RIPPER FOR WELL CASING

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This invention pertains to a ripping tool or apparatus for use in separating the casing or pipe sections of a well such as a gas or oil well.

At the present time there are two types of casings used for wells; one is known as the thread and coupling type and the other is known as the inserted joint type. In the first type, with the exception of the drive pipe or butt- ing type, a gap of considerable width between casing members is provided. When it is necessary to separate members or sections of such a type of casing while in the well bore at greater depths, a ripper of the type shown in my Patent No. 2,850,183 of March 22, 1952, is commonly used.

In the second or inserted joint type and particularly, the so-called extreme line casing (such as produced by the National Supply Company) a very narrow gap is provided between the end of one casing member and the end of the mating joint of the other casing member. In most instances, this gap approaches about 3/64 of an inch. To separate a joint of this type by a joint ripping method, I have found that it is necessary to accurately locate or position the ripping element, knife or cutter with relation to the small gap provided.

It has thus been an object of my invention to provide a new and improved form of ripper tool for well casings; another object has been to provide a tool that will be positive and efficient in action and may be effectively employed where the casing gap is of relatively small extent;

A further object has been to provide a tool which will accurately locate and position its ripping or cutting element with reference to the joint gap between casing members.

These and many other objects of my invention will appear to those skilled in the art from the following description and the illustrated embodiment of my invention.

In the drawings, Figure 1 is a longitudinal vertical section taken through a ripper tool of my present invention and showing the relationship of its parts when it is being moved downwardly within a well casing;

Figure 2 is a somewhat similar view of Figure 1, but illustrates the relationship of the parts of the tool at the time when its downward movement has been arrested and upward movement has been initiated, but before the trigger tripping element has reached the gap between casing members or sections;

Figure 3 is a view similar to Figure 2, but illustrates a third position of the tool wherein the tripping element has engaged the joint gap and the tool is aligned for a cutting or ripping operation on the joint of a well casing;

Figure 4 is a view similar to Figure 3, but illustrates a fourth position of the parts of the tool after a cutting or ripping operation has been effected and while the tool is being raised from a cutting or ripping position; in Figures 1 to 4, the horizontal scale is twice the vertical scale;

Figure 5 is a reduced side view in vertical elevation of a blank body part of the ripper tool and showing the front side thereof from which a slip and trigger mechanism is adapted to operate;

Figure 6 is a vertical section in elevation taken along the line VI—VI of Figure 5 at right angles with respect to the latter figure;

Figure 7 is a view similar to Figure 5 and is taken from an opposite or back side of the blank tool body within which the cutter knife and other elements are to be positioned;

Figure 8 is a greatly enlarged fragmental section taken along line VIII—VIII of Figure 9 and shows a portion of the tool with its parts in the working relationship illustrated in Figure 1;

Figure 9 is a front side view on the same scale as Figure 8 and showing the tool parts in the relationship of Figure 8;

Figure 10 is an enlarged side view in elevation of a cutter or knife element employed in the embodiment of my invention shown in Figure 1; Figure 10A is a top end view and Figure 10B is an outer side view thereof;

Figure 11 is a greatly enlarged perspective view in elevation of a trigger tripping finger or element employed in the tool of Figure 1;

Figures 12 to 17, inclusive, are enlarged transverse sections taken respectively along the lines XII—XII, XIII—XIII, XIV—XIV, XV—XV, XVI—XVI and XVII—XVII of Figure 1;

Figure 18 is a greatly enlarged side view in elevation of a rider spring assembly employed in the tool of Figure 1;

Figure 19 is a sectional view in elevation taken along the line XIX—XXIX of Figure 18;

Figure 20 is a still further enlarged perspective detail of an upper spacer block employed in the rider spring assembly of Figures 18 and 19;

Figure 21 is an enlarged front detail view in elevation of a lower spacer block employed in the assembly of Figures 18 and 19; and Figure 22 is an end view taken on line XXII—XXII of Figure 21;

Figure 23 is a greatly enlarged front side view in elevation of a slip part with its tripping finger assembly;

Figure 24 is a sectional view taken along the line XXIV—XXIV of Figure 23, but additionally showing the casing wall at the joint between the casing sections;

Figure 25 is a top transverse section taken along the line XXV—XXV of Figure 24, but with the casing eliminated;

And Figure 26 is an enlarged vertical sectional detail through the lever mechanism and along the line XXVI—XXVI of Figure 8.

