

Sept. 9, 1969

K. SILVON

3,465,617

QUICK-DETACHABLE SHARPENERS FOR CHAIN SAWS

Filed Nov. 9, 1966

6 Sheets-Sheet 1

FIG. 1

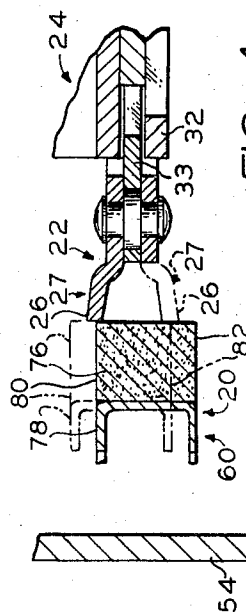
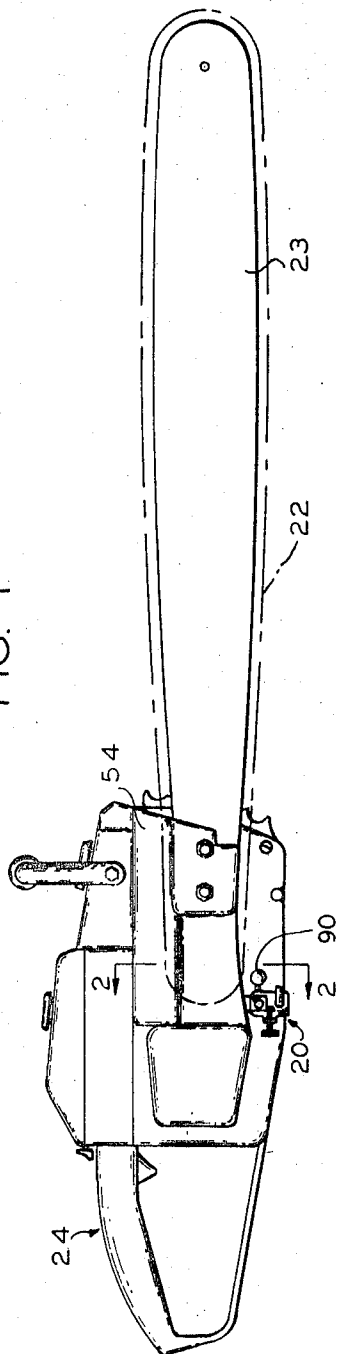


FIG. 4

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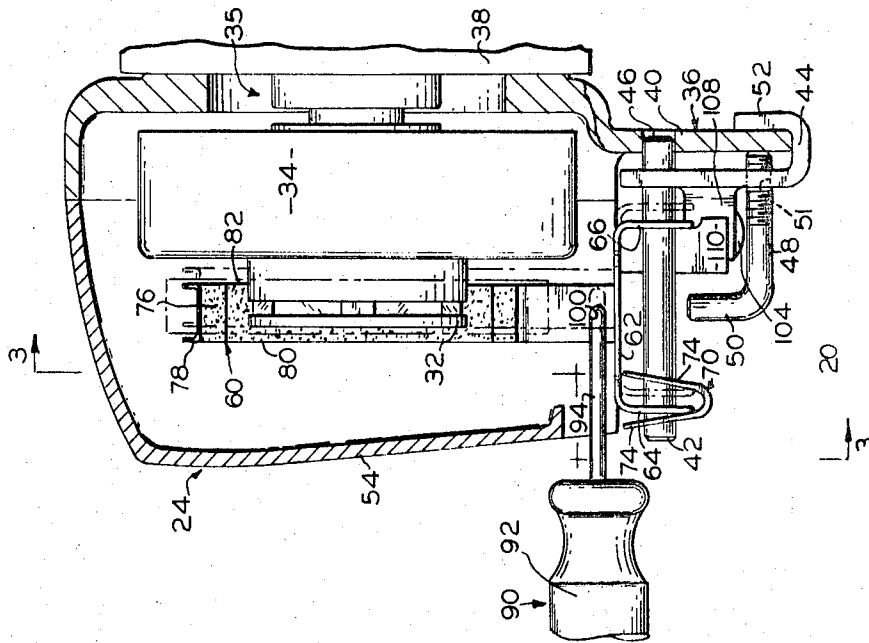


