March 23, 1965 D. D. WEBB 3,174,548

COMBINATION WASHOVER TOOL, PIPE CUTTER AND RETRIEVER

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Fig 1A.

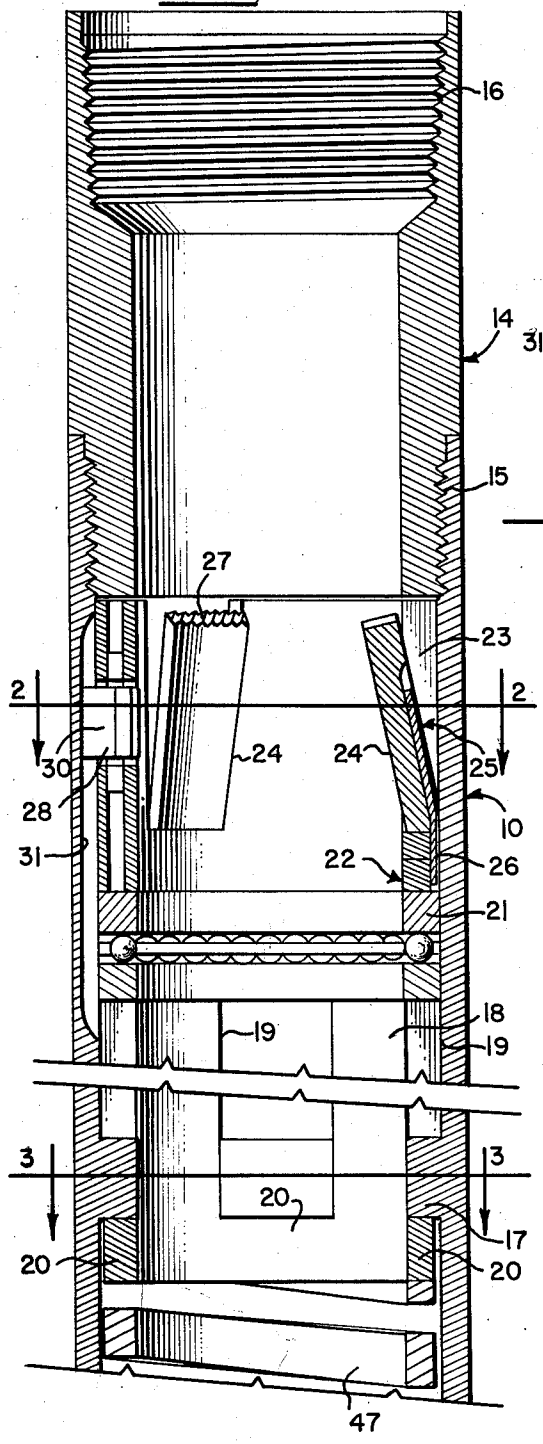


Fig 2

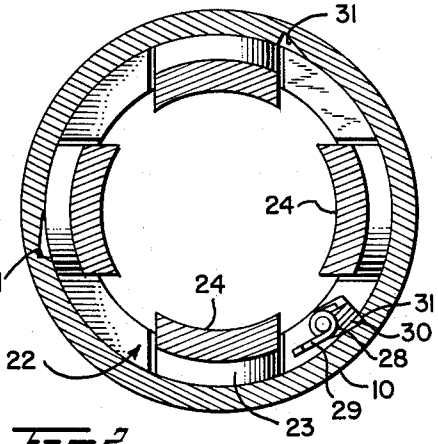
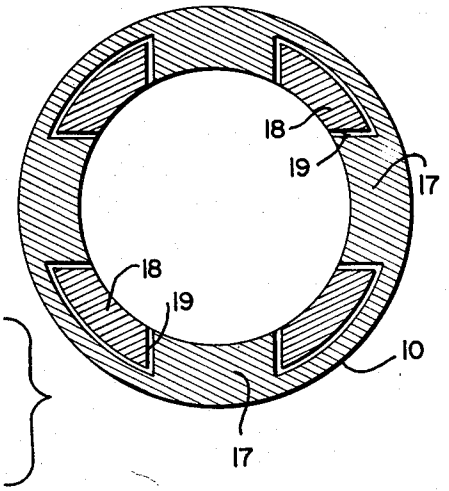


Fig 3.