Although the ripping tool of my present invention is suitable for severing casing sections of both joint types, it has been designed particularly to meet the problem involved in connection with the inserted joint type.

In carrying out my present invention, I employ a tool body which carries a ripping knife or cutter element, and a rider spring assembly which is operably connected through a lever arm mechanism to a slip part. The slip part carries a latch or trigger tripping finger mechanism that serves to control the alignment of the slip element with respect to the joint gap and to initiate movement of the body with its immovably mounted knife into a cutting relationship with respect to the casing wall and joint gap.

In the drawings, a pair of well casing members 10 and 11 are connected together by an inserted joint 12 which provides a small gap 13. The tool 14 of my invention has a longitudinally-axially extending integral body. The upper end of the body has a wrench flat portion 15 and a threaded pin 16 for connecting it to a well string in such a manner that it can be suspended within and moved along the casing members 10 and 11.

An intermediate portion 18 of the body is provided with vertically spaced-apart and transversely extending through slots or bores 17 and 17a to operatively receive a rider spring assembly 20, see also Figures 18 and 19. The rider spring assembly 20, 21, rider, or actuating mechanism or means 20 has an upper spacer block 21 (see also Figure 20) which has a transverse bore 21a therethrough. A pair of oppositely positioned front and back wiper or rider spring members 23 and 23a are orderly mounted at their upper ends on the block 21 by a nut and bolt assembly 22. It will be noted that the spring members 23 and 23a are of similar leaf-like or strap construction and have shoulders forming to bulge outwardly and resist inward flexing; the shoulder portions are adapted to ride along the inner wall of the casing and guide the assembly during movement of the tool 14 therealong.

The lower ends of the springs 23 and 23a are mounted on a lower spacer block 24. The block 24, as also shown
in Figures 21 and 22, has a threaded stud 24e extending from its front face to receive a nut 25 and secure the lower end of the front spring 23 and a bore 24h through its back face to receive a bolt 27 for securing the lower end of the back spring 23a thereon. A vertical bore 24c extends through the lower block 24 and is adapted to slidably receive an upper arm or slip rod 27 of a slip connection arm. A frangible pin 28 of copper or other suitable material is adapted to be positioned in a cross bore 24d that extends through a lower projection of the arm to receive a slip pin or rod 27. It will be noted that the rider spring assembly 20 is adapted to vertically move within the slots 17 and 17a, that its springs 23 and 23a substantially balance each other, and its lower spacer block 24 is limited in its movement by the lower abutment face 18h of the body portion 18 and an upper abutment face 19a of a lower body portion 19. Compare the positions in Figures 1 and 2.

The slip rod 27 at its upper end has an outwardly-extending limit pin 27a secured thereto. It is also provided with a hole or bore 27b therethrough, as seen in Figures 3 and 4 to receive the friction pin 28. As shown particularly in Figures 2 and 6, the lower end of the rod 27 is bifurcated to receive a connecting arm or link 25, which is pivotally secured to the rod by a pivot pin 27c extending through its bifurcated portions and the upper end of the connecting arm 29. The lower end of the connecting arm 29 is pivotally secured by a pin 30 within a slot 31 provided by an upper bifurcated end 31a of the body portion 31, see also Figures 23 and 24. As shown in Figures 5, 6 and 16, the slip rod 27 is guidedly positioned in a longitudinal clearance slot 18b that is open to and located behind the slot 18a.

