United States Patent [19]

Beaulieu

[11] **3,818,563**

[45] **June 25, 1974**

[54] **WORK-HOLDING CHUCK AND CARTRIDGE-CASE TRIMMER EMPLOYING SAME**

[75] Inventor: **Richard G. Beaulieu,** Columbia, Conn.

[73] Assignee: **The Leisure Group, Inc.,** Los Angeles, Calif.

[22] Filed: **Sept. 21, 1972**

[21] Appl. No.: **285,770**

Related U.S. Application Data

[63] Continuation of Ser. No. 153,194, June 15, 1971, abandoned.

[52] **U.S. Cl.** ..... **29/1.32,** 86/44, 279/1 L

[51] **Int. Cl.** **F42b 5/26,** B21d 51/54

[58] **Field of Search** ..... 29/1.30, 1.31, 1.32; 86/23, 29, 31, 36, 44; 279/1 L

[56] **References Cited**

UNITED STATES PATENTS

2,744,307	5/1956	Smiley	29/1.32
3,025,743	3/1962	Cecchi	86/44
3,185,019	5/1965	Shoffstall	86/44
3,274,661	9/1966	Westbrook	29/1.32
3,319,511	5/1967	McLean	86/44

Primary Examiner—Andrew R. Juhasz
Assistant Examiner—Leon Gilden
Attorney, Agent, or Firm—Steward & Steward

[57] **ABSTRACT**

A work-holding chuck designed for use as a cartridge-case holder for reloading ammunition, especially in connection with a trimmer for cartridge cases, in which the holder is provided with a centering ball against which the empty primer pocket in the base of the case is held by retaining-fingers when the case is placed in the holder. The retaining-fingers are mounted so that they spread outward to receive and retain cartridge cases of all sizes and styles. When the holder is locked, the base of the cartridge-case is pressed by the retaining-fingers solidly against a cartridge-positioning surface of the holder through which the centering ball projects, thereby ensuring both exact centering of the head of the cartridge case and location thereof longitudinally with respect to a tool-positioning surface on the device such as a case trimmer, with which the holder is used.