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Fig 1B

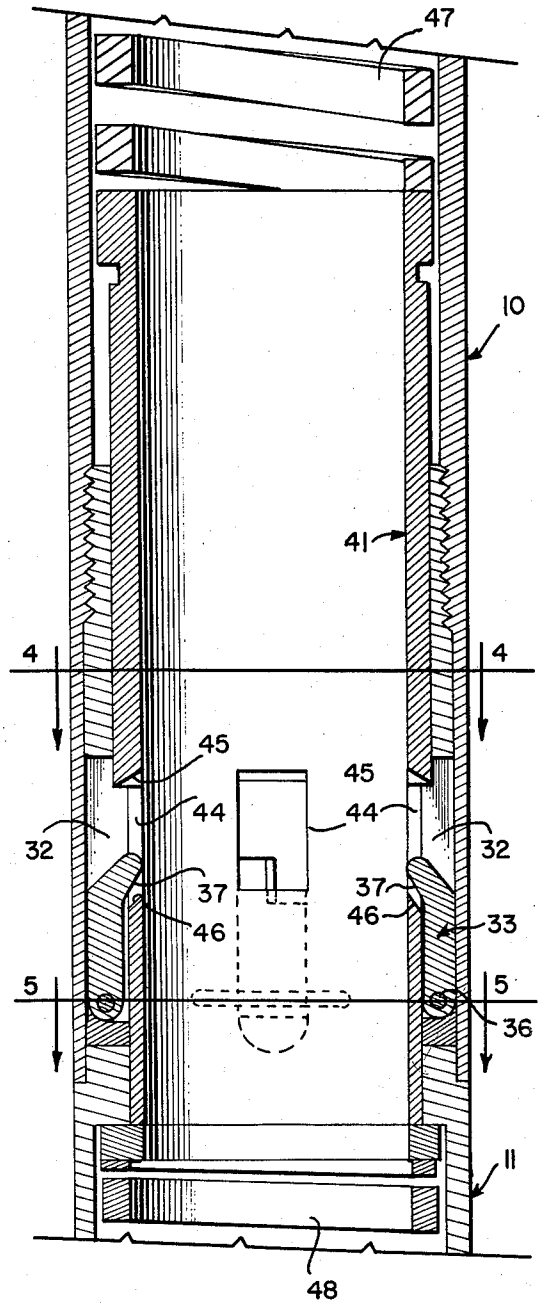


Fig 4

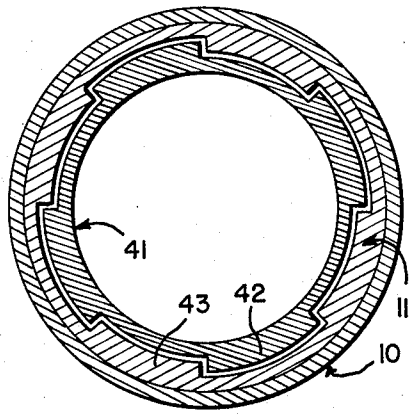
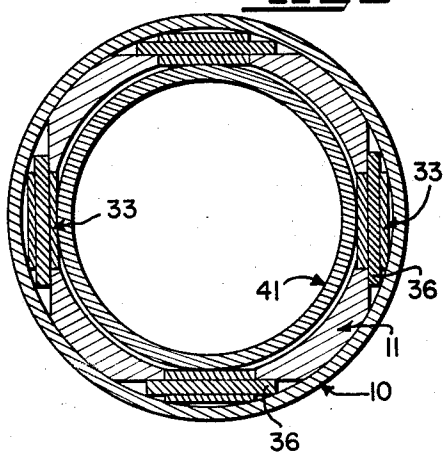


Fig 5



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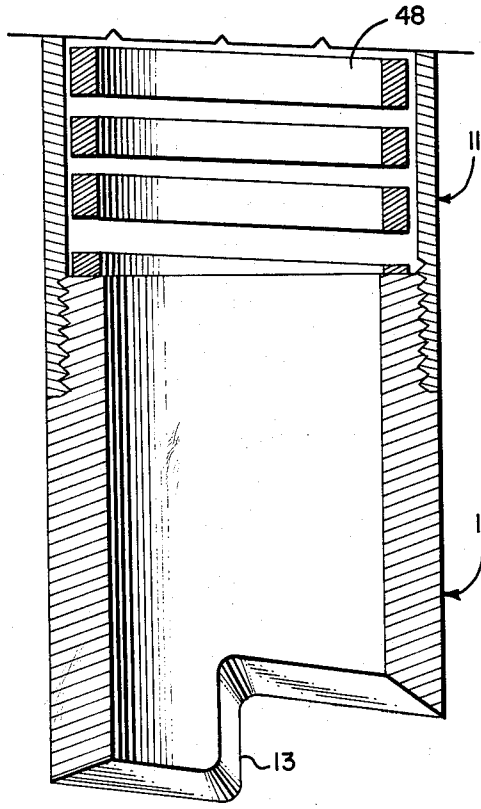
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COMBINATION WASHOVER TOOL, PIPE CUTTER AND RETRIEVER

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Fig 1C.



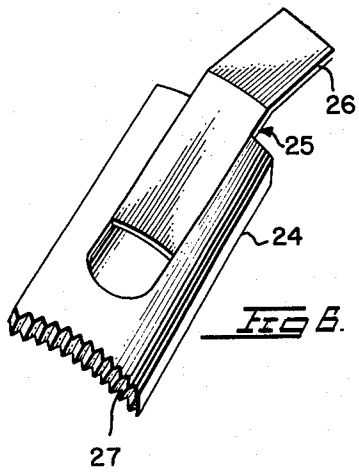


Fig 6.



Fig 7.