The slip part 31 (see also Figure 25) has a rounded front face 31b provided with serrations or teeth therealong to grip the inner wall of the well casing when it is slid into light engagement therewith. The slip part 31 has flanges 31c adjacent its bottom or slip face 31d that are adapted to be entered endwise or vertically into a vertical guide slot 19e of the lower body portion 19 of the tool, see also Figure 5.

As shown in Figures 1, 2, 6 and 8, a slipway 35 extends along the body portion 19 between the guide slots 19e thereof and is wedge-shaped or inclined outwardly-downwardly towards its lower end to provide a slide surface for the outwardly-inclined wedge or sliding back face 31d of the slip 31. The lower or outwardly-projecting portion of the slipway 35, shown for example in Figures 8 and 9, reaches an apex and its lower portion 35r drops or slopes abruptly, inwardly-downwardly. As shown particularly in Figures 4, 6 and 14, the slipway 35 is provided with a longitudinally-vertically extending clearance slot 35b therealong for the connecting arm or lever 29.

A trigger tripping or latch finger or pawl 32 is pivotally positioned by a pin 33 within a bifurcated lower end portion 31e of the slip, see Figures 23 and 24, and is adapted to be flexibly urged outwardly at its extending end by a coil spring 34 welded at w to extend therefrom and seat within an offset seating portion or hole 31f in the slip 31. The trigger tripping finger 32, as shown particularly in Figure 11, has a back face 32a, a lower guide edge or lip 32b and an upper latching edge or lip 32c.

As shown particularly in Figures 5 and 6, the front side or face of the tool body 14 has a continuous, open slotway therealong provided by the transverse slots 17 and 17a, the longitudinal slot 18c, the enlarged longitudinal slot 19c, and the enlarged longitudinal slot 19e. The intermediate slot 19d provides a guideway for a back strap rider spring 38 which is similar to the springs 23 and 23a of the rider assembly. The slot 19a also serves as an opening for the ending insertion and removal of a knife part 40 or its continuous runner or guide portion 40b into an offset guide slot 19e in the body portion 19, see Figures 1, 6, 10, 27 and 30. The runner or guide portion 40b is the opposite ends by bolts 39 within openings 19h. The spring 38 and a lower spring 41 have sufficient tension to normally force the front side of a head portion 15a of the tool 14 into engagement with the casing 10, and to hold the knife part 40 in a spaced relation inwardly away from the casing wall.

As shown particularly in Figures 10, 10A and 10B, the knife 40 has a rounded cutting edge 40a and a continuous, outwardly-extending, side runner or flange 40b for holding it in position within the inwardly-offset guide slot 19e. The slot 19a is also provided with an opening for the ending insertion and removal of a knife part 40 or its continuous runner or guide portion 40b into an offset guide slot 19e in the body portion 19, see Figures 1, 6, 10A and 10B. The runner or guide portion 40b is the opposite ends by bolts 39 within openings 19h. The spring 38 and a lower spring 41 have sufficient tension to normally force the front side of a head portion 15a of the tool 14 into engagement with the casing 10, and to hold the knife part 40 in a spaced relation inwardly away from the casing wall.

In utilizing the tool of my invention, it may be first lowered, as indicated by the arrow of Figure 1, until its trigger tripping finger 32 enters or passes the gap 13 between the interfitting parts of the casing joint 12. During this downward movement, the tool 14 is pressed forwardly or to the left of Figure 1 (see the position of the head portion 15a) by the guide or rider springs 23a, 38 and 41. This keeps the knife element 40 in an open spaced relationship with the back or opposite side wall of the casing. Such downward movement causes the lower spacer block 24 to abut against the upper limit face 18a and thus, prevent relative downward movement of the slip 31 with respect to the tool body 14.

Thus, the slip 31 is held in an open spaced relationship with the front wall of the casing as is also the heel edge 32b of its trigger tripping finger 32. That is, see Figures 4 and 14. The tip of the trigger finger 32 does not slide along the casing during the downward movement of the tool body 14 and thus, is protected against excessive wear.