10 Claims, 5 Drawing Figures

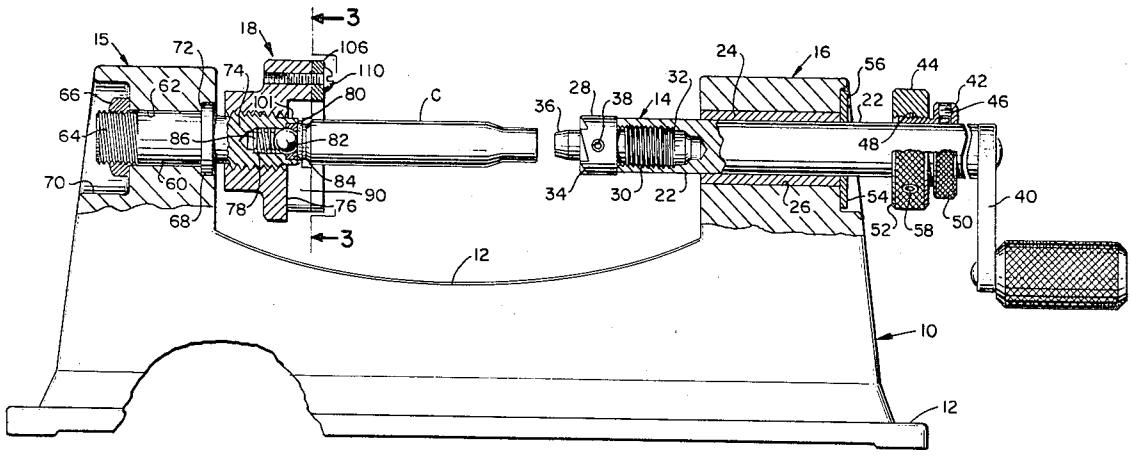


FIG. 1

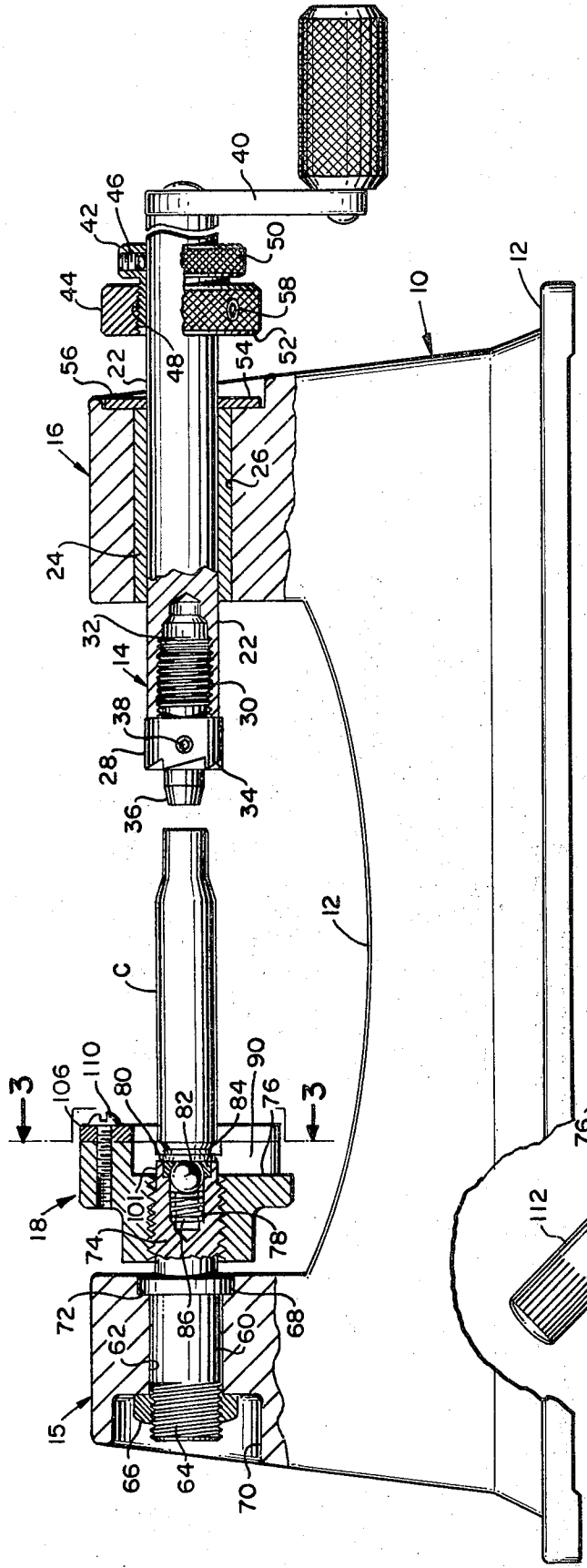


FIG. 4

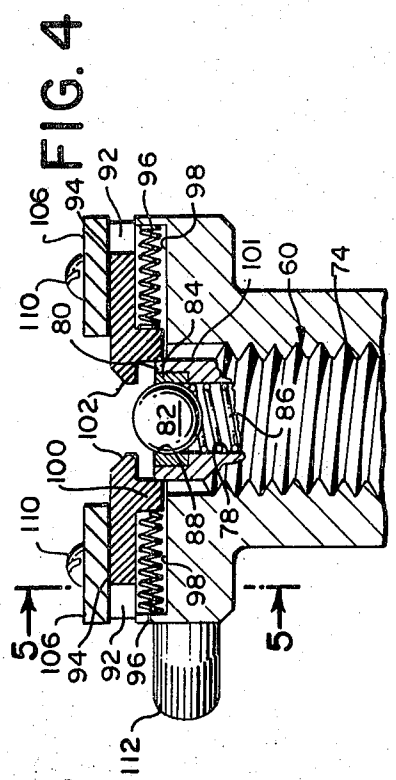
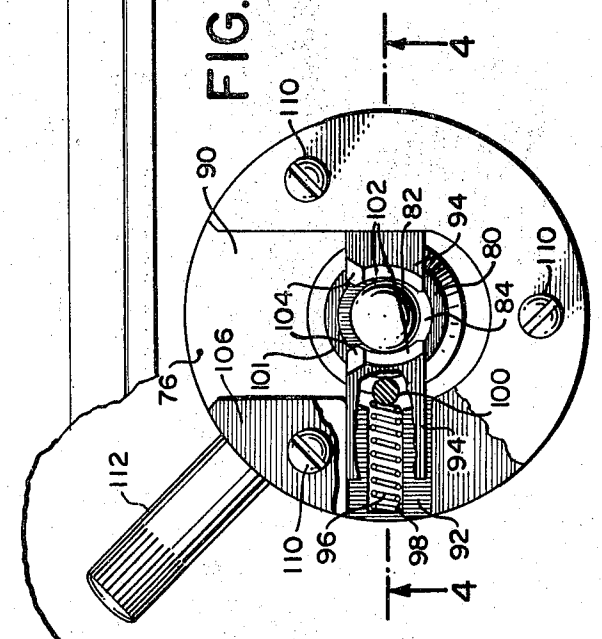


FIG. 3



INVENTOR
RICHARD G. BEAULIEU

BY Steward & Steward
his ATTORNEYS.