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COMBINATION WASHOVER TOOL, PIPE CUTTER AND RETRIEVER

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Fig 10A

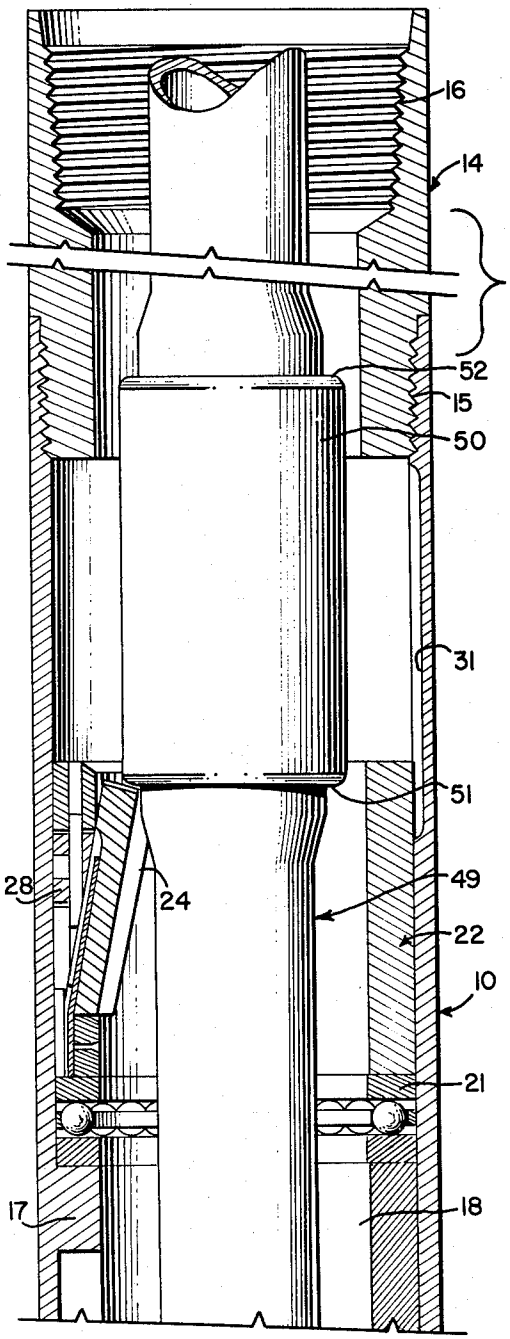


Fig 8

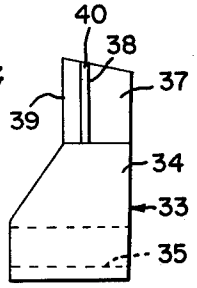
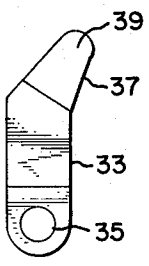


Fig 9



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Fig 10B.

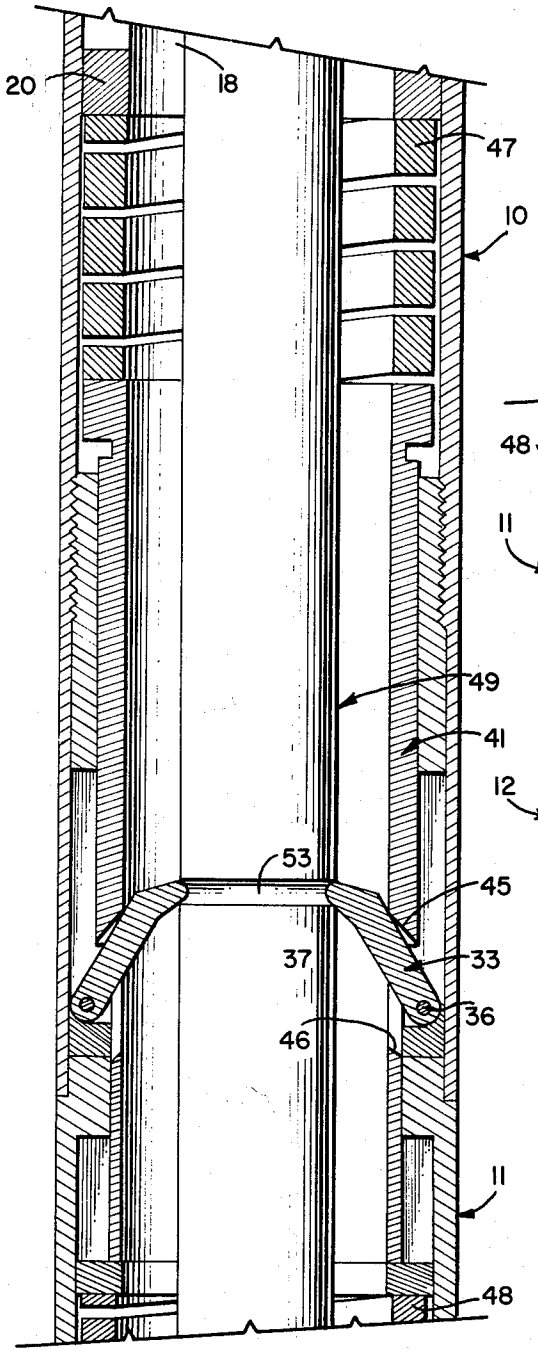
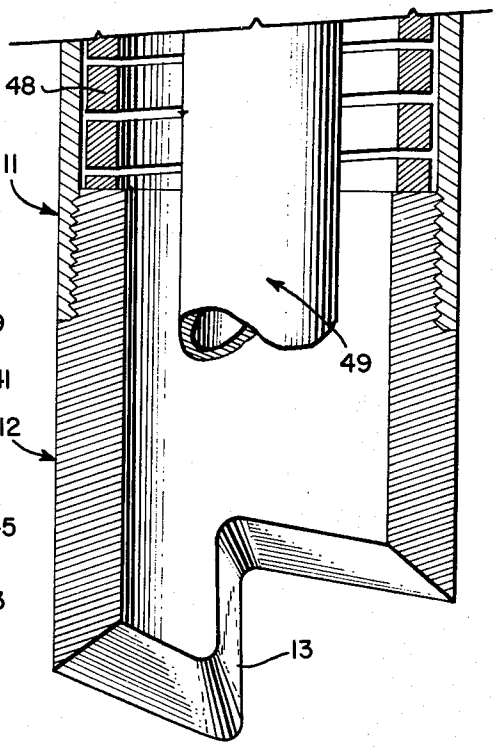


