer body and across the connections of the ram guideways therewith to provide an opening through the bore, when the rams are retracted, and to be deformed into sealing relation with an object in the opening, or with itself when the hole is empty, when the rams are extended.

Since the seal means as disclosed is a sleeve preferably of resilient material and of a supple or pliant nature, it will be understood that the operating energy required to squeeze or deform the sleeve into sealing engagement after it has been moved into sealing position will be relatively small. Further, since the sleeve is moved inwardly into sealing position by being folded or collapsed about the opening therethrough rather than by being extruded inwardly as in the case of the massive seals presently known, it will also be understood that the operating energy required to move the sleeve into sealing position will be relatively small. In addition, since the sleeve is preferably anchored at the lower end of the body and the rams engage the sleeve near the upper end of the body, when the pressure on the outside of the sleeve between the rams and the anchor point is balanced against the pressure within the sleeve, the deformation required to move the sleeve radially inwardly is distributed over the length of the sleeve between the rams and the anchor. This further reduces the operating energy to move the sleeve into sealing position.

For a more detailed description and better understanding of the blowout preventer of this invention, reference is made to the attached drawings wherein a preferred embodiment of the invention is shown and wherein like characters are used to designate like parts. In the drawings:

FIG. 1 is a schematic view in elevation of the blowout preventer of this invention mounted in operative position on a well, the right hand portion of the preventer and attached equipment being shown in vertical section;

FIG. 2 is a top plan view, partially in horizontal section, of a preferred embodiment of the blowout preventer of this invention showing the relative position of parts when the rams are retracted, and with a casing extending through the bore of the blowout preventer;

FIG. 3 is a vertical sectional view taken along lines 3—3 of FIG. 2;

FIG. 4 is a vertical sectional view taken along lines 4—4 of FIG. 2;

FIG. 5 is a view in horizontal section of the right hand portion of the blowout preventer of FIG. 2 showing the relative position of parts during the initial closing movement of the rams before a seal is accomplished about the casing in the bore;

FIG. 6 is a view similar to FIG. 5 showing the relative position of parts upon full closure of the rams to seal about the casing;

FIG. 7 is a view in cross section of the right hand portion of the preventer of FIG. 2 after a seal has been accomplished about a tubing substantially smaller in diameter than the casing of FIGS. 5 and 6;

FIG. 8 is a view in cross section of the right hand portion of the preventer of FIG. 2 when the sealing element of the blowout preventer is in sealing relation with itself when the bore is empty; and

FIG. 9 is an exploded perspective view of the compound ram in the blowout preventer of FIGS. 2 to 8.

The operation and use of the blowout preventer of this invention in connection with a typical well installation is illustrated in FIG. 1, the blowout preventer 20 being mounted on side outlet spool 76 which is in turn connected to surface casing 77 through casing housing 78. Flow of gas through side outlet 79 from spool 76 is controlled by valve 80 which may be opened to divert gas from the well to a point remote from the well when the blowout preventer is operated to seal the well off. At this point, and before the preventer is operated to seal the well off, rams 25 are in a retracted position within body 21 out of the bore therethrough while sleeve 24 is in an unstressed condition and extends longitudinally along the bore through the body and across the connection of the ram guideways therewith, as more clearly shown in FIGS. 2 and 4.

It will be understood that the bore through the blowout preventer, defined by the reduced portion of bore 22 and the bore 27 through sleeve 24, preferably corresponds to the bore in the surface or conductor casing to permit passage of the large drilling tools which may be used during the early stages of the drilling operation as illustrated in FIG. 1.

With particular reference to FIGS. 2–4, it will be seen that the blowout preventer of this invention, indicated generally at 20, comprises a body 21 having a bore 22 therethrough and a plurality of radially extending guideways 23 connecting with the bore. A sleeve 24 of resilient material extends longitudinally of the bore across the connections of the guideways therewith and is anchored at its lower end against movement axially of the bore. A compound ram 25 is longitudinally movable in each of the guideways between a retracted position (FIG. 2) within the body, in which the sleeve 24 is unstressed and provides an opening 26 through the bore, and an extended position in the bore, in which it deforms the sleeve into sealing engagement with an object in the opening (FIGS. 6 and 7), or with itself when the opening is empty (FIG. 8).

An intermediate portion of the bore 22 in body 21 is stepped on a larger diameter to provide an annular recess 37 for receiving the sleeve 24 in such a manner that the bore 27 through sleeve 24 and the reduced portion of bore 22 of body 21 are substantially coaxial and of equal diameter when the sleeve is in an unstressed condition.

A U-shaped groove 28 circumferentially surrounding and spaced radially outwardly from bore 22 and opening at its upper end into the enlarged portion 37 of bore 22 is provided at the lower end of body 21 for receiving the end of sleeve 24. Sleeve 24 is preferably sealably anchored in groove 28 against movement axially of bore 22, as by retainer 29 and lock screw 30.