FIG. 2

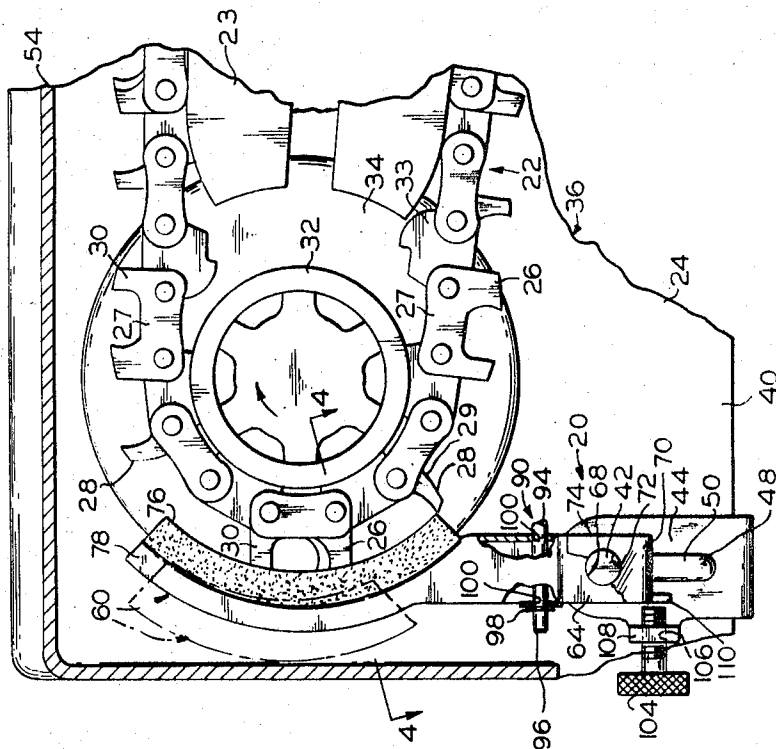


FIG. 3

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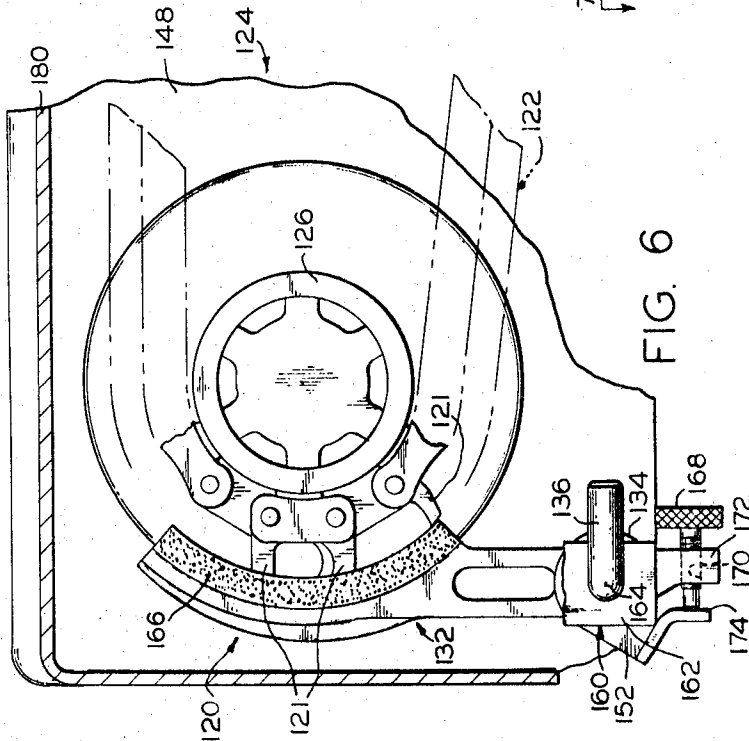
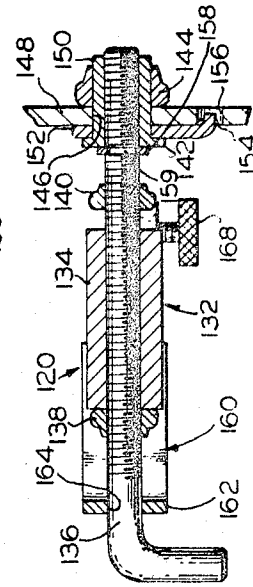
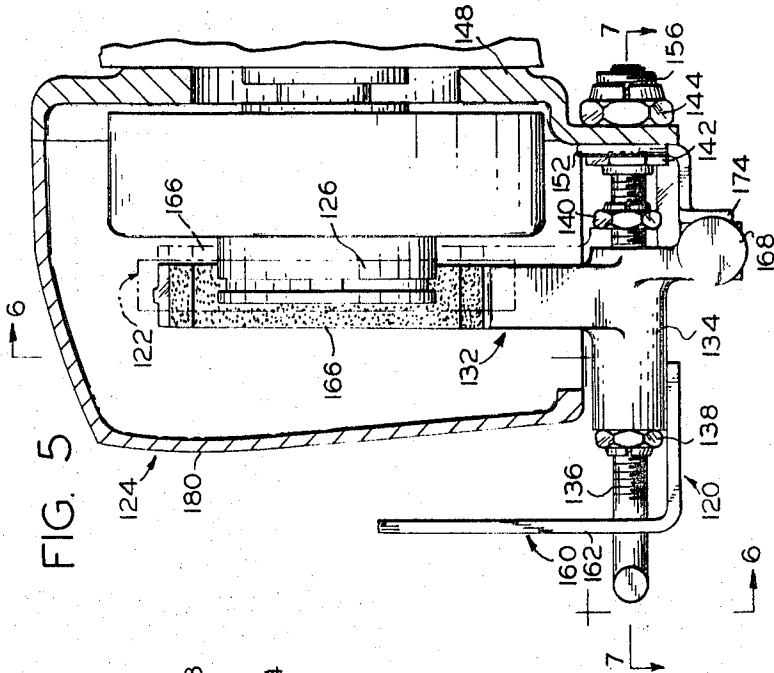
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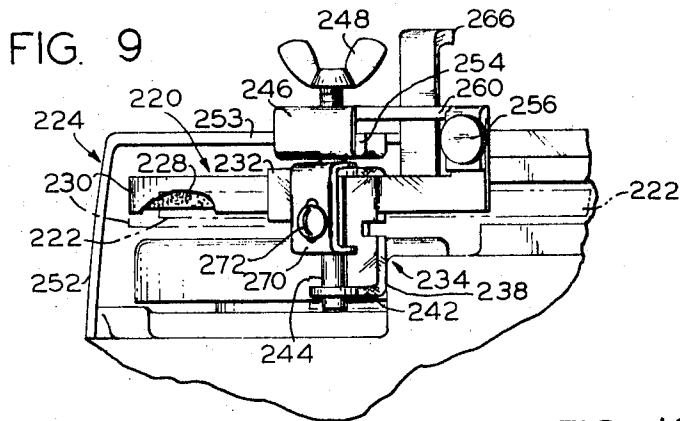
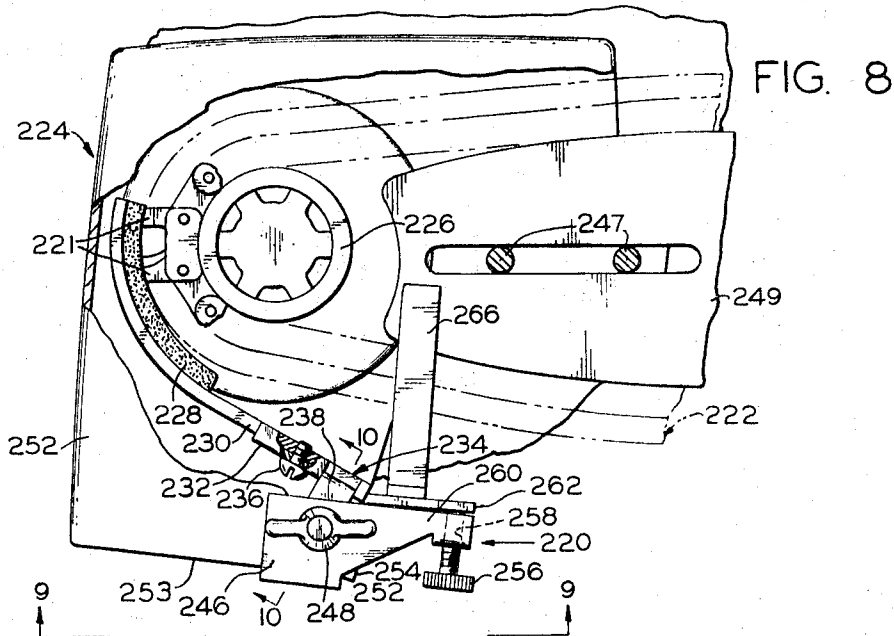
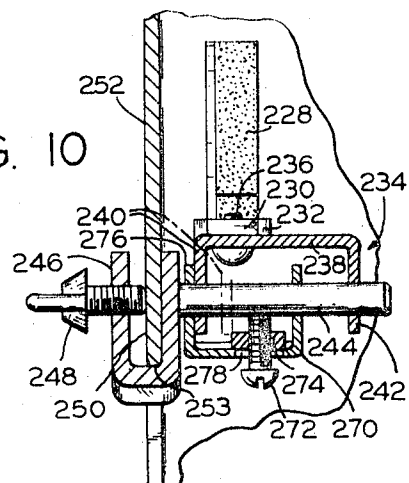