Fig 10C.



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United States Patent Office 3,174,548 Patented Mar. 23, 1965

3,174,548

COMBINATION WASHOVER TOOL, PIPE CUTTER AND RETRIEVER

Derrel D. Webb, Houston, Tex., assignor to Houston Engineers, Inc., Houston, Tex., a corporation of Texas

Filed Sept. 6, 1963, Ser. No. 307,186
11 Claims. (Cl. 166—55.6)

This invention relates to well drilling operation and more particularly to a combination washover tool, pipe cutter and retriever which may be utilized for freeing or recovering at least a portion of a casing or tubing which has become lodged in a well.

Heretofore it has been common practice when a casing or tubing has become lodged in a well to attempt to free the same by the use of a washover tool which essentially comprises an annular cutter located at the lower end of a tubular body member which is attached to a washover pipe and is lowered into the well over the casing or tubing which has become lodged therein. Upon lowering the washover tool to a point where the casing or tubing has become lodged, rotation of the washover pipe and annular cutter, theoretically at least, will operate to cut away the rock or other debris which may be operating to grip the casing or tubing and hold the same against movement thereby freeing the casing or tubing to permit retrieving thereof or further drilling operations. Frequently these prior art washover tools include means for engaging the casing or tubing or a collar thereon to permit raising of the same from the well by raising the washover pipe, but frequently the washover operation is not sufficient to free the lodged casing or tubing and it then becomes necessary to cut the same in order that the upper free portion thereof may be removed from the well.

Attempts have been made to provide a combination washover tool, pipe cutter and retriever, but difficulty has been experienced in providing such a tool within the dimensional limitations encountered in well drilling operations and also a tool which may be conveniently operated from the surface to perform the various operations and furthermore, such prior art tools have been relatively complex and costly and also subject to frequent damage or breakage thereby necessitating costly repairs and also delaying well drilling operations which materially increases the cost of such operations. Also, where it has been attempted to combine pipe cutting and retrieving functions in a washover tool, this has materially interfered with the normal use of the tool for washover operations which must be performed by rotation, upward and downward motion of the tool, as well as the free flow of fluid into and out of the well. Furthermore, many of these prior art tools required a relatively complex mode of operation in order to perform the various functions of the tool and such mode of operation was quite foreign to the normal washover operation.

It is accordingly an object of the invention to provide a combination washover tool, pipe cutter and retriever which may be attached to a washover pipe and in which all operations are consistant with the normal washover operation, or in other words, the tool of this invention may be operated to perform all of the functions thereof merely by rotation of the washover pipe string in one direction and by upward or downward movement of such pipe string.

A further object of the invention is the provision of a combination washover tool, pipe cutter and retriever which includes means for performing a normal washover operation, together with means for engaging a collar or other enlargement on the pipe or tubing which has become lodged in the well in order that an upward force may be exerted through the washover tool to raise the pipe from the well.

A still further object of the invention is the provision of a combination washover tool, pipe cutter and retriever, including means for engaging a collar or other enlargement on a pipe to be removed from a well and in which, by an appropriate operation, such engaging means may be disengaged in order to permit movement of the tool upwardly over the collar or enlargement.

Another object of the invention is the provision of a combination washover tool, pipe cutter and retriever incorporating cutting means which may be engaged and disengaged with a pipe to be cut by upward and downward movement of the tool with relation to such pipe and in which the cutters are urged toward the pipe to be cut by spring means thereby precluding damage to the cutters due to excessive forces exerted thereon.