After the latch finger 32 has passed or at least reached the gap 13, a lifting movement on the tool is then initiated, as shown in Figure 2. At this time, the upward movement of the tool 14 and the resistance of the frictional engagement of the opposed rider springs 23a and 23c of the rider spring assembly 20 with the casing wall, causes the lower spacer block 24 to abut against the upper face 19a of the tool body. This initiates relative movement between the slip 31 and the tool body 14 as shown in Figures 24 and 25 for the construction, and is urged towards the casing 11. The engagement leading latch edge 32c of the tripping finger 32 is kept from engagement by reason of the wearing heel 32b that bears on the inner wall of the casing 11. Thus, the slip assembly may freely slide upwardly along the inner wall of the casing, until the leading edge 32c engages and is urged into the joint gap 13 by the spring 38. However, the slip 31 does not positively engage the casing wall until the trigger tripping finger 32 enters the joint gap 13, see Figure 3. That is, the front or left-hand side of the head portion 15a of the tool 14 is still held in abutment with the casing wall (Figure 2).

The above relationship is maintained until the tool 14 is raised to the position of Figure 3, at which time the finger 32 drops and is forced by the spring 34 into the gap 13.
and its leading latch edge 32c securely engages therewith. The upward movement of the tool 14 is continued, but the upward movement of the slip 31 is arrested.

The upward movement of the tool body 14 causes a pulling stress on the connecting arm or link 29 and the slip rod 27 which severs the frangible pin 28. When the pin 28 is severed, the tool body 14 may be moved upward further and the casing 30 is then placed vertically stationary. The tool body 14 also moves horizontally or transversely away from the left-hand side of the casing wall, see Figure 3, towards the right-hand side of the casing 30. This further movement is compressing the basket elements 23c, 36 and 41. When the frangible pin 28 is broken or sheared away, the slip 31 moves outwardly on its way 35 into tight engagement with the inner wall of the casing, flexing the back rider-guide springs 23c, 36 and 41 and forcing the back right-hand side in Figure 3 of the head portion 15a of the tool 14 against the casing wall, see Figure 3. This is due to the fact that the rider spring assembly 20 must move with the body of the tool 14 after it has moved from the position of Figure 1 to the position of Figure 2 from abutment with the upper face 18c into abutment with a lower face 19a, and relative movement between the slip 31 and the casing wall is prevented by the finger 32. This rearward, transverse movement is also affected by the slip 31 as controlled by the locking of the trigger trip spring 32 on the gap 13 of the joint 12, thus also forcing the knife element 40 into an operative or cutting engagement with the wall of the casing as shown in Figure 3. At this time, the tool 14 is pulled or jarred upwardly to cut a slot in and sever the joint. After the joint has been severed, the tool 14 can be raised out of the well casing to be used again.

I have thus provided a casing ripper whose rippling knife or blade 40 is immovably attached to the ripper body 14 and whose ripper body moves horizontally or transversely in one moving action. Obviating the further path of the slipway 35 may be varied so that the vertical-transverse movement of the tool body 14 and the knurled grip 30a of any desired degree. For this purpose, the tier of the sliding-wedge engagement may be proportioned to the thread taper of the casing joint.

The positive latching of the trigger fingers 32 is effected, since the spring 34 (see Figure 24) tends to always urge it outwardly and thus into any registering gap 13. The continued upward movement of the tool body 14 thus causes its leading edge 32c to throw it about its pivot pin 29a having a sliding-guide housing 32a and the adjacent portions of the slip 31 to permit this desired action.

It will thus be apparent that the tool 14 of my invention in effect automatically finds the gap 13 between a pair of casing sections, holds a slip part 31 stationary with respect to the casing after such engagement, causes the tool body to move downwardly, tight wedging engagement with the casing wall, causes the tool body to compress its opposite rider or guide springs and thus, move its knife or cutter element 40 transversely into cutting engagement with the joint to be severed. On the other hand, its rider or guide springs normally maintain the knife element 40 in a spaced relationship with respect to the casing during movement of the tool body into an operative position, thus preventing damage to the casing and wear and tear on the knife 40.