FIG. 10



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FIG. 11

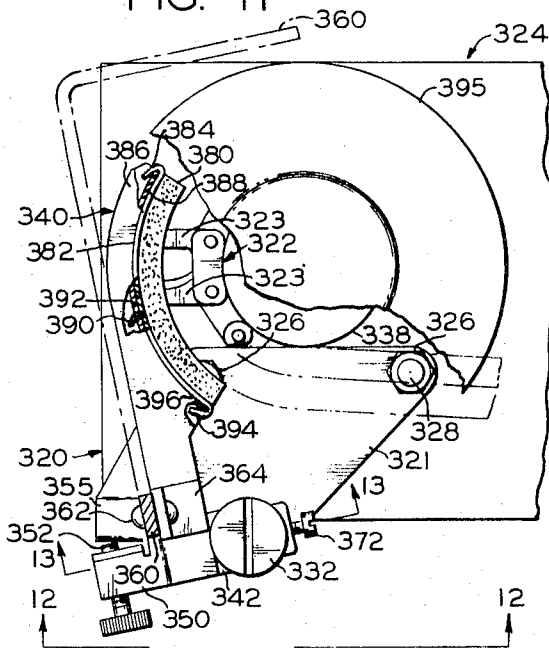


FIG. 13

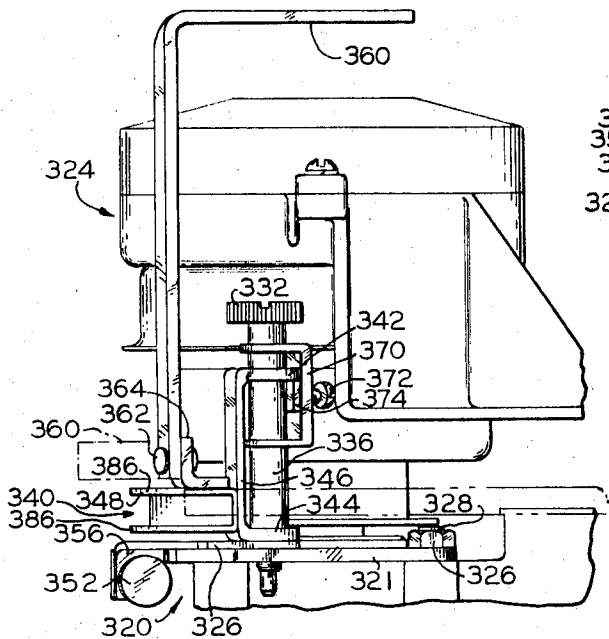
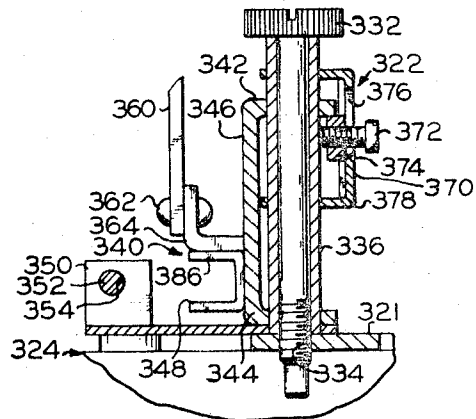


FIG. 12

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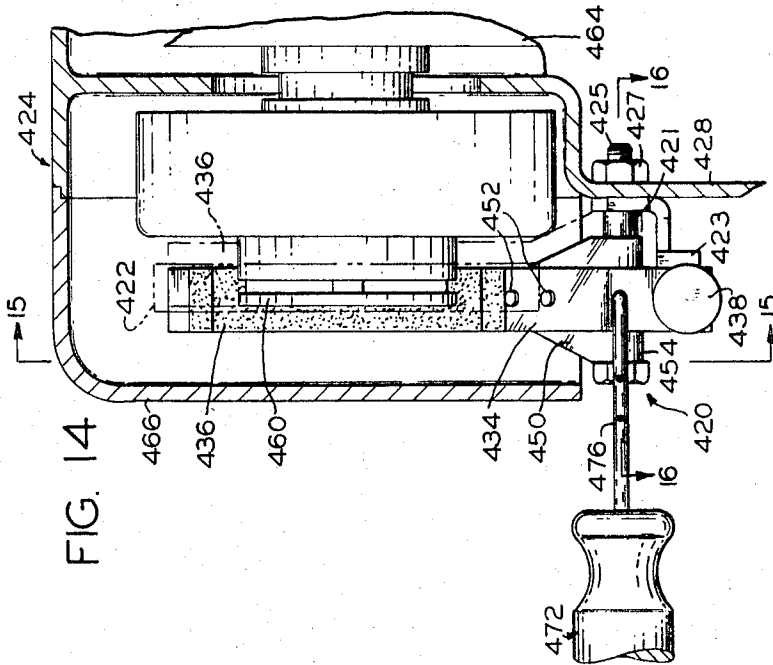