A further object of the invention is the provision of a combination washover tool, pipe cutter and retriever in which the cutter, when in inoperative position, are received in recesses which serve to protect the same against inadvertent damage.

A still further object of the invention is the provision of a combination washover tool, pipe cutter and retriever in which all operations of the tool requiring rotation may take place in one direction thereby precluding inadvertent unthreading of pipe sections.

Another object of the invention is the provision of a combination washover tool, pipe cutter and retriver in which the operation of the cutters is controlled solely by up and down movement of the tool with respect to the pipe to be cut.

A further object of the invention is the provision of a combination washover tool, pipe cutter and retriever in which rotation of the tool to operate the cutters in no way interferes with the engagement of the retriever dogs with a collar or enlargement on the pipe to be cut and retrieved.

A still further object of the invention is the provision of a combination washover tool, pipe cutter and retriever including dogs for engaging a collar or other enlargement on a pipe to be retrieved and in which the dogs are provided with teeth disposed at an angle which, upon rotation relative to the collar or other enlargement, serve to cam the dogs outwardly to permit passage thereof over the collar or enlargement to provide a releasing means to release the collar or enlargement.

Another object of the invention is the provision of a combination washover tool, pipe cutter and retriever in which the cutters are of such construction as to provide a long wearing cutting edge in which breakage of the relatively hard cutting material is either compensated for or substantially prevented.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1A is a longitudinal sectional view showing the upper portion of the tool of this invention;

FIG. 1B is a longitudinal sectional view showing an intermediate portion of the tool;

FIG. 1C is a longitudinal sectional view showing the lower portion of the tool;

FIG. 2 is a sectional view taken substantially on the line 2—2 of FIG. 1A and showing the disposition of the pipe collar engaging dogs when in engaging position;

FIG. 3 is a sectional view taken substantially on the line 3—3 of FIG. 1A;

FIG. 4 is a sectional view taken substantially on the line 4—4 of FIG. 1B;

FIG. 5 is a sectional view taken substantially on the line 5—5 of FIG. 1B and showing the mounting for the cutters;

FIG. 6 is a view in perspective showing one of the pipe collar engaging dogs;

FIG. 7 is an end view of a pipe engaging dog showing the disposition of the teeth therein;

FIG. 8 is a front elevational view showing the structure of one of the cutters utilized in the tool of this invention;

FIG. 9 is a side elevational view of the cutter shown in FIG. 8;

FIG. 10A is a longitudinal sectional view similar to FIG. 1A, but showing the relative position of the parts in the upper portion of the tool when in cutting position;

FIG. 10B is a sectional view similar to FIG. 1B, but showing the cutters in cutting position; and

FIG. 10C is a sectional view similar to FIG. 1C, but showing the position of the cutter release spring during a cutting operation.

With continued reference to the drawings and particularly FIGS. 1A, 1B and 1C, there is shown a combination washover tool, pipe cutter and retriever constructed in accordance with this invention and which comprises an upper tubular body **10**, a lower tubular body **11** and an annular cutter **12** secured to the lower end of the lower body **11** and having a cutter element **13** thereon. A suitable coupling **14** is threadedly secured at **15** to the upper end of the upper body **10** and the upper end of the coupling **14** may be provided with suitable screw threads **16** for connecting the tool to a washover pipe string.

Intermediate the length of the upper body **10** there are provided a plurality of circumferentially spaced inwardly extending lugs **17** and a sleeve **18** slidably disposed in the upper body **10** is provided with slots **19** slidably receiving the lugs **17**. The lower ends of the slots **19** are closed and serve to provide abutments **20** for engaging the lower ends of the lugs **17** to limit upward movement of the sleeve **18**.

A conventional ball type thrust bearing **21** is disposed on the upper end of the sleeve **18** and a tubular dog cage **22** is slidably and rotatably received in the upper portion of the upper body **10** and is supported on the thrust bearing **21**.

The wall of the dog cage **22** is provided with a plurality of circumferentially spaced longitudinally extending recesses **23** and an elongated pipe collar engaging dog **24** is pivotally mounted adjacent the lower end thereof for movement into and out of each recess. A leaf spring **25** is secured to each dog **24** and has a portion **26** secured to the cage **22**, this spring being provided for urging the dog **24** inwardly to the inclined position shown in FIG. 1A for a purpose to be later described.

As clearly shown in FIGS. 1A, 6 and 7, the dog **24** is provided at the upper end thereof with angularly disposed teeth **27** and the purpose and operation of such teeth will be later described.

As clearly shown in FIGS. 1A and 2, a pawl **28** is pivotally mounted on the cage **22** and a suitable spring **29** serves to urge the nose portion **30** of the pawl **28** outwardly of the cage **22**. A plurality of longitudinally extending circumferentially spaced ratchet grooves **31** are provided in the inner surface of the upper body **10** and the nose portion **30** of the pawl **28** serves to engage in one of the grooves **31** to prevent relative rotation between the upper body **10** and the cage **22** in one direction, but permitting relative movement therebetween in the opposite direction. The purpose of this structure and operation will later appear.