The slip 31 and the trigger tripping finger 32 are entirely out of engagement with the casing during the downward movement of the tool body 14. The finger 32 moves into sliding engagement with the casing when the tool body is then raised and it is not until the trigger finger 32 finds and engages the gap 13 that the slip 31 is then moved on its slipway 35, and it is not until the slip 31 has been moved transversely to an outer position on the slipway 35 that the tool body is forced transversely-backwardly until its immovably-secured knife or cutter element 40 engages the casing 30a.

At this point, the cutter element 40 will follow the root of the threads of the joint 12. Upon completion of the ripping operation, the cutter element 40 reaches the upper face of the joint 12, the slip 31 will reach the lip end of its slipway 35 and follow along the surface 35a into the escapement slot 19c and out through its open bottom end. The rider springs 35a, 38 and 41 then force the back side of the tool 14 away from the casing and disengage the cutter element 40 from the slot in which it has cut. The tool is then free to be withdrawn from the well bore.

Under normal conditions, unless fouled, the slip 31 will ride 27 hanging on the pin 27a within the lower spacer block 24 of the rider spring assembly 20. However, if the slip 31 or the trigger 32 becomes fouled, the frangible pin 27a may be easily broken to permit withdrawal of the slip 31. The slip is held on the pin 37 that is positioned on the body portion 19 inside of the basket elements 36 and at which position, it may be carried to the surface along with the tool body. Further fouling of the rider spring 27b and frangible bolt 37 may be easily sheared by a upper pull and this will permit the slip 31 and the linked mechanisms 27 and 29 to fall in the bottom of the well, where it can do no damage.

What I claim is:
1. In an improved ripping tool for a joint of a well casing, a tool body adapted to be longitudinally lowered and raised within the well casing, a cutting element secured on said tool body to project transversely therefrom towards the well casing, a tripping finger mechanism operatively carried by said tool body, an operating mechanism operatively carried by said tool body and connected to said tripping finger mechanism to hold said finger mechanism out of engagement with the well casing when the tool body is being lowered therewithin to and move said finger into sliding engagement with the well casing when the tool body is being raised therewithin, said tripping finger mechanism operatively connected by said tool body to the tripping finger mechanism to force it into engagement with a gap of the well joint when said tool body is being raised within the well casing, and said operating mechanism having transversely-expandable casing engaging means actuated by said tool body when said tool body is raised after said tripping finger mechanism has engaged the gap of the casing joint to force said cutting element into cutting engagement with the casing joint.

2. In an improved tool for a joint of a well casing, a tool body adapted to be longitudinally raised and lowered within the well casing, a cutting element secured to project transversely from said tool body towards the well casing, a latch mechanism operatively carried by said tool body and having means to move it into engagement with a gap in the casing joint, a slip mechanism operatively carried by said tool body and operatively connected to said latch mechanism to move said cutting element transversely of the well casing into cutting engagement with the casing joint, said slip mechanism operatively connected to said latch mechanism to move said tool body to move said tool body transversely of the well casing until said cutting element engages the casing joint.

3. An improved ripping tool as defined in claim 2 wherein, flexible means is carried by said tool body and engages the well casing to normally carry said cutting element out of engagement with the well casing.

4. An improved ripping tool as defined in claim 2 wherein, flexible guide means is secured to project transversely of said tool body into engagement with opposite sides of the well casing, and said guide means is adapted to normally guide said tool body along the well casing during its downward movement therein in such a manner that said latch mechanism and said cutting element are out of engagement with the well casing.

5. An improved tool as defined in claim 2 wherein, the sliding-wedge engagement of said slip mechanism has a taper proportioned to a thread taper of the casing joint.