FIG. 2

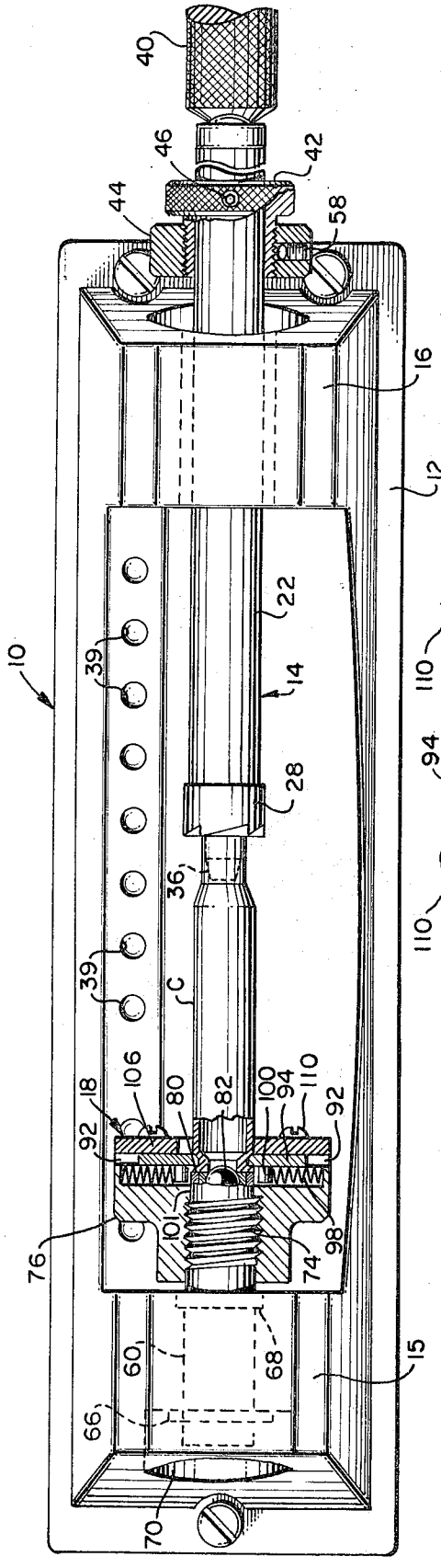
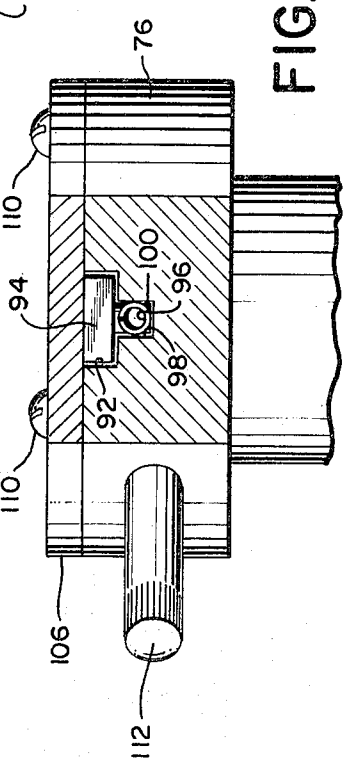

40
46
42
44
58
16
12
10
22
14
39
28
36
C
18
106
80
82
100
94
110
92
101
74
98
76
60
68
15
66
70

FIG. 5


76
110
100
96
94
98
92
110
106
112

WORK-HOLDING CHUCK AND CARTRIDGE-CASE TRIMMER EMPLOYING SAME

This is a continuation of application Ser. No. 153,194, filed June 15, 1971, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to work-holding chucks especially for use in cartridge-case reconditioning and reloading equipment for firearms, and it relates more particularly to a chuck for positioning and holding the head of the shell of the cartridge in proper alignment and at a fixed position with respect to the tool being used. The invention also relates specifically to a tool of this general type known as a case trimmer, in which the mouth of the shell is cut or ground off in order to reduce the overall length of the cartridge case by a desired amount.

In the reloading of cartridge cases for firearms, the equipment employed in reconditioning used cases and for loading them usually requires means for holding the head of the case so that it is in alignment with the tool or tools that are used and in some instances for holding the case so that it is located precisely a predetermined distance from a fixed point of reference for such tool. For example, in order to trim a cartridge case properly to the desired length, it is necessary to hold the head of the case so that it is exactly aligned with the axis of rotation of the cutter, and at the same time so that its base is located a precise distance within say a thousanth of an inch from the point of reference for the cutter. Accurate alignment and positioning of the cartridge-case base is likewise desirable in performing certain operations in reloading presses where the cartridge case must be held very exactly.

Furthermore, since cartridge cases come in a wide variety of diameters and shapes, it is desirable to provide a holder which will accommodate cartridges of various sizes and having different styles of heads, such as rimmed, rimless, belted and the like. One of the difficulties encountered heretofore in designing such a holder has been the variation in thickness of the rim at the head of the cartridge and in the position of the extractor groove with respect to the base or flat end-portion of the head. Such variations exist not only in cartridge cases of different calibers, styles and makes, but even in cartridges of the same caliber, style and make because of manufacturing tolerances in the production of the shells. Consequently, a case holder designed for one particular style and caliber of cartridge may not be capable of holding every cartridge case, because the rim on some of the cases may be too thin, while in others the rim may be so thick that it will not fit into the holder.