With particular reference to FIGS. 1B and 5, the lower body **11** is provided with a plurality of circumferentially spaced cutter receiving recesses **32** and pivotally mounted in each recess is a cutter **33**. Each cutter **33**, as shown in FIGS. 8 and 9, includes a body **34** formed of tough non-brittle metal having an aperture **35** at one end for receiving a pivot pin **36** which serves to pivotally mount the same in the recess **32** and terminating at the opposite end in a nose portion **37** disposed at an angle to the remainder of the body **34**. The

nose portion **37** of the cutter **33** is provided with a recess **38** for receiving a relatively hard cutter insert **39** which may be formed of tungsten carbide or other suitable material and the insert **39** may be secured to the nose portion **37** by brazing **40** or in any other suitable manner and it will be seen that the nose portion **37** of the body **34** provides a complete support for the relatively brittle cutter insert **39**, thereby protecting the same against inadvertent damage or breakage. Furthermore, this structure permits wear of the cutter insert **39** and at the same time, the nose portion **37** will be worn away in order to always present a relatively sharp cutting edge thereby maintaining the effectiveness of the cutter.

A cutter actuating sleeve **41** is slidably received in the lower body **11** and projects into the upper body **10** and splines **42** and **43** are provided on the sleeve **41** and lower body **43** to prevent relative rotation between the sleeve **41** and lower body **11**. Cam slots **44** are provided in the cutter actuating sleeve **41** and the free ends constituting the nose portions **37** of the cutters **33** project into the cam slots **44**. As clearly shown in FIG. 1B, the upper ends of the cam slots **44** are provided with cam surfaces **45** for engaging the upper ends of the cutters **33** and the lower ends of the cam slots **44** are provided with cam surfaces **46** for engaging the lower surfaces of the free nose portions **37** of the cutters **33**. The cam surfaces **45** and **46** operate to move the cutters **33** into and out of the cutter receiving recesses **32** in the lower body **11**, in a manner to be later described.

As best shown in FIGS. 1A, 1B and 1C, a compression spring **47** is disposed between the lower end of the sleeve **18** in the upper body **10** and the upper end of the cutter actuating sleeve **41** in the lower body **11** and a second compression spring **48** is disposed between the lower end of the cutter actuating sleeve **41** and the upper end of the annular cutter **12** secured in the lower end of the lower body **11**.

The tool of this invention has been described above primarily with reference to FIGS. 1A, 1B and 1C and as shown therein, before introduction of the tool into a well, the pipe collar engaging dogs **24** occupy an inwardly inclined position and the pipe cutters **33** are retracted into the cutter receiving recesses **32** by reason of the fact that the cutter actuating sleeve **41** is urged upwardly by the spring **48** which in turn moves the sleeve **18**, the thrust bearing **21** and the dog cage **22** upwardly to the position shown in FIG. 1A.

When it is desired to utilize the tool of this invention for washover operations for cutting a pipe and for retrieving the pipe, the coupling member **14** at the upper end of the upper body **10** is connected to the lower end of a washover pipe string, not shown, and as shown in FIGS. 10A, 10B and 10C, the tool is lowered into a well over a pipe or tube **49** which has become lodged in the well. The tube **49** is composed of sections joined together by a coupling or collar **50** and such collar **50** provides a shoulder **51** at the lower end thereof.

As the tool is lowered into the well, the upper end **52** of the collar **50** engages the inner surfaces of the dogs **24** and cams the same outwardly against the action of leaf springs **25** into the recesses **23** which permits passage of the tool downwardly over the collar **50**. When the annular cutter **13** at the lower end of the lower body **11** reaches the obstruction in the well which is retaining the pipe or tubing **49** against movement therein, the washover pipe string and the tool of this invention, including the annular cutter **13** may be rotated in an attempt to clear the obstruction and free the pipe **49**. If this washover operation is successful the pipe **49** becomes free and the same may be raised out of the well by raising the washover pipe string which causes the dogs **24** to engage the lower end **51** of the collar **50** thereby permitting the pipe **49** to be retrieved.

If, however, it is desired to raise the tool of this in-

vention out of the well without raising the pipe 49, this may be accomplished by raising the tool until the teeth 27 at the upper ends of the dogs 24 engage the lower end 51 of the collar 50, at which time by reason of the fact that the nose portion 30 of the pawl 28 is in engagement with one of the ratchet grooves 31 in the upper body 10, rotation of the washover pipe string with consequent rotation of the tool will result in turning the dogs 24 with respect to the collar 50 which will result in providing a camming action between the teeth 27 on the dogs 24 and the lower end 51 of the collar 50 which will serve to cam the dogs 24 outwardly and permit movement thereof together with the tool upwardly around the collar 50.