6. In a self-aligning ripping tool for a well casing joint, a longitudinally-extending body adapted to be moved along a well casing, a cutting element carried by said body, a slipway on said body, a slip slidably positioned on said body in an operative relationship with respect to said slipway, a latch finger carried by said body and adapted to slide along an inner wall of the casing when the tool is raised therein, a rider mechanism operatively mounted on said body for relative movement with respect to said slipway, a latch finger operatively connected to said rider mechanism, said latch finger being moved by said rider mechanism to engage within a gap formed by the casing joint and hold said slip in a stationary relationship with respect to the casing, said body being adapted to move said slip outwardly along said slipway when said latch finger is in engagement with the joint gap, and said slip when moved outwardly along said slipway being adapted to move said cutting element into engagement with the inner wall of the casing.
7. In a self-aligning ripping tool for a well casing joint, a longitudinally-extending body adapted to be moved along a well casing, a cutting element carried by said body, a slot slidably positioned on said body in an operational relationship with respect to said slippery, a latch finger carried by said slip and adapted to slide along an inner wall of the casing when said slip is extended, a rider mechanism operably mounted on said body for relative movement with respect thereto, said rider mechanism being operably connected to said latch finger, said slippery outwardly adapted to engage with a gap formed by the casing joint when said slip has been moved outwardly along said slippery to hold said slip in a stationary position with respect to the casing, said body being operatively positioned to move said slip further outwardly along said slippery when said latch finger is in engagement with the joint gap, flexible means carried by said body to normally urge said cutting element away from the inner wall of the casing, and said slip when moved further outwardly along said slippery by said body being adapted to position said cutting element into engagement with the inner wall of the casing.

8. In a self-aligning ripping tool for a well casing joint, a longitudinally-extending body adapted to be moved along a well casing, a cutting element carried in one side of said body, a slip mechanism operatively carried in an opposite side of said body, flexible means and body adapted to engage with the inner wall of the casing during movement of said body along the casing, said flexible means being positioned to normally force the side of said body within which said slip element is positioned away from the inner wall, said slip mechanism having a tripping finger adapted to engage within the gap formed by a casing joint, means to move said tripping finger into position for engagement within the gap formed by the casing joint, means carried by said body and operatively mounted to move said slip mechanism into tight engagement with an abrasive surface of the inner wall of the casing when said body is being moved upwardly and the trigger finger is in engagement with the gap of the casing joint, and said slip mechanism when in engagement with the casing having a flexible guide means and move said cutting element into engagement with the casing joint.

9. In a self-aligning ripping tool for a well casing joint, a longitudinally-extending body adapted to be moved along an inner wall of the well casing, a cutting element mounted on one side of said body, a slip mechanism operatively carried on an opposite side of said body, a smaller diameter inner than the inner wall of the casing, flexible means carried by said body to normally urge its slip mechanism carrying side into close adjacency with the inner wall of the casing, latch means carried by said clip mechanism to latch it with respect to the joint of the casing, a rider mechanism operatively carried by said body and operatively connected to said slip mechanism, means by said body and cooperating with said rider mechanism to move said slip mechanism towards the inner wall of the casing and to move said latching means into engagement with the inner wall of the casing, said latching means being moved in engagement with and along the inner wall of the casing until it latches with the joint when said body is moved relatively with respect to said rider mechanism, movement means carried by said body to limit relative movement of said rider mechanism with respect thereto, and said slip mechanism when in engagement with the inner wall of the casing and when said latching means are latched with the joint being adapted to move the cutting element-carrying side of said body close adjacency with the inner wall of the casing and thus move said cutting element into engagement with the casing joint gap.