The U.S. Pats. to Cecchi 3,025,743, Paul 3,107,575, Aulabaugh 3,157,407, Shoffstall 3,185,019 and McLean 3,319,511 show cartridge-case holders which are designed to hold cartridges of different calibers and diameters. However, these prior holders all have certain disadvantages, such as greater expense, inconvenience in use or inability to adapt for variations in rim thickness. In the patent to Smiley 2,744,307, on the other hand, which shows a case trimmer having a collet-type holder, it is necessary to change the collet for cartridge cases having different diameters, because of the limited range of sizes which each collet is capable of handling. Furthermore, while the case holder shown in the Smiley patent may provide accuracy in aligning the head of the case with the trimming tool, there is no way of precisely determining and setting the distance between the head of the cartridge case and the point of reference for the tool without a master case of exactly the right length. The same is true insofar as ammunition-making equipment is concerned where each machine is designed to hold cartridge cases of one size and style. Furthermore, one of the reasons that serious marksmen reload their own ammunition is that they desire greater accuracy than "factory-loads" can be relied upon to provide.

It is accordingly an object of the present invention to provide a work-holding chuck which is capable of accepting various sizes and types of work-pieces having a centrally disposed recess in a reference surface, such as the primer or detonator pocket in the center of the base of a cartridge case, while locking the work-piece in place with its reference surface positively located at a longitudinally fixed position. The work-pieces for which the invention is primarily intended are so-called center-fire cases for guns, especially high-power rifles and pistols, as well as shotgun shells, but also include cartridge cases for other explosive charges for impact tools and similar industrial applications. The term "center-fire cartridge cases" is accordingly used herein in a generic sense to include all of the foregoing. Another and equally important object of the invention is to provide a work-holding chuck which automatically aligns the work-piece with the tool.

SUMMARY OF THE INVENTION

While the invention is applicable to work-holding chucks in general where the work-piece has a reference surface with a recess that is symmetrical with the central axis of the piece, it is particularly suited for ammunition reloading tools, and it was with such application in mind that the invention was initially conceived. The description hereinafter of a particularly desirable embodiment of the invention accordingly refers specifically to reloading equipment for case-type ammunition.

Proper alignment of the cartridge case is achieved by the present invention in taking advantage of the primer recess or pocket provided in the center of the flat end surface or base of the head of every cartridge of the type hereinbefore referred to as center-fire ammunition. In such cartridges the priming charge is located within this recess or pocket, as distinguished from rim-fire cartridges, in which the primary charge is provided in the rim of the cartridge. The cartridge-case holder of the present invention is accordingly provided with a central member in the form of a mounting stud which is supported on the base or frame of the press, case trimmer or other reloading device and which has a work-positioning surface against which the cartridge case is held by suitable retaining means, such as a pair of retaining fingers, in a body portion of the holder having means for urging the retaining fingers against the rim of the cartridge case in order to force the base of the cartridge case into rigid engagement with the work-positioning surface on the mounting stud. The de-primed cartridge case is aligned on the mounting stud by a spring-loaded, spherical, work-centering member, such as a steel ball, which is located in a recess in the mounting stud such that it engages within the empty primer pocket in the base of the case which is then

locked in the holder, the alignment being maintained as the flat base on the head of the shell is forced against the ball and into solid engagement with the cartridge-positioning surface on the mounting stud.

A particularly desirable application of the invention resides in a cartridge-case trimmer having a unitary frame with an upright portion at each end of a horizontal base on which it rests, somewhat like a machinist's lathe. One of the upright members supports an elongated, rotary cutter-tool for rotation about its longitudinal axis parallel to the base of the frame and has a longitudinally fixed cutter-positioning surface for limiting the axial movement of the cutter-tool toward a cartridge-case holder mounted on the other upright member of the frame. Suitable means are provided for engaging the cutter-positioning surface on the frame for accurately determining how long the cartridge case will be after it has been trimmed.

Precise tolerances are possible with the cartridge-case holder of the present invention, because the shell is always aligned accurately with the tool and its base is positively located on the holder-mounting stud, which is longitudinally fixed with respect to the frame and therefore with respect to the reference point for the tool. Fine adjustment of the trimming tool with respect to the point of reference is also provided, so that it is not necessary to set the tool by means of a master case having exactly the right length. Another advantage of the invention is that variations in rim-thickness from one cartridge to another do not affect the accuracy of the device, whether it be a trimmer for restoring the case to a precise length or whether it is a reloading press.

SPECIFIC DESCRIPTION OF PREFERRED EMBODIMENT OF THE INVENTION

The foregoing objects and advantages of the invention, as well as others, will become more apparent from the detailed description hereinafter in connection ith an improved cartridge-case trimmer embodying the invention and shown in the accompanying drawings, wherein

FIG. 1 is a side elevational view of the trimmer, portions thereof being shown broken away and in longitudinal section;

FIG. 2 is a top plan view of the device shown in FIG. 1, with portions thereof again broken away and shown in section;

FIG. 3 is an end view of the cartridge-case holder per se shown in FIGS. 1 and 2, looking in the direction of the arrows 3—3 in FIG. 1 but with the cartridge case removed;

FIG. 4 is a longitudinal section through the cartridge-case holder taken on the line 4—4 of FIG. 3; and

FIG. 5 is a side view of the cartridge-case holder shown partly in section on the line 5—5 of FIG. 4.