In many instances, the washover operation utilizing the annular cutter 13 fails to free the pipe 49 and in this case if the pipe 49 cannot be raised by exerting an upward force thereon through the tool and dogs 24 engaging the collar 50, it is necessary to cut the pipe 49 in order that the portion above the cut may be removed from the well. For performing the cutting operation, the tool is lowered over the pipe 49 until the desired location is reached, at which time the tool is raised until the dogs 24 engage the lower surface 51 of the collar 50 immediately above the point where it is desired to cut the pipe 49 and continued upward movement of the tool will result in forcing the dog cage 22 downwardly which in turn will move the thrust bearing 21 and sleeve 18 downwardly to exert a downward force on the spring 47 which in turn will move the cutter actuating sleeve 41 downwardly against the action of spring 48 and cause the cam surfaces 45 on the actuating sleeve 41 to cam the cutters 33 inwardly into engagement with the surface of the pipe 49. Since the downward movement of sleeve 18 and cutter actuating sleeve 41 is limited by engagement of the thrust bearing 21 with the lugs 17 in the upper body 10 inward force exerted on the cutter 33 by the cam surfaces 45 on the cutter actuating sleeve 41 will be determined by the compression of spring 47 and the compression of spring 48.

The cutters 33 are shown in cutting position in FIG. 10B and in order to produce a cutting operation, the washover pipe string and tool is rotated to rotate the cutter 33 with respect to the pipe 49 which will result in cutting an angular grove 53 in the pipe 49 and continued rotation will serve to sever the pipe 49 at this point. It is to be noted that with the dog cage 22 in lowermost position as shown in FIG. 10A, the pawl 30 has moved below the ratchet groove 31 in the upper body 10 with the result that the upper body 10 and the remainder of the tool may rotate while the dog cage 22 and dog 24 in engagement with the lower end 51 of the collar 50 remain stationary and the thrust bearing 21 permits such rotation relatively free of friction.

Upon completion of the cutting operation, raising of the washover pipe string and the tool will result in removing the cut section of the pipe 49 from the well, since the dogs 24 are in engagement with the lower surface 51 of the collar 50 and also since the thrust bearing 21 is in engagement with the lugs 17 on the upper body 10, a sufficient upward force may be exerted to raise the pipe 49 out of the well and also this engagement of the thrust bearing 21 with the lugs 17 permits the application of a strong upward force when it is desired to attempt to free the pipe 49 from the well prior to a cutting operation and this upward force may be exerted without danger of damaging any of the other parts of the tool, since the total load is carried by the dogs 24, the dog cage 22, the thrust bearing 21 and the lugs 17 of the upper body 10. Rotation of the cutters 33 to accomplish the cutting operation is, of course, accomplished by the fact that the cutters 33 are carried by the lower body 11 and furthermore, the cutter actuating sleeve 41 is provided with the splines 42 inter-engaging with splines 43 on the lower body 11 with the result that both the cutter actuating sleeve 41 and the lower body 11 rotate together. After completion of the cutting operation and removal of the pipe or tube 49 from the tool, the cutters 33 are retracted by reason of the fact that upon upward movement of the collar 50 away from the dogs 24, upward movement of the dogs 24, dog cage 22, thrust bearing 21, sleeve 18, spring 47 and cutter actuating sleeve 41 is permitted as a result of the upward force of spring 48 which causes the cam surfaces 46 on the cutter actuating sleeve 41 to cam the cutters 33 outwardly into the cutter receiving recesses 32.

It will, therefore, be seen that there has been provided a combination washover tool, pipe cutter and retriever which may be utilized for washover pipe cutting and retrieving operation by the simple expedient of raising or lowering the tool and by rotating the same in one direction as a result of which the various operations possible may be selectively accomplished.

It is also possible with the tool of this invention to cut and remove lengths of pipe successively from a well and if desired, to determine the condition of the cutters without removing the tool from the well. In order to accomplish this operation, the lengths of cut pipe may be removed from the well and a length coupled to the lower end thereof, after which the same is lowered into the well until the same contacts the dogs 24. At this time, the tool may be rotated to cause the piece 27 on the dogs 24 to cam the same outwardly thereby permitting further downward movement of the pipe until the same reaches the cutters 33. At this time, the operation of the cutters 33 may be tested by holding the washover pipe string and tool stationary and rotating the pipe within the tool with respect thereto to provide a place cut on such pipe which then may be removed and inspected for proper cutter operation. If the cutters are in proper condition and operating properly, further cutting operations may be accomplished as desired without removing the tool from the well or in the event the test shows that the cutters are in need of repair, the tool can be removed from the well in order to accomplish such repair.