FIG. 14

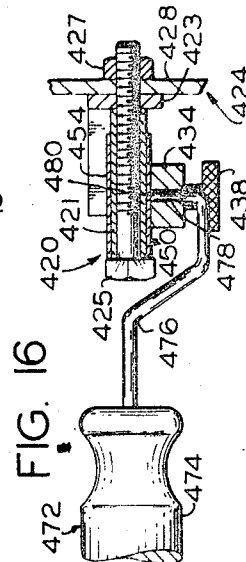


FIG. 16

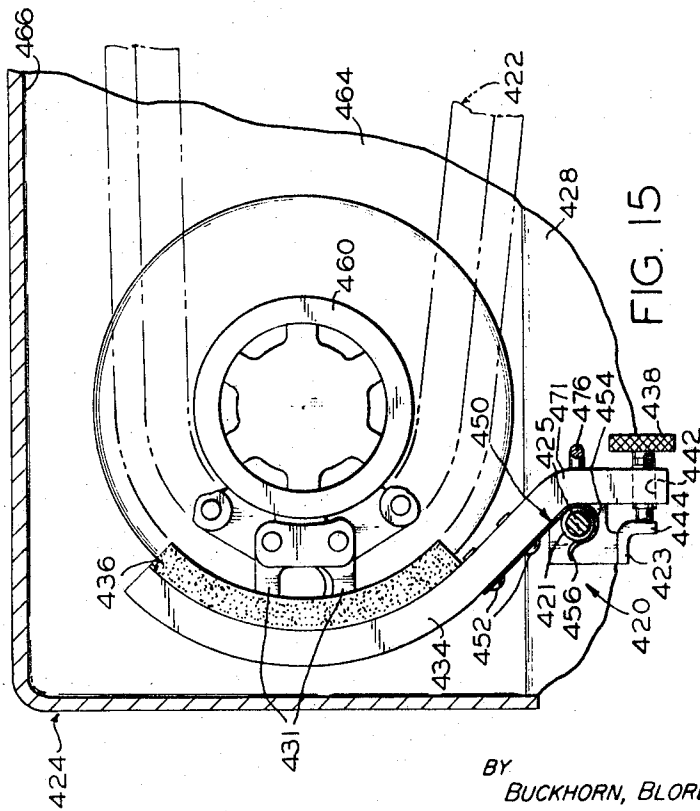


FIG. 15

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QUICK-DETACHABLE SHARPENERS FOR CHAIN SAWS

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Filed Nov. 9, 1966, Ser. No. 593,034
Int. Cl. B23d 63/00

U.S. Cl. 76—25

24 Claims

ABSTRACT OF THE DISCLOSURE

A quick-detachable sharpener which may be installed on existing chain saws. The sharpener is mounted on a carrier which has a handle for moving the sharpener into and out of engagement with the teeth of the chain saw.

This invention relates to quick-detachable sharpeners for chain saws, and more particularly to sharpeners which are easily installed in used chain saws to adapt the used chain saws to the use of top sharpening saw chains.

Sharpeners for sharpening saw chains by moving an abrasive member of the sharpener into engagement with the tips of projecting elements such as teeth and depth gauges of the saw chains are disclosed and claimed in U.S. Patent 3,040,602 and copending application Ser. No. 457,552, filed May 21, 1965, and assigned to the same assignee as this application. Said copending application discloses sharpeners which can be installed in existing or used chain saws by mounting the sharpeners on special covers or castings which are then substituted for the covers or castings of the used chain saws. These structures permit relatively simple installation of sharpeners in used or previously existing chain saws. However, it would be desirable to provide sharpeners which are even more easily mounted in existing or used chain saws. It also would be desirable to provide sharpeners which can be installed in and removed from existing chain saws in a matter of a few seconds. It also has been found to be desirable for such sharpeners to be easily removed from the chain saw so that the sharpeners are not contaminated or gummed up sawdust and dirt during use of the chain saws, and also will not be damaged in the event that the saw chains ever come off the drive sprockets during use thereof.

An object of the invention is to provide quick-detachable sharpeners for chain saws.

Another object of the invention is to provide sharpeners which are easily installed in used chain saws to adapt the used chain saws to the use of top sharpening saw chains.

A further object of the invention is to provide sharpeners which can be installed in existing or used chain saws with less adaptation than has been possible with sharpeners known hitherto.

Another object of the invention is to provide a compact sharpener which can be clamped onto and removed from a used chain saw.

A still further object of the invention is to provide a sharpener which may be clamped to and removed from a guard cover of a chain saw.

Yet another object of the invention is to provide a sharpener which can be quickly clamped to and detached from a side frame casting of a chain saw.

Another object of the invention is to provide an adapter plate by which a sharpener can be quickly attached to and detached from a chain saw.

A still further object of the invention is to provide a threaded bushing adapted to be installed in a hole in a side frame casting of a chain saw and to have a sharpener quickly attached to and detached therefrom.

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The invention provides sharpeners which can be installed in new or used chain saws with little or no modification of the chain saws. Each sharpener includes quick-detachable means which quickly attaches to and releases the sharpener from the chain saw so that, after each use, each sharpener may be removed from the chain saw. In a sharpener forming a specific embodiment of the invention, a post is held by a releasable clamp in a position parallel to the axis of rotation of the drive sprocket of the chain saw, and a carrier arm carrying an abrasive stone is slidable along the post to dress the stone and is pivotal on the post to move the stone into engagement with teeth and depth gauges of a saw chain driven by the drive sprocket. A spring clip adjustable along the post defines the limits of the dressing movement. An adjustment screw carried by the carrier arm in adapted to engage a fixed stop to limit the depth of cut of each sharpening operation. In a sharpener forming an alternate embodiment of the invention, a releasable clamp is adapted to be quickly tightened on a guard cover of the chain saw, and a carrier arm is pivoted on and slidable along a post carried by the clamp. A strap-like arm carrying the stone is secured by a screw in a socket in a portion of the carrier arm. In a sharpener forming an alternate embodiment of the invention, a tapped bushing is mounted in a hole in a side frame casting and holds a stop plate against the casting. A threaded post can be quickly screwed into or out of the bushing and mounts a carrier arm. A pair of stop nuts on the post limit sliding movement of the carrier arm to define the dressing movement of the carrier arm. A sharpener forming an alternate embodiment of the invention includes a post adapted to be held by a thumb screw on an adapted plate mounted on a side frame casting by studs and nuts of the chain saw. A carrier arm is pivotally and slidably mounted on the post. In a sharpener forming an alternate embodiment of the invention, a spring clip carried by a carrier arm carrying an abrasive stone is adapted to be snapped onto a post fastened to a chain saw and mount the carrier arm for feed of the stone toward the path of a saw chain and for dressing movement of the stone relative to the path of the saw chain. The clip also may be easily snapped off the post.