10. In a self-aligning ripping tool for a well casing joint, a tool body adapted to be mounted on a well string and to be raised and lowered within a casing provided by a well bore, said tool body having connected sections forming a casing jointing operatively carried by said tool body and adapted to slidably engage the casing during movement of said body therealong, a wedge face in a slotted portion of said body, a slip operatively mounted within the slotted portion of said body and in sliding engagement with said wedge face, a link mechanism connecting said slip to said rider assembly, a cutting element carried by said body in an opposed relationship with respect to said slip, guide means along said body adapted to guide said cutting element in a spaced relationship with respect to the casing, a tripping finger operably carried by said slip to register with a gap defined by the casing joint, said body having spaced-apart stationary sections forming a casing joint operatively connected to said slip face and said tripping finger into register with the gap, said wedge face being adapted to move said slip outwardly into tight engagement with the casing when said body is raised after said body has been previously engaged with the casing joint, and said body being adapted to compress said guide means and move said cutting element into engagement with the joint.

11. In a self-aligning ripping tool for a well casing joint, a longitudinally-extending body adapted to be moved along and within a well casing, a cutting element secured within said body to project transversely-outwardly, a pair of the said slips secured to said body and adapted to slidably engage the inner wall of the well casing, said slips having a plurality of projections disposed in a spaced-apart relationship with respect to an inner wall of the casing, said projections extending outwardly from said body and adapted to engage with the inner wall of the casing, and said projections being positioned to move said cutting element outwardly with respect to said guide means and into engagement with the inner wall of the casing, said projections being progressively adapted to move the first-mentioned side portion of said body towards the inner wall of the casing, and means operatively mounted with respect to said slip mechanism to aid in further outward movement of said slip mechanism when said cutting element is in alignment with the casing joint to thus move said cutting element into cutting engagement with the joint.

12. In a self-aligning ripping tool for well casing joints, a longitudinal tool body adapted to be moved along a well casing, a pair of longitudinal slots along opposite sides of said body, a projecting head about an upper portion of said body, a pair of longitudinally spaced-apart transversely-extending openings through said body in alignment with said pair of longitudinal slots, a spacer block extending transversely through one of said openings and a second spacer block extending transversely through the other of said openings, a pair of outwardly bulging spring strap members, one of said弹簧 strap members being secured at one end of said spacer blocks and at its other end to one end of the second-mentioned spacer block, said spring straps being positioned to extend outwardly from said longitudinal slots and slidingly engaging said slot walls, and said spring strap members and said spacer blocks providing a rider assembly adapted to move in a limited respect to said body within the longitudinal extent of said pair of transverse openings, an outwardly-downwardly inclined slipway within one of said longitudinal slots and below said rider assembly, a slip slidably positioned with respect to said slipway for downward and outward movement thereon, a cutting element secured within the other of said longitudinal slots to project transversely-outwardly therefrom, a link mechanism pivotally connected at its lower end to said slip and normally held outwardly through said lower spacer block and secured there to by a frangible pin, said arm extending above said lower spacer block and having a projecting pin through an upper end thereof, a latch finger pivotally carried by said slip, spring means interposed between said latch finger and said slip mechanism for urging said latch finger towards the casing, said latch finger being adapted to engage with a gap formed by said slot, and continued relative movement of said body with respect to said joint gap providing for mechanical breaking off of said frangible pin and an outward movement of said slip on said slipway to force an opposite side of said body which carries said cutting element into close adjacency with the casing and to force said cutting element into cutting engagement with the casing joint.

13. A self-aligning ripping tool as defined in claim 12.
wherein, said slipway drops off inwardly at its lower end to drop said slip therefrom to hang from said projecting pin after said cutting element has severed the casing joint, and means extending across said one longitudinal slot below said slipway to retain said slip therein.

14. In an improved ripping tool for a joint of a well casing wall, a tool body for longitudinal movement within the well casing wall, a cutter carried on one side of said tool body, means carried by said tool body and initially maintaining said cutter in a spaced-apart relationship with respect to the well casing wall, a slip operatively carried by said tool body in a substantially opposed relationship with respect to said cutter, a joint-locating means operatively connected to said slip to engage the joint movement of said tool body within the well casing wall when the direction of movement of said tool body is changed, said actuating means operatively carried by said tool body and operatively connected to said slip, said actuating means initially co-operating with said first-mentioned means to retain said slip in the spaced-apart relationship with the well casing wall and being actuated to move said slip to a second and adjacent position with respect to the casing wall when the direction of movement of said tool body is changed, said joint-locating means when in engagement with the joint, cooperated with said tool body to move said tool slip in engagement with the well casing wall in one direction and move said tool body in an opposite direction therefrom until said cutter is in cutting engagement with the joint.