Referring more particularly to FIGS. 1 and 2 of the drawings, the frame 10 of the case trimmer is illustrated as being a one-piece casting having a stable, horizontal base 12 for holding a cartridge-case C and a trimming tool 14. A cartridge-holder supporting upright 15 projects upward from one end of the base 12 and a trimming-tool supporting upright 16 projects upward from the other end of base 12 in spaced relationship to the upright 15. A cartridge-holder indicated generally at 18 is mounted on the upright 15 for holding the empty shell C in a horizontal position, with its mouth facing the trimming tool 14.

Trimming tool 14 consists of an elongated cylindrical shaft 22 that is rotatably supported by and extends through the upright 16 for both rotary and longitudinal movement with respect thereto. A bearing sleeve 24 for shaft 22, which is desirably made of an oil-impregnated bearing material, is pressed into a horizontal hole 26 through upright 16, so that it is rigid with frame 10. A cylindrical cutter 28 is removably mounted co-axially on shaft 22 at the inner end thereof by means of a threaded portion 10 on one side, which fits a threaded socket 32 in the end of shaft 22. Suitable cutting teeth 34 are provided on the opposite side of cutter 28 for removing material at the mouth of the shell C when trimming tool 14 is moved axially into engagement with the shell and rotated in the proper direction. A pilot 36 of the desired diameter is removably mounted in the center of the cutting face of cutter 28 co-axial with shaft 22 for guiding engagement within the neck of the empty cartride case C, thereby supporting the neck of the case while it is being trimmed. Pilot 36 may be provided with a smooth co-axially extending, mounting stud (not shown), which fits closely within a socket located in the center of the cutting face of cutter 28 and is fixed therein by means of a set screw 38 extending radially into the socket cutter 28 from its periphery. Accordingly, pilot 36 is readily removed for replacement by similar pilots having diameters corresponding to cartridge cases of different calibers. A row of mounting recesses 39 (FIG. 2) are provided in the upper surface of the base 12, in which to keep the extra pilots 36 which are not in use.

A crank 40 is provided at the outer end of cutter shaft 22 for rotating cutter 28 when trimming cartridge cases C to the desired length. In order to set the cutter so that each case or shell C is trimmed to the same length, a pair of stop-sleeves 42, 44 are slideably supported as a unit or cutter shaft 22 outward of upright 16. Stop-sleeves 42, 44 may be fixed at any desired position on cutter shaft 22 by means of a binder screw 46 on the inner stop-sleeve 42, which is shaped like a packing glandnut with an externally threaded portion 48 and a knurled head-portion 50, through which binder screw 46 is threaded. Stop-sleeve 44 is internally threaded to fit the threaded portion 48 of stop-sleeve 42, by which it is supported. When binder screw 46 is loose, the stop-sleeves 42, 44 can be slipped quickly to any desired location along shaft 22 and then fixed thereto by tightening binder screw 46. Stop-sleeve 44 can then be rotated on sleeve 42 in order to accurately position its inner face, referred to hereinafter as stop-surface 52, for engagement with a cutter-positioning surface 54 on the outer side of upright 16 around the cutter shaft 22.

By sliding the trimming tool 14 lengthwise, the pilot 36 first enters the neck of cartridge case C, holding it in place as the cutting teeth 34 move into contact with the mouth of the case. When the trimming tool is rotated by means of its crank 40 while maintaining a light pressure longitudinally against the end of the case, the mouth of the case is gradually trimmed back by cutter 28 until the stop-surface 52 of stop-sleeve 44 comes into engagement with the positioning-surface 54 on upright 16. At this point axial movement of the trimming tool toward the case is prevented, so that it cannot be trimmed more than the setting of the stop-sleeve 44

permits. It is desirable to provide a smooth-surfaced washer 56 at the opening of the hole 26 through upright 16, so that the stop-surface 52 engages washer 56 instead of the upright 16 directly. The cutter-positioning surface 54, whether it is considered to be the outer side of washer 56 or the adjacent portion of upright 16 against which it rests, is of course disposed perpendicular to the longitudinal axis of the trimming tool 14. As will be described in greater detail hereinafter, when the stop-sleeve 44 has been adjusted to its desired position, it is fixed in place by another binder screw 58, which locks it in place on stop-sleeve 42, so that it cannot be rotated out of adjustment.

Referring now more particularly to the cartridge-case holder 18, it will be seen that this device is provided with a mounting stud 60 which is supported on holder-supporting upright 15 of the trimmer frame in a horizontal opening 62 co-axial with the trimming tool 14. The cylindrical body portion of mounting stud 60 fits within opening 62 and is threaded at its outer end 64 in order to receive a large assembly nut 66. An enlarged annular positioning flange 68 is formed in the central portion of mounting stud 60, such that when assembly nut 66 is turned up tight against the bottom of a recess 70 in the outer side of upright 15, positioning flange 68 is brought up rigidly against the bottom of another recess 72 in the opposite side of upright 15. Mounting stud 60 is accordingly immovably held in upright 15 as if it were integral therewith.