A complete understanding of the invention may be obtained from the following detailed description of quick-detachable sharpeners for chain saws, forming specific embodiments thereof, when read in conjunction with the appended drawings, in which:

FIG. 1 is a front elevation view of a chain saw and a quick-detachable sharpener forming one embodiment of the invention and mounted on the chain saw;

Fig. 2 is an enlarged, fragmentary, vertical sectional view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is an enlarged, fragmentary, vertical sectional view taken substantially along line 3—3 of FIG. 2;

FIG. 4 is an enlarged, fragmentary, generally horizontal sectional view taken substantially along line 4—4 of FIG. 3;

FIG. 5 is a fragmentary, vertical sectional view of a chain saw and a quick-detachable sharpener forming an alternate embodiment of the invention and mounted on the chain saw;

FIG. 6 is a fragmentary, vertical sectional view taken substantially along line 6—6 of FIG. 5;

FIG. 7 is a fragmentary, horizontal sectional view taken substantially along line 7—7 of FIG. 5;

FIG. 8 is a fragmentary front elevation view of a chain saw and a quick-detachable sharpener forming an alternate embodiment thereof and mounted thereon;

FIG. 9 is a fragmentary, bottom plan view taken substantially along line 9—9 of FIG. 8;

FIG. 10 is an enlarged, fragmentary, sectional view taken substantially along line 10—10 of FIG. 8;

FIG. 11 is a fragmentary, front elevation view of a chain saw and a quick-detachable sharpener forming an alternate embodiment thereof and mounted on the chain saw;

FIG. 12 is a fragmentary, bottom plan view taken substantially along line 12—12 of FIG. 11;

FIG. 13 is an enlarged, fragmentary, sectional view taken substantially along line 13—13 of FIG. 11;

FIG. 14 is a fragmentary, vertical sectional view of a chain saw and a quick-detachable sharpener forming an alternate embodiment of the invention and mounted on the chain saw;

FIG. 15 is a fragmentary, vertical sectional view taken substantially along line 15—15 of FIG. 14; and

FIG. 16 is a fragmentary, horizontal sectional view taken along line 16—16 of FIG. 14.

EMBODIMENT OF FIGS. 1 TO 4

Referring now in detail to the drawings, there is shown in FIGS. 1 to 4 a quick-detachable sharpener 20, which quickly and precisely sharpens a top-sharpening saw chain 22 while the saw chain is mounted on a saw bar 23 and driven by a chain saw 24. The sharpener may accurately be mounted on or detached from the chain saw within a matter of seconds, and is very compact so that it can be conveniently carried in the pocket or lunch box of the user, and may be set to take a predetermined optimum sharpening cut from the top surfaces of projecting elements comprising slitting teeth 26 of allochiral cutter links 27, raker teeth 28 of raker links 29 and depth gauges 30 (FIG. 3) of the saw chain as the saw chain is being advanced by and around a drive sprocket 32 of the chain saw. The saw chain also includes center drive links 33. The drive sprocket is driven by a clutch 34 of the chain saw driven by an engine 35 thereof. The chain saw has a side frame casting 36 which is fixed relative to a main casting 38 of the engine and has a lower flange or skirt portion 40.

The sharpener 20 includes a rigid pivot post or pin 42 to which a C-clamp frame 44 is welded or brazed. The pin fits closely in an indexing bore 46 (FIG. 2) in the side frame casting 36, and a clamping screw 48 having a handle 50 may be screwed through a tapped bore 51 in the frame 44 to clamp, with an arm 52 of the frame, against the lower flange 40 of the side frame casting 36. This locks the pin 42 rigidly on the side frame casting in a position parallel to the axis of rotation of the sprocket 32 and below and to the left, as viewed in FIG. 3, of the path of the saw chain 22 around the sprocket. The pin 42 also is below a guard cover 54 of the chain saw.

A formed, sheet metal, carrier arm 60 (FIGS. 2 to 4) is channel-like in transverse cross section, and a U-shaped mount 62 having arms 64 and 66 (FIG. 2) provided with aligned bores 68 (FIG. 3) fitting closely on the pin 42 is brazed to the arm 60 and is pivotal on and slidable along the pin 42. A generally U-shaped spring clip or stop 70 has slightly oversize aligned holes 72 in arms 74 thereof which receive the pin 42. The arms 74 are urged apart and the clip clamps itself onto the post by biting action of the edges of the holes 72 to prevent movement of the clip along the pin 42 unless the arms are pressed together to release the clip. The arms 74 bracket the arm 64 and are spaced a predetermined distance apart to permit the arm 64 to move back and forth along the pin 42 for dressing movement of an arcuate abrasive stone 76 carried by an arcuate portion 78 of the carrier arm 60. The throw or length of the dressing movement permitted by the stop 70 is such that each of side edges 80 and 82 of the stone 76 is moved, during dressing movement, inside the adjacent side edge of the path of the top surfaces of the slitter teeth 26 of the allochiral cutter links 27 at the extremes of the dressing movement, as best illustrated in FIG. 4. The stop 70 (FIG. 2) is positioned so as to center the dressing movement relative to the path of the

outer surfaces or tips of the teeth of the saw chain, as illustrated in FIG. 4.

A handle 90 (FIGS. 2, 3 and 4) having a handle portion 92 and an L-shaped shank portion 94 is pivotally mounted in aligned bores 100 in the arm 60. A retaining lock nut 98 is mounted on an end portion 96 of the shank portion 94. The handle may be selectively located in either an operating position shown in FIG. 2 or a storage position folded alongside the arm 60 when the sharpener is detached from the saw. The handle 90 may be pushed to the right, as viewed in FIG. 3, to press the arm 60 and abrasive stone 76 softly into sharpening engagement with the projecting elements 26, 28 and 30 of the saw chain 22. The handle is pushed and pulled also while the stone is in engagement with the saw chain to effect dressing of the stone as well as the sharpening of the chain.