15. In an improved ripping tool for a joint of a well casing, a tool body to be moved within the well casing, a cutting element secured on one side of said tool body, a slip operatively carried by said tool body in an opposed relationship to said cutting element, a tripping mechanism operatively carried by said slip and having means for forcing said mechanism into engagement with a gap in the casing joint, means operatively carried by said tool body to initially position said slip in a withdrawn position thereon, and means actuated after the gap engagement of said tripping mechanism to move said slip outwardly on said tool body in engagement with the well casing and move said tool body transversely of the well casing until said cutting element is in cutting engagement with the casing joint.

16. In a self-aligning ripping tool for well casing joints, a longitudinal tool body to be moved along a well casing, a longitudinal slot along one side of said tool body, a slip operatively positioned in said slot, actuating means operatively mounted for relative movement with respect to said body and operatively connected to said slip to initiate movement of said slip outwardly within said slot towards a portion of the inner wall of the casing, latching means carried by said slip and engaging the gap of a casing joint to hold said slip in a stationary relationship with respect thereto, a cutting element normally carried by said body in a spaced relationship with respect to an opposed portion of the inner wall of the casing, means carried by said body and engaging said slip to guide said slip outwardly towards the first-mentioned portion of the inner wall of the casing and move said body towards the opposed portion of the inner wall casing when said latching means is in engagement with the casing joint and said body is being moved in a direction to move said slip outwardly, and said body moving said cutting element into a cutting relationship with respect to the casing joint when it has, itself, been moved outwardly towards the opposed portion of the inner wall of the casing by the outward movement of said slip towards the first-mentioned inner wall portion of the casing.

17. In an improved ripping tool for a joint of a well casing wall, a tool body to be lowered past and raised along a joint of the well casing wall, a slip operatively mounted with respect to an inclined slide on said tool body, actuating means carried by said tool body and operatively connected to said slip to maintain said slip in a non-engaging relationship with the well casing wall when said tool body is lowered, a cutter on an opposed side of said tool body with respect to said slip and out of engagement with the well casing wall when said slip is also out of engagement therewith, a joint locator operatively carried by said slip to engage the joint when said tool body is lowered and then raised with respect to the joint, a pair of spaced-apart abutment portions on said tool body, said actuating means being in operating engagement with one of said abutment portions when said tool body is lowered and being moved into engagement with the other of said abutment portions when said tool body is then raised to move said slip operatively-outwardly on said inclined slide; said joint locator, upon its engagement with the joint and a raising of said tool body, actuating said slip to move said slip operatively-outwardly on said inclined slide and into full engagement with the well casing wall to position said cutter in cutting engagement with the joint; and said slip being then operatively positioned on said inclined slide to maintain said cutter in cutting engagement with the joint during a further raising of said tool body to sever the joint.

18. An improved ripping tool as defined in claim 17 wherein, said tool body has an escapeway at an outer end of said inclined slide, and said slip is moved off said inclined slide into said escapeway upon a further raising of said tool body after the severance of the joint by said cutter.

19. An improved well tool mechanism for utilization with a joint of a well casing wall, a tool body to be moved along the well casing wall, a wall-engaging slip, means operatively positioning said slip on said tool body with an initial non-engaging position with respect to the well casing wall and subsequently in an engaging position with respect thereto, said slip having a joint-locating means, means actuated by relative movement with respect to said tool body to move said joint-locating means into an effective joint-locating position, a cutter carried by said tool body in an opposed relationship with respect to said slip, and said joint-locating means when in a joint-located position being operatively positioned to hold said slip in engagement with the well casing wall and move said cutter into cutting engagement with the joint.

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