A closure cap 31 is preferably sealably mounted as by recessed bolts 33 at the upper end of the body 21. Although cap 31 is shown as a separate element and as

such may be removed to facilitate assembly and replacement of sleeve 24, it will be understood that it may be formed integrally with body 21 and the sleeve 24 deformed for assembly and removal. In any event, it will be seen that an annular recess has been provided in body 21 intermediate the ends thereof surrounding and opening into the bore through the body for receiving sleeve 24. Further, the arrangement is such that the sleeve conforms to and substantially fills this annular recess and is anchored in the lower end thereof against movement axially of the bore such that in an unstressed condition the sleeve extends along the bore through the body and provides an opening 26 therein.

A plurality of threaded holes 34 may be provided in cap 31 and in the face of the open flange portion 35 of body 21 to receive mounting studs when the blowout preventer is connected to a well as illustrated in FIG. 1. Grooves 36 in cap 31 and flange portion 35 are provided to receive suitable sealing means to provide a fluid-tight seal between the body 21 and the flanges on adjacent equipment when the blowout preventer is connected to the well.

As can be seen from FIGS. 1, 2 and 3, the guideways 23 connect at one end with the enlarged portion 37 of bore 22 behind the sleeve 24, and extend radially outwardly therefrom through the wall of body 21 to provide a plurality of laterally extending openings through the body which intersect the bore at points intermediate the ends thereof, and preferably near its upper end opposite the anchor point of sleeve 24. The guideways 23 are closed at their outer ends by bonnets 38 which are removably and sealably mounted on body 21 as by bolts 39.

Referring now to FIGS. 2, 3 and 9, rams 25 preferably comprise compound rams having laterally adjacent parts longitudinally movable in telescoping relation with respect to one another. The telescoping parts are preferably independently movable with respect to one another from the retracted to the extended position and dependently movable from the extended to the retracted position in guideways 23 in body 21. That is, a releasable engagement is provided between the parts such that they may be disengaged and separately moved from the retracted to the extended position, and then engaged such that one of the parts is carried by the other part from the extended to the retracted position.

More particularly, in the preferred embodiment, each compound ram comprises an outer ram 46 having an inner ram guideway 47 therethrough for guiding and supporting an inner ram 48 for movement longitudinally therein. Slots 65 in the wall of guideway 47 slidably receive lugs 64 carried by inner ram 48, and engagement of the lugs with shoulder 66 at the end of the slots limits the movement outwardly of the inner ram with respect to the outer ram and provides a releasable engagement between the ram parts.

The inner and outer rams are movable from the retracted position of FIG. 2 to the extended positions of FIGS. 5, 6, 7 and 8 in response to fluid pressure supplied through connections 41 in bonnets 38 to chamber 40 in the outer portion of guideways 23. The pressure thus applied acts on the outer ends of each of the ram parts to move them inwardly to the extended position. Since the engagement of shoulder 66 by lugs 64 limits the outward movement of the inner ram with respect to the outer ram, it will be understood that the inner and outer rams may be disengaged and separately moved to the extended position in response to pressure supplied to chamber 40.

As shown in FIG. 3, outer ram 46 is preferably formed in two U-shaped parts comprising an upper retainer 49 and a lower retainer 50, with one-half of inner ram guideway 47 formed in each of the retainers. The retainers are spaced apart at each edge by spacer plates 61 and bushings 53, and are held in assembled relation by recessed screws 52. A side seal 54 of the shape of the horizontal central cross section of the outer ram is carried about each spacer plate between the opposing edges of the retainers and extends longitudinally of the outer ram to seal between the upper and lower retainer thereof.

End seal 61 is the shape of and is mounted on the outer end of ram 46, as by retainer plate 62 and recessed cap screw 63. Seal 61 provides a sliding seal between outer ram 46 and the walls of guideway 23, on the one hand, and between the outer ram 46 and inner ram 48 on the other hand. Bolts 67 are attached to plate 62 and are slidably and sealably received through openings 68 in bonnet 38, the head 69 of the bolt being adapted to engage the bonnet 38 to limit the inward movement of the outer ram element. This provides a means for centering a tool in the well and in addition prevents one of the opposing rams from being forced out of its guideway in the event the opposing rams do not move inwardly at the same rate.

Inner ram 48 is provided with an axial bore 55 which is bottomed at one end within the body of the ram and is closed at the other end by cylinder head 56 which is removably mounted on ram 48 as by recessed bolts 60 and is provided with an opening 59 for slidably receiving a piston rod 42. Piston rod 42 is rigidly connected at one end to bonnet 38 and carries a piston 43 at its other end for sealable and sliding fit within bore 55 to divide the bore 55 into an outer retracting chamber 70 and an inner extending chamber 71.