The inner end 74 of mounting stud 60 extends inwardly of upright 15 toward the trimming tool 14, and co-axially therewith, far enough to support a hollow, generally cylindrical, body member 76, which provides a chuck for drawing the head of a cartridge case rearward (to the left as viewed in FIG. 1) against, and into locking relation with, the end of the mounting stud 60. The end 74 of stud 60 is externally threaded, and the body member 76 is internally threaded to fit the threads 74. Consequently, as the body member 76 is rotated on the threaded end of mounting stud 60, it moves axially thereon. Housed within a central recess 78 at the extreme inner end 80 of mounting stud 60, is a spherical centering member 82, such as a precisely ground and polished ball bearing. The central recess 78 for ball 82 is cylindrically shaped and opens at the inner end 80 of mounting stud 60 to receive a retaining sleeve 84, which is pressed into an enlarged outer end section of the recess 78 for retaining and guiding ball 82 on the longitudinal axis of the cartridge-case holder 18. A coil spring 86 is compressed between the closed end of recess 78 and ball 82, so that it urges the ball outward against an inwardly beveled, ball-retaining seat 88 at the outer corner of retaining sleeve 84, permitting a portion of ball 82 to project outwardly somewhat beyond the end surface 80 of mounting stud 60. Retaining sleeve 84 should be carefully formed in order to keep ball 82 on center, both when it is pressed against the retaining seat 88 and when it is moved inward of its recess 78 against spring 86.

The body member 76 of the holder is provided with a wide access groove 90, which extends laterally or radially from the hollow central portion around centering ball 82 to the periphery of the holder. A pair of diametrically opposite T-shaped guide-slots 92, 92 (FIG. 5) are formed in body member 76 at right angles to access grove 90. Grove 90 provides access to the holder for the head of each cartridge case C, while guide-slots 92, 92 form ways for a pair of cartridge-case retaining-fingers 94, 94, in which to move radially, so that they will fit cartridge cases of different sizes. Retaining-fingers 94, 94 are urged inward toward each other by a pair of coil springs 96, 96, each compressed within a central portion 98 of each of the T-shaped guide-slots 92, 92.

As may be seen in FIGS. 3 and 4, the wide portions of guide-slots 92, 92 for retaining fingers 94, 94 are open at the periphery of the body member 76 in order to permit the outer ends of retaining fingers 94, 94 to extend outward through the slot when they are spread apart by cartridge cases having large diameters. However, the central portion 98 of each guide-slot 92 is closed at its outer end for retaining the outer end of each coil spring 96. The inner end of each of the two coil springs 96, 96 presses against a pin 100 located at the inner end of each retaining-finger 94 and extending rearwardly or downwardly, as the case may be, into the center portion 98 of each slot 92. Retaining-fingers 94, 94 are accordingly constantly urged inward toward each other by their respective springs 96, 96 with pins 100, 100 on the retaining fingers resting on an unthreaded end section 101 of mounting stud 60 as shown in FIG. 4.

The inner end of each retaining finger 94 is curved in order to engage as much of the rim of the cartridge case as possible. In addition, the curved inner end of each of the retaining-fingers 94, 94 is beveled at 102 on the side facing away from the mounting stud 60, in order to fit cartridge cases having extractor grooves of different widths. The beveled edges 102, 102 likewise facilitate insertion of the cartridge case between the retaining-fingers by camming them outward as the head of the case is pressed against the beveled edges of the fingers. In addition, the fingers 94, 94 are also beveled at the corner 104 adjacent the access slot 90 for ease in inserting the case laterally into the holder. The inner or back side of each of retaining-fingers 94, 94 should of course be square with its curved end, so that it engages the rim of the cartridge solidly.

Retaining-fingers 94, 94 are held in place in their guide-slots 92, 92 by a horseshoe-shaped cover-plate 106, which has an access opening 108 corresponding in shape to the access groove 90 in the body member 76 and is fastened to the outer face thereof by screws 110. In order to facilitate turning the body member 76 on the mounting stud 60 of the cartridge-case holder 18, a lever 112 is rigidly mounted on the member 76 so that it extends radially outward therefrom, as best shown in FIG. 3.

It will be readily apparent from the foregoing that by rotating the body member 76 on mounting stud 60 in one direction — as for example clockwise as viewed in FIG. 3 if righthand threads are provided — the body member 76 and retaining-fingers 94, 94 will be drawn toward the cartridge-positioning surface 80 on mounting stud 60. Rotation in the other direction will of course result in axial movement of the body member 76 in the opposite direction. Consequently, with the body-member 76 moved outward away from the centering ball 82 as shown in FIG. 4, the rim of cartridge case C may be inserted between the end surface 80 of mounting stud 60 and retaining-fingers 94, 94 by pressing the head of the case against centering ball 82 and the beveled edges 102, 102 of the retaining-fingers. Ball 82 is thus depressed inwardly while retaining-fingers 94, 94

are forced outward until their curved inner ends engage within the extractor groove of the shell or outward of the rim. As the shell moves into position, centering ball 82 snaps outward into the empty primer pocket in the flat base of the head of the shell ensuring that the case is properly centered at this end. Before being trimmed, all used cartridge cases must of course be deprimed by removing the expended primer cap, and each case should also be resized in order to restore it to its correct cross-sectional dimensions.