The sharpening cut is controlled by the setting of an adjustment screw 104 (FIG. 3) screwed through a tapped hole 106 in a tab 108 of the C-clamp frame 44. Pivotal movement of the carrier arm 60 and abrasive stone 76 in a sharpening direction is limited by a stop lug 110 of the arm coming into engagement with the end of the adjustment screw. The width of the stop lug is sufficient that the stop lug is in alignment with the adjustment screw during the full length of the dressing movement of the carrier arm.

The sharpener 20 can be quickly attached to the chain saw in a precise position relative thereto as determined by the pin 42 entering the indexing hole 46 in the frame plate 36. The screw 48 is quickly tightened to lock the sharpener in operative position and also is quickly loosened when desired to remove the sharpener from the chain saw. After the latter has been done, the handle 90 may be folded alongside the arm 60 and the sharpener is very compact and may be easily carried in a user's pocket or other small space. The length of the inner, sharpening surface of the abrasive stone 76 is sufficient to always span at least two of the projecting elements of the saw chain 22, the projecting elements comprising the slitter teeth 26, the raker teeth 28 and the depth gauges 30, and is also sufficient that the two preceding projecting elements are fully engaged by the stone as the third projecting element comes into engagement with the stone. The stone may be cemented to the arcuate portion 78 of the carrier arm 60 or may be, if desired, mounted on a detachable arcuate carrier plate (not shown) secured to the carrier arm.

EMBODIMENT OF FIGS. 5 TO 7

A quick-detachable sharpener 120 adapted to sharpen projecting elements 121 of a top-sharpening saw chain 122 mounted on a chain saw 124 and driven by a sprocket 126 is quickly attached to and detached from the chain saw. The sharpener is a compact unit and includes an arm 132 having an elongated, transversely extending bushing portion 134 pivotal on an externally threaded post or pin 136 and slidable between nuts 138 and 140. The pin 136 may be screwed into or out of a tapped mounting bushing 142 secured by a nut 144 in an indexing hole 146 in a side frame plate 148 of the saw 124. The nut 144 is screwed onto exteriorly threaded shank portion 150 of the bushing. The bushing and nut 144 clamp a stop plate 152 against the frame plate and a keying tab 154 (FIG. 7) of the stop plate extends into keying hole 156 in the side frame plate. A snap ring 158 fitting into an annular groove 159 in the pin acts as a stop to limit the extent that the pin enters the bushing and to lock the pin in a precise location.

A strap-like handle 160 has a handle portion 162 provided with a bore 164 rotatable and slidable on the post 136. The handle 160 is rigidly fixed to the bushing portion 134 of the arm 132, and may be swung to pivot the arm 132 clockwise as viewed in FIG. 6 from a retracted position to a sharpening position in which an arcuate abrasive stone 166 carried by the arm 132 is in sharpening

engagement with the projecting elements 121 of the saw chain. The handle also is used to push and pull the bushing portion 134 along the post 136 to dress the stone as sharpening of the saw chain is effected. An adjustment screw 168 screwed through a tapped bore 170 in downwardly extending arm portion 172 of the arm 132 engages stop tab 174 of the stop plate 152 to limit movement of the arm in the sharpening direction, and the adjustment screw thus limits the depth of the sharpening cut. The bushing portion 34 extends under a guard cover 180 of the chain saw.

EMBODIMENT OF FIGS. 8, 9 AND 10

A detachable sharpener 220 forming an alternate embodiment of the invention for top-sharpening projecting elements 221 of a saw chain 222 like the chains 22 and 122 is driven by a chain saw 224 through a sprocket 226 thereof. The sharpener has an arcuate abrasive stone 228 cemented to an arcuate carrier plate 230 detachably secured in a channel-like mount 232 of a carrier arm 234 by a screw 236. A U-shaped pivot mount 238 has widely spaced arms 240 and 242 pivotal on and slidable along post or pin 244. A C-clamp frame 246 integral with the post 244 and a clamping screw 248 clamps tightly against a lower edge portion 250 of a guard cover 252 of the chain saw to mount the sharpener in a precise position on the chain saw. The cover 252 is mounted in a predetermined position on the chain saw by nuts (not shown) on studs 247, which also mount a saw bar 249. The C-clamp frame 246 fits against a lower edge 253 of the cover 252 to precisely locate the sharpener on the chain saw. An adjustment screw 256 (FIG. 8) screwed through a tapped bore 258 in an arm 260 of the frame is adapted to engage a stop lug 262 of the carrier arm 234. A handle 266 is fixed rigidly to the carrier arm for pivoting the carrier arm on the post 244 and for sliding the carrier arm back and forth along the post to dress the stone 228. A U-shaped dressing stop 270 (FIGS. 9 and 10) is secured in adjusted position on the post 244 by a screw 272 and a nut 274. An arm 276 of the stop 270 is engageable by the arm portion 240 to limit dressing movement in one direction and the nut 274 is engageable by the arm 240 to limit dressing movement in the other direction. A slot 278 in the stop 270 extending parallel to the post 244 permits adjustment of the space between the nut 274 and the arm 276 to adjust the length of dressing movement and the position of the stop 270 along the post 244 may be adjusted to center the dressing movement relative to the path of the chain 222.