Inner ram 48 is movable from the extended to the retracted position in response to fluid pressure supplied to the retracting chamber 70 through bore 44 and side tap 45 in rod 42. The pressure in chamber 70 acts between piston 43 and head 56 to move inner ram 48 outwardly to its retracted position. Inasmuch as the releasable engagement between the ram parts is operable to provide an engagement between inner and outer rams and limit the outward movement of the inner ram with respect to the outer ram, the outer ram will be seen to be carried from the extended position to the retracted position by the inner ram.

Communication between extending chamber 71 and chamber 40 in guideway 23 is provided by bores 57 and 58 in the body of ram 48. This arrangement exposes the inner side of piston 43 to the fluid pressure in chamber 40, and during extension of the rams permits the pressure in chamber 40 to act between piston 43 and the bottom of bore 55 to assist in moving ram 48 inwardly.

Seal 24 preferably comprises an elongated relatively thin-walled sleeve of resilient material such as rubber or the like which may be reinforced by flexible cords of rayon, nylon, or similar material. In any event, contrary to seals presently known and use for this purpose, the material and manner of construction is selected so as to provide a tubular seal member which in use is sufficiently strong to withstand the pressures to which it may be subjected in a well, yet is of a pliant or supple nature to permit it to be deformed into sealing engagement with an object in a well, or with itself if the opening therethrough is empty, by expenditure of a relatively small amount of energy.

The lower end of the sleeve is formed in a boot-shaped flange 75 which is held between the retainer 29 and the wall of groove 28 in the body 21 to sealably anchor the sleeve against movement axially of bore 22. In an unstressed condition, the sleeve extends from this anchor point in the lower end of body 21 longitudinally along the enlarged portion of bore 22 across the connections of guideways 23 therewith to the upper end of the body.

The outer face of sleeve 24 is formed on a reduced diameter as at 72 at the lower end thereof to provide an annular space 73 between the sleeve and wall of the bore through the body. A port 74 between annular space 73 and bore 22 provides a means of equalizing the pressure across the sleeve when it is in sealing engagement with an object, or with itself when the opening there-

through is empty. This balancing of the pressure on the outside portion of the sleeve between the anchor and the rams against the pressure within the sleeve prevents the sleeve from being flattened against the wall of the bore and the underside of the rams by an overbalance of pressure from within the sleeve when a seal is made. This permits distribution over the length of the sleeve of the deformation required to move the sleeve radially inwardly to sealing position, rather than confining all this deformation to the relatively short portion of the sleeve between the wall of the bore and the face of the rams as would be the case if the pressure were not balanced.

When it is desired to seal the well off in order to control the flow of gas therefrom, fluid under pressure is introduced into each of the chambers 40 through connections 41. This pressure acts on the outer ends of both outer ram 46 and inner ram 48, as well as on the inner side of piston 43 to move the ram parts of each opposing compound ram radially inwardly from a retracted position within body 21 to an extended position in the bore through the body. As the opposing rams are moved inwardly into the bore, the face of the ram parts engages sleeve 24 and begins to collapse or fold the sleeve inwardly into the opening 26 as shown in FIG. 5. Continued inward movement of the rams folds the sleeve about an object in the opening and subsequently squeezes or deforms the sleeve into sealing engagement with the object in the opening such as casing 81 (FIG. 6), tubing 82 (FIG. 7), or with itself if the opening is empty (FIG. 8). This folding action of the sleeve in moving it from an unstressed position radially inwardly into sealing position is to be distinguished from the operation of presently known seals in which extrusion and severe deformation is required during the full travel of the seal from its unstressed position into its sealing position so that a seal may subsequently be accomplished. This further reduces the energy required and increases the life of the seal.

Since the pressure in the chamber 40 acts on both the inner and outer rams for moving the rams inwardly into an extended position and the releasable engagement between the inner and outer rams limits only the outward movement of the inner ram with respect to the outer ram, it will be understood that these parts may be sized so that the inner and outer rams of each compound ram either will move inwardly separately, or will move inwardly together until further inward movement of the outer ram is stopped by the limit bolt attached thereto. In the latter case, when the inward movement of the outer ram is stopped, engagement between the inner and outer rams is released so that each inner ram 48 may be separately moved further inwardly into the bore to squeeze the sleeve into sealing engagement with an object in the opening or with itself if the opening is empty. Thus, limit bolts 67 not only serve to limit the inward movement of the outer rams for centering an object in the well, but may also provide a means for disengaging the inner and outer rams so that they may be independently moved to the extended position from an intermediate retracted position.