After each case is placed in the holder 18 and before the holder is locked, the trimming tool 14 is moved axially toward the open mouth of the cartridge case until the pilot 36 enters the neck of the case and the cutting teeth 34 touch the case mouth. The cartridge holder 18 is then locked by rotating the body member 76 to its locked position, or clockwise in the present instance. Rotation of the body member of the holder in this manner causes the retaining-fingers 94, 94 to draw the base of the cartridge case rigidly against the cartridge-positioning surface 80 of mounting stud 60. Centering ball 82 in the meantime exerts a constant pressure on the base of the case, keeping the head of the case centered at all times, due to the fact that ball 82 engages within the empty primer pocket in the case.

It will be noted that since the mounting stud 60 is fixed on the frame 10 of the case trimmer, the cartridge cases are always referenced by the positioning surface 80 at a fixed point with respect to the positioning surface 54 for the cutter on the upright 16 of frame 10. This provides great accuracy and uniformity in trimming any number of cartridge cases, once the trimming tool 14 has been adjusted properly. Lever 112, by which the holder 18 is rotated into and out of locked position, is desirably located peripherially of the body member 76 such that when the holder is unlocked, the lever 112 is located to the left, as viewed in FIG. 3, or to the front of the unit. Furthermore, the threads at the end 74 of the mounting stud should be selected such that only about one-quarter of a turn of the body member 76 is required in order to lock the cartridge case C in the holder. It will also be noted that lever 112 extends far enough from the holder 18 to engage the base 12 of frame 10, preventing the body member 76 from making a complete revolution on stud 60 and from being backed-off too far.

With the case C locked in holder 18 as illustrated in FIG. 2, the trimming tool 14 is next adjusted to trim the shell to the desired length by setting the stop-sleeves 42, 44 at the outer end of cutter shaft 22. Both binder screws 46 and 58 on sleeves 42 and 44 should be loosened, so that they can be rotated relative to each other in the proper direction in order to spread them apart far enough to allow for fine adjustment. With the cutting teeth 34 of the cutter 28 still touching the mouth of the case C, the two stop-sleeves are slid along the cutter shaft 22 until the stop-surface 52 of sleeve 44 tightly engages the positioning surface 54 on the upright 16. The binder screw 46 on the stop-sleeve 42 is then tightened to lock sleeve 42 in place on cutter shaft 22. Fine adjustment for the amount of cut can then be made by rotating stop-sleeve 44 in steps to move it closer to the head-portion 50 of sleeve 42. Between each adjustment of stop-sleeve 44, the trimming tool 14 is rotated by means of crank 40 and pressed axially against the mouth of the case C until stop-sleeve 44 engages the cutter-positioning surface 54, preventing any additional cut of the case until stop-sleeve 44 is again backed off a little.

By selecting the desired threads 48 between stop-sleeves 42 and 44, one complete revolution of stop-sleeve 44 on sleeve 42 can be made to provide approximately 0.020 inches of axial movement of the cutter head and produce a corresponding amount of cut from the length of the cartridge being trimmed. By adjusting the cut a little at a time and checking the length of the case with a vernier caliper after each cut, the correct length of the case can be obtained with great accuracy. On obtaining the exact length of the cases to be trimmed, the stop-sleeve 4 is locked in place on sleeve 42 by tightening its binder screw 58.

Once the trimmer is in adjustment for a particular case length, any number of cases to be trimmed to that length can be processed without further adjustment by simply placing each deprimed case in the holder 18 in the manner described hereinbefore and by rotating the crank 40 while maintaining an inward pressure on the cutter 28 so that it is always bearing against the case mouth. When stop-sleeve 44 comes in contact with positioning surface 54, the cutter can no longer move into cutting engagement with the case C, which is accordingly trimmed to the correct length.

Where a master case of the correct length is available, adjustment for setting up the trimmer can of course be speeded up by placing the master case in the holder and setting the stop-sleeves 42, 44 on the cutter shaft 22 with the cutting teeth touching the mouth of the master case. However, if master cases of the desired length are not available, as is frequently the situation, the trimmer of the present invention provides a convenient and accurate means for setting the exact length of the cases to be trimmed.

The cartridge-case holder of the present invention likewise contributes substantially to the accuracy of the length of the cases that are trimmed, as well as to the ease and speed with which they can be trimmed.

What is claimed is:

1. A work-holding chuck for work-pieces having a central axis, a reference surface and a recess in said surface formed symmetrical with said central axis, said chuck comprising in combination

a central member having a free end extending coaxially with said central axis and a work-positioning surface at said free end disposed transversely thereof,

a spherical work-centering member supported within the free end of said central member with its center on said central axis, the diameter of said spherical member being greater than that of the recess in the work-piece,

means within said central member for restricting said work-centering member for movement along said central axis and for positively limiting such movement in the direction of said free end of said central member,

spring means for urging said work-centering member in the direction of said free end,

a body member mounted on said central member for retaining a work-piece with the open end of its recess disposed against said work-centering member and depressing the same against said spring means,

retaining means carried by said body member for engaging said work-piece in order to hold it in engagement with said work-centering member, and

means for moving said body member axially relative to said central member into work-locking relation with said central member, whereby the reference surface of the work-piece is forced into rigid surface-to-surface contact with said work-positioning surface on said central member.