As stated above, the tool of this invention provides a relatively simple device for accomplishing a plurality of operations and furthermore, the cutters are completely protected against damage, in that the same are retracted into cutter-receiving recesses during non-cutting operations and furthermore, the entire load is carried by the dogs 24 and associated parts engaging the lugs 17 whereby no load is exerted on the cutters 33 during the pipe raising operation. The design of the tool of this invention permits use of the same to washover a pipe or tubing of maximum diameter, since the nature of the parts of the tool permit the provision of a passage therethrough of maximum diameter which materially contributes to the versatility of the tool of this invention.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, a coupling member removably secured to the upper end of said upper body for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, the lower ends of said slots being closed to provide abutments for engaging said lugs to limit upward movement of said sleeve, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported on said thrust bearing, the wall of said cage having a plu-

rality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, a pawl pivotally mounted on said cage, longitudinally extending circumferentially spaced ratchet grooves in the inner surface of said upper body, said grooves extending from adjacent the upper end of said upper body to a point spaced upwardly from said lugs, spring means for urging said pawl into engagement with said grooves to prevent relative rotation between said cage and said upper body in one direction, but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

2. A combination washover tool, pipe cutter and retriever as defined in claim 1, in which each dog is provided at the upper pipe collar engaging end with angularly disposed teeth, whereby upon rotation of said dogs relative to a pipe collar said teeth will operate to cam said dogs outwardly to permit upward movement thereof over the pipe collar.

3. A combination washover tool, pipe cutter and retriever as defined in claim 1, in which the means for urging said dogs inwardly comprises a leaf spring for each dog.

4. A combination washover tool, pipe cutter and retriever as defined in claim 1, in which each cutter comprises a body of tough non-brittle metal terminating at the free end in a nose portion, said nose portion having a recess and a hard brittle cutter insert secured in said recess, said nose portion providing supports for the entire cutter insert to prevent breakage thereof.

5. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, the lower ends of said slots being closed to provide abutments for engaging said lugs to limit upward movement of said sleeve, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported on said thrust bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, a pawl pivotally mounted on said cage, longitudinally extending circumferentially spaced ratchet grooves in the inner surface of said upper body, said grooves extending from adjacent the upper end of said upper body to a point spaced upwardly from said lugs, spring means for urging said pawl into engagement with said grooves to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement into engagment with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter engaging recesses.

6. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, a thrust bearing disposed in the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported on said thrust bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, a pawl pivotally mounted on said cage, longitudinally extending circumferentially spaced ratchet grooves in the inner surface of said upper body, said grooves extending from adjacent the upper end of said upper body to a point spaced upwardly from said lugs, spring means for urging said pawl into engagement with said grooves to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

7. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferen-

tially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slot slidably receiving said lugs, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported by said bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, a pawl pivotally mounted on said cage, longitudinally extending circumferentially spaced ratchet grooves in the inner surface of said upper body, said grooves extending from adjacent the upper end of said upper body to a point spaced upwardly from said lugs, spring means for urging said pawl into engagement with said grooves to prevent relative rotation between said cage and said upper body in one direction, but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

8. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported by said bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, a pawl pivotally mounted on said cage, longitudinally extending circumferentially spaced ratchet grooves in the inner surface of said upper body, spring means for urging said pawl into engagement with said grooves to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

9. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported by said bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, means to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, splines between said lower body and said actuating sleeve to prevent relative rotation therebetween, cam slots in said actuating sleeve, the free ends of said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

10. A combination washover tool, pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported by said bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dog inwardly out of said recesses, means to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably received in said lower body and projecting into said upper body, means to prevent relative rotation between said actuating sleeve and said lower body, cam slots in said actuating sleeve, the free ends of

said cutters projecting through said cam slots and having cam surfaces for engaging the upper and lower ends of said cam slots, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and cam said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to cam said cutters outwardly into said cutter receiving recesses.

11. A combination washover tool, a pipe cutter and retriever comprising an upper tubular body, a lower tubular body removably secured to the lower end of said upper body, an annular cutter removably secured to the lower end of said lower body, means for connecting said tool to a washover pipe string, a plurality of circumferentially spaced inwardly extending lugs intermediate the length of said upper body, a sleeve disposed in said upper body and having slots slidably receiving said lugs, a thrust bearing disposed on the upper end of said sleeve, a tubular dog cage slidably received in the upper portion of said upper body and supported by said bearing, the wall of said cage having a plurality of circumferentially spaced longitudinally extending recesses, an elongated pipe collar engaging dog pivotally mounted for movement into and out of each recess, means for urging said dogs inwardly out of said recesses, means to prevent relative rotation between said cage and said upper body in one direction but permitting relative rotation in the opposite direction, circumferentially spaced cutter receiving recesses in said lower body, a cutter pivotally mounted in each of said last named recesses for movement inwardly into engagement with a pipe to be cut and for movement outwardly into said last named recesses, a cutter actuating sleeve slidably mounted in said lower body and projecting into said upper body, means to prevent relative rotation between said actuating sleeve and said lower body, interengaging means on said actuating sleeve and said cutters to move said cutters into and out of said last named recesses upon movement of said actuating sleeve, a compression spring disposed between the lower end of said first mentioned sleeve and the upper end of said actuating sleeve to urge said actuating sleeve downwardly and move said cutters inwardly into engagement with a pipe to be cut and a second compression spring fixed in the lower end of said lower body and engaging the lower end of said actuating sleeve to urge said actuating sleeve upwardly to move said cutters outwardly into said cutter receiving recesses.

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