EMBODIMENT OF FIGS. 11, 12 AND 13

A sharpener 320 forming an alternate embodiment of the invention may be quickly attached to and detached from an adapter plate 321 mounted on a chain saw 324 by nuts 326 and studs 328 forming portions of the engine frame of the chain saw, and is adapted to sharpen top-sharpening saw chains, a top-sharpening saw chain 322 being shown and having projecting elements 323 comprising slitter teeth, scratcher teeth and depth gauges. The sharpener is detachably secured to the adapter plate by a thumb screw 332 screwed into a tapped bore 334 (FIG. 13) in the adapter plate and clamping a hollow post 336 tightly against the adapter plate in a position parallel to the axis of rotation of a drive sprocket 338 (FIG. 11). A carrier arm 340 has a pair of widely spaced mounting legs 342 and 344 rotatable on and slidable along the post 336. The legs 342 and 344 form a part of a U-shaped mounting portion 346, which is welded or brazed to formed sheet metal arm portion 348 of the carrier arm 340. A bracket 350 welded or brazed to the mounting portion 346 carries an adjustment screw 352 threaded into tapped bore 354 in the bracket 350. The adjustment screw 352 is adapted to engage stop lug 355 of the adapter plate 321. A handle 360 is pivotally mounted on rivet 362 secured to a plate 364 welded or brazed

to the arm portion 348. A U-shaped dressing stop 370 is secured in adjusted position on the post 336 by a set screw 372 and a nut 374, the set screw 372 extending through a slot 376 in the stop 370. The nut 374 and an arm portion 378 bracket the leg 342 to limit dressing movement of the carrier arm 340. The handle 360 may be moved between a folded, compact, storage position shown in full lines in FIG. 12 and an operative position shown in broken lines in FIG. 11.

An abrasive stone 380 (FIG. 11) is secured by an adhesive to an arcuate sheet metal holder plate 382 having an upper, hook-like tab 384 fitting closely between flanges 386 of the arm portion 348, which is channel-like in transverse cross section, and is hooked over arcuate portion 388 of the arm portion 348. A central, keying tab 390 fits closely in slot 392 in the arm portion 348, and a lower tab 394 is bent over an end portion 396 of the arm portion 348. The tabs 384, 390 and 394 hold the stone 380 rigidly in position on the carrier arm.

The sharpener 320 may be quickly mounted on the adapter plate 321 merely by screwing the thumb screw 332 into the tapped bore 334. The sharpener 320 may be detached merely by screwing the thumb screw out of the tapped bore. With the sharpener mounted on the adapter plate and the handle 360 in its operative position extending beyond a guard 395 of the chain saw and the saw running, the handle may be manipulated to swing the stone 380 into engagement with the outer tips of the projecting elements 323 and the projecting elements ground to sharpen the teeth and make the depth gauges of the desired height relative to that of the teeth. The handle is connected to the carrier arm 340 quite close to the post 336 on which the carrier arm is pivoted while the stone is carried outwardly from the post so that a soft force is provided in feeding the stone to the path of the chain. The adjustment screw 352 engages the stop 355 to limit the depth of the sharpening cut. The handle is pushed and pulled to move the stone 380 back and forth to dress the stone during the sharpening.

EMBODIMENT OF FIGS. 14, 15 AND 16

A quick-detachable, snap-on sharpener 420 forming an alternate embodiment of the invention may be snapped onto a hollow adapter post 421 or removed therefrom. The post 421 and a stop bracket 423 are secured by a bolt 425 and a nut 427 to a side frame casting 428 of a chain saw 424 adapted to drive a top sharpening saw chain 422 having projecting elements 431 adapted to have the outer tips thereof ground down to sharpen them and/or make them the desired heights. The sharpener includes an arcuate carrier arm 434 to which an arcuate abrasive stone 436 is cemented. An adjustment screw 438 is adjustably threaded in tapped bore 442 in the arm, and is adapted to engage lug 444 of the bracket 423 to limit the depth of the sharpening cut. The carrier arm is mounted for pivotal movement on the post 421 and for sliding movement therealong by a wide, spring clip 450 secured by rivets 452 to the carrier arm. The clip 450 has an arcuate portion 454 of over 180° in extent and a flared entrance portion or lip 456 adapted to aid in snapping the clip onto the post 421. The clip fits closely on the post 421 and is rotatable thereon and also is slidable therealong to provide for dressing movement of the stone 436 relative to the path of the chain 422 around a drive sprocket 460 of the chain saw 424. The chain saw also has an engine 464 and a guard cover 466. A handle 472 having a handle portion 474 is aligned with the longitudinal axis of the arcuate portion 454 of the spring clip 450. The handle has a shank 476 having a transverse end portion 478 (FIG. 16) fitting into a transverse bore 480 in the carrier arm. By turning the handle portion, the carrier arm may be swung clockwise, as viewed in FIG. 15, from a retracted position to the operative position thereof as shown in full lines in FIG. 15. It will be noted that the post 421 is in a rigid arcuate

portion 471 of the carrier arm which backs up the spring clip when the stone 436 is pressed toward the path of the saw chain. By pushing and pulling the handle 472 during the sharpening, the stone 436 is moved back and forth in a dressing movement to dress the stone. The head of the bolt 425 and the bracket 423 act as end stops for the clip 450 to limit the dressing movement. With the sharpener detached from the chain saw, the handle 472 may be swung clockwise as viewed in FIG. 14, to a folded, compact, storage position lying along the carrier arm. The sharpener 420 may be attached to or detached from the post 421 in a very few seconds, and can be easily carried in the pocket of the user or in a lunch bucket thereof, if desired.

Each of the above-described sharpeners 20, 120, 220, 320 and 420 is quickly attached to and quickly detached from the chain saws. Each sharpener sharpens precisely the saw chain associated therewith, and is rugged and durable.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In combination with a chain saw including a saw chain, housing means including a frame and a cover, a saw bar secured to the frame and a drive sprocket mounted on the frame and in the cover and driving the saw chain around the sprocket and along the saw bar, a quick-detachable sharpener comprising

carrier means,
a sharpening member carried by the carrier means,
adapter means detachably clamped to the housing means and mounting the carrier means pivotally in the cover for movement of the sharpening member between a retracted position away from the saw chain and a sharpening position engaging the saw chain,

cooperating adjustable stop means carried by the adapter means and the carrier means for limiting the movement of the sharpening member toward the saw chain, and

a handle extending through from the outside to the inside of the cover and secured to the carrier means for moving the carrier means between said positions.

2. The combination of claim 1 wherein the means quickly detachable from the housing means includes C-clamp means adapted to clamp to the housing means,

a pin carried rigidly by the C-clamp means,
the carrier means comprising an arm pivotally and slidably mounted on the arm,
adjustable means on the pin retaining the arm on the pin and limiting sliding movement of the arm on the pin,

the stop means including a stop on the C-clamp means,
the stop means also including a stop member carried by the arm for engaging the stop on the C-clamp means.