In order to retract the rams from an extended position within the bore to the retracted position within the body, the pressure in chamber 40 is released as by a valve in the line (not shown) supplying pressure to connection 41 and pressure is introduced into retracting chamber 70 in inner ram 48 through bore 44 and side tap 45, from a suitable source (not shown). This pressure acts on stationary piston 43 and cylinder head 56 to move inner ram 48 outwardly. As inner ram 48 moves outwardly, studs 64 carried thereon slide along slots 65 in the outer ram until they engage shoulders 66 at the end of the slots so that the outer ram is carried from the extended position to the retracted position by the inner ram. Since sleeve 24 is of a resilient nature, it will assume its original unstressed position along the bore through the body when the rams are retracted.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A low pressure blowout preventer comprising; a body having a bore therethrough, a plurality of guideways in the body connecting with the bore; seal means of resilient material extending longitudinally of the bore across the connection of each guideway therewith and anchored at only one end against movement axially of the bore; and a ram movable longitudinally within each guideway between retracted and extended positions, said seal means providing an opening in said bore when the rams are retracted, and being deformable into sealing engagement about an object in the opening, or with itself when the opening is empty, when the rams are extended.

2. A low pressure blowout preventer comprising; a body having a bore therethrough, a plurality of guideways in the body connecting with the bore; seal means of resilient material extending longitudinally of the bore across the connection of each guideway therewith and anchored at only one end against movement axially of the bore; and a ram movable longitudinally within each guideway from a retracted position in the body to an extended position in the bore, said seal means providing an opening in said bore when the rams are retracted and being deformable into sealing engagement about an object in the opening, or with itself when the opening is empty, when the rams are extended.

3. A low pressure blowout preventer comprising; a body having a bore therethrough, a plurality of guideways in the body connecting with the bore; seal means of resilient material extending longitudinally of the bore across the connection of each guideway therewith and anchored against movement axially of the bore; and a ram movable longitudinally within each guideway between a retracted position in the body out of engagement with the seal means and an extended position in the bore in engagement with the seal means, said rams comprising compound rams having a plurality of laterally adjacent parts longitudinally movable in telescoping relation with respect to one another, said seal means having a normally unstressed shape providing an opening through the bore when the rams are retracted and being deformable into sealing engagement about an object in the opening, or with itself if the opening is empty, when the rams are extended.

4. A low pressure blowout preventer according to claim 3 including means for releasably engaging the telescoping ram parts whereby the parts may be disengaged and moved from the retracted to the extended position and then engaged and moved together from the extended to the retracted position, one of said engaged parts being carried from the extended to the retracted position by the other of said parts.

5. A low pressure blowout preventer comprising; a body having a bore therethrough, said bore being formed on an enlarged diameter intermediate the ends of the body to provide an annular space surrounding and opening into the bore intermediate the ends thereof; a plurality of lateral guideways in the body connecting with the annular space; tubular seal means of resilient mate-

rial sized to conform to and substantially fill said annular space and being anchored at only one end against movement axially of the bore; and a ram movable longitudinally within each guideway between a retracted position in the body out of engagement with the seal means and an extended position in the annular space in engagement with the seal means, said seal means having a normally unstressed shape providing an opening through the bore when the rams are retracted and being deformable into sealing engagement about an object in the opening, or with itself when the opening therethrough is empty, when the rams are extended.

6. A low pressure blowout preventer according to claim 5 wherein said guideways are connected with the annular space near the upper end thereof and said seal is anchored in the body at the lower end of said annular space.

7. A low pressure blowout preventer comprising; a body having a bore therethrough, a plurality of lateral guideways in the body connecting with the bore near the upper end thereof; a sleeve of resilient material extending longitudinally of the bore across the connection of the guideways therewith and sealably anchored at only the lower end of the body against movement axially of the bore; and a ram in each guideway movable longitudinally therein between an outer retracted position within the body in which the sleeve provides an opening through the bore and an inner extended position in the bore in engagement with the sleeve for moving the sleeve radially inwardly into sealing engagement with an object in the opening, or with itself if the opening is empty.

8. A low pressure blowout preventer according to claim 7 including an annular space between the outer face of the sleeve and the wall of the bore intermediate the anchor point of the sleeve and the guideway connections with the bore, and means including a port connecting the bore and said annular space for equalizing the pressure across the sleeve to prevent an overbalance of pressure within the sleeve when the seal is made.

9. A low pressure blowout preventer according to claim 8 wherein said rams comprise compound rams having laterally adjacent parts movable longitudinally in telescoping relation with respect to one another, and means including a releasable engagement between the telescoping ram parts for limiting said longitudinal movement therebetween operable first to disengage the parts to permit them to be moved separately from the outer retracted position to the inner extended position in response to fluid pressure supplied to the parts and then to engage the parts to permit them to be moved together from the inner extended position to the outer retracted position in response to fluid pressure supplied to one of the parts.

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