2. A work-holding chuck as defined in claim 1, comprising a cartridge-case holder for a device for reconditioning and reloading deprimed center-fire cartridge cases, wherein the base of the case head comprises the reference surface of said work-piece and the empty primer pocket comprises said recess, said device having a frame for supporting such cartridge case along said central axis for engagement with a tool mounted on said frame, said central-member comprising a mounting stud supported on said frame with said work-centering member disposed within said mounting stud for engagement by the outer end of the primer pocket of a cartridge case, said work-positioning surface comprising a surface for positioning a cartridge, said retaining means being adapted and arranged to engage the rim of such cartridge case such that upon movement of said body member into locking relation with said mounting stud the base of the cartridge-case is brought into such surface-to-surface contact with said cartridge-positioning surface.

3. A cartridge-case holder as defined in claim 2, wherein said mounting stud is rigidly fixed to said frame and said cartridge-positioning surface is disposed at the extreme end of said mounting stud, said cartridge-centering member comprising a ball, said means for restricting said work-centering member comprising a cylindrical passage within said mounting stud having a circular opening through said cartridge-positioning surface and an annular restriction at said opening of smaller inside diameter than the diameter of said centering ball in order to prevent said ball from passing while permitting a portion thereof to project through said opening.

4. A cartridge-case holder as defined in claim 3, wherein said cartridge-case retaining means comprises a plurality of retaining-fingers guided in radial ways in said body member for radial movement thereon and spring means for urging said retaining-fingers inward into engagement with the head of a cartridge case disposed between them.

5. A cartridge-case holder as defined in claim 4, wherein the inner ends of said retaining-fingers are provided with beveled surfaces by which said retaining-fingers are cammed outwardly by pressure exerted against said beveled surfaces by the head of a cartridge as it is inserted between said retaining-fingers and centering ball.

6. A cartridge-case holder as defined in claim 3, wherein said cartridge-case retaining means comprises a pair of retaining-fingers guided in oppositely disposed grooves in said body member for radial movement thereon and spring means for urging said retaining-fingers inward into engagement with the head of a cartridge case disposed between them.

7. A cartridge-case holder as defined in claim 6, wherein said means for moving said body member axially with respect to said mounting stud comprises screw threads between said body member and mounting stud such that rotation of said body member on said mounting stud results in axial movement for moving said retaining-fingers toward and away from said centering ball.

8. A cartridge-case trimming device for center-fire cartridge cases having a frame, a cartridge-case holder mounted on said frame for supporting a cartridge case along a predetermined longitudinal axis, a trimming tool mounted on said frame for movement along said longitudinal axis into engagement with the open mouth of said cartridge case, said cartridge-case holder comprising

a mounting stud supported on said frame and having a free end extending along said longitudinal axis toward said trimming tool,

a cartridge-positioning surface on said free end of said mounting stud disposed transversely of said longitudinal axis and facing said trimming tool and

a spherical, cartridge-centering member supported by said mounting stud on said longitudinal axis and having a diameter greater than the diameter of the largest primer pocket in available cartridges, said centering member being spring-loaded toward and projecting through said cartridge-positioning surface toward said trimming tool;

a body-member supported on said mounting stud for retaining the head of a deprimed cartridge case against said centering member with the outer end of the empty primer pocket engaging said centering member,

cartridge-case retaining means carried by said body member for engaging the rim of a cartridge case in order to hold it in such engagement with said centering member,

means for moving said body member axially of said mounting stud into case-locking relation with said mounting stud whereby the base of the case head is forced into rigid surface-to-surface contact with said cartridge-positioning surface, and

trimming-tool positioning means on said frame for limiting the axial movement of said trimming tool in the direction of said cartridge-case holder in order to trim a cartridge case accurately to a predetermined length.

9. A cartridge-case trimming device as defined in claim 8, wherein said mounting stud is rigidly fixed to said frame, said centering member comprises a ball and said trimming tool includes an elongated shaft rotatably mounted on said frame co-axially with said longitudinal axis and movable along said axis and a rotary cutter mounted at one end of said shaft adjacent said holder, said trimming-tool positioning means comprising a cutter-positioning surface on said frame adjacent said cutter shaft and stop-means adjustably mounted on said shaft for engagement with said cutter-positioning surface upon movement of said cutter shaft toward said cartridge-case holder.

10. A cartridge-case trimming device as defined in claim 9, wherein said cutter shaft is provided at its end opposite said rotary cutter with a crank for rotating said trimming-tool, said cutter-positioning surface comprising an annular surface of said frame through which said shaft extends, said stop-means comprising a first collar member slidably supported on said cutter shaft adjacent its crank end, means for rigidly fixing said first collar member on said cutter shaft, a second

collar member carried by, and concentric with, said first collar member on the side adjacent said annular cutter-positioning surface for engagement therewith, said second collar member being threaded to said first collar and having means for rigidly fixing it thereto in order to prevent relative rotation between said collar members.

* * * * *