3. The combination of claim 2 wherein the frame is provided with a skirt portion having a hole therein, the pin having an end portion adapted to enter the hole to locate the pin,

the C-clamp means being adapted to bracket the lower edge portion of the skirt portion and clamp thereto.

4. The combination of claim 2 wherein the cover has a skirt portion,

the C-clamp means being adapted to bracket the lower edge portion of the skirt portion and clamp thereto.

5. The combination of claim 1 wherein the adapter means includes an attaching member fixed to the frame and having a tapped bore therein,

the adapter means also including pin means having a

threaded portion adapted to be quickly threaded into the bore and quickly threaded out of the bore, the carrier means being pivotally carried by the pin means.

6. The combination of claim 5 wherein the attaching member comprises a plate, the housing means and the attaching member having interengaging keying portions.

7. The combination of claim 6 wherein the carrier means includes a stop member,

the plate having a stop tab adapted to be engaged by the stop member of the carrier means to limit movement of the carrier means toward the sprocket.

8. The combination of claim 5 wherein the frame has a hole therein,

the attaching member comprises a tapped bushing, a head and an exteriorly threaded shank portion extending through the bore,

a nut screwed onto the shank portion to clamp the bushing to the frame,

the pin means being adapted to be screwed into and out of the tapped bore.

9. The combination of claim 8 including a stop plate clamped by the bushing to the frame and including a stop member, and

a stop carried by the carrier means and adapted to engage the stop member.

10. The combination of claim 1 including pin means fixed to the housing means in a position extending transversely of the sprocket and spaced radially therefrom, and

a spring clip carrying the carrier means and adapted to snap onto and off of the pin means and mount the carrier means pivotally on the pin means.

11. The combination of claim 1 wherein the carrier means comprises an arm and the handle is pivotally secured to the arm for movement from a position extending laterally away from the arm to a position lying along the arm.

12. The combination of claim 1 including pin means mounting the carrier means pivotally thereon and slidable therealong,

the carrier means including an arm pivotal on and slid and a generally U-shaped spring member having arm members with holes therein receiving the pin means, the arm members bracketing the arm to limit sliding movement of the arm on the pin means,

the arm members diverging from each other and the holes therein being of a size of which the arm members normally grip the pin means and release the pin means when pressed together.

13. In combination with a chain saw including a saw chain, frame means including a frame and a saw bar secured to the frame and a sprocket on the frame for driving the saw chain around the saw bar, a quick-detachable sharpener comprising

adapter means detachably secured to the frame means in a fixed position relative thereto and having a stop, a pin,
quick-detachable means securing the pin to the adapter means,

an arm mounted pivotally on the pin and having a stop member adapted to engage the stop,

a sharpening member carried by the arm and movable from a retracted position spaced from the chain to a sharpening position engaging the chain, and

a handle secured to the arm.

14. In combination with a chain saw including a saw chain, frame means including a frame and a cover, a saw bar secured to the frame and a drive sprocket mounted on the frame in the cover and driving the saw chain around the sprocket and along the saw bar, a quick-detachable sharpener comprising

C-clamp means adapted to be quickly clamped to and quickly released from the frame means and including a stop,

pivot means carried by the C-clamp means,

an arm mounted on the pivot means and pivotal thereon from a retracted position spaced away from the saw chain and a sharpening position adjacent the saw chain,

a stop member on the arm adapted to engage the stop to limit the extreme sharpening position of the arm, a sharpening member carried by the arm, and a handle connected to the arm for moving the arm between said positions.

15. In a sharpener for a chain saw having frame means, a sprocket and a saw chain, an arm pivotally mounted on the frame means and having a channel-like connecting portion, an arcuate strap having a shank portion fitting into the connecting portion, an arcuate sharpening stone secured to the strap, and releasable means for locking the shank portion in the connecting portion.

16. In a sharpener for a chain saw having frame means, a sprocket and a saw chain, an arm pivotally mounted on the frame means and having an arcuate plate portion having a centrally located hole, an arcuate shoe of sheet metal having a pair of end tabs bent over the ends of the arcuate plate and also having a central tab extending through the hole and bent over the plate portion, and a sharpening stone carried by the shoe.

17. In combination with a chain saw including a saw chain, saw frame means including a saw bar, a drive sprocket mounted on the frame means and means for driving the drive sprocket, a quick-detachable sharpener comprising carrier means, a sharpening member carried by the carrier means, sharpener guide means, connecting means for attaching the sharpener guide means rigidly to the saw frame means, mounting means mounting the carrier means movably on the sharpener guide means for moving the sharpening member into and out of engagement with the saw chain, and a handle for moving the carrier means toward and away from the saw chain.

18. The combination of claim 17 wherein the frame means has a pair of spaced locating portions and the guide means includes a pair of spaced members adapted to engage the locating portions to secure the clamp means fixedly to the saw frame means.

19. The combination of claim 17 wherein the connecting means comprises C-clamp means.

20. The combination of claim 17 wherein the handle is pivotally secured to the carrier means for movement from a storage position lying along the carrier means to an operative position extending away from the carrier means.

21. The combination of claim 17 wherein the connecting means includes connector socket means fixed to the saw frame means, the guide means includes pin means detachably connected to the connector socket, the carrier means including means mounted pivotally and slidably on the pin means, and

a pair of spaced stop members on the pin means for limiting sliding movement of the carrier means on the guide means to define a predetermined range of dressing movement of the sharpening member.

22. The combination of claim 21 wherein the connecting socket means comprises a headed, exteriorly threaded, tapped bushing fitting into a hole in the saw frame means and a nut threaded on the bushing to secure the bushing to the frame means,

the pin means including a threaded end portion screwed into the bushing and a lock member thereon adapted to engage the bushing.

23. The combination of claim 21 wherein the pin means has an elongated threaded portion and the stop members comprise a pair of nuts screwed onto the elongated threaded portion.

24. The combination of claim 17 wherein the saw frame means has a hole therethrough, the guide means comprises an elongated bushing, the connecting means includes a screw member extending through the bushing and the hole, a bracket fixed to the frame means by the screw, and stop means carried by the carrier means and adapted to engage the bracket to limit movement of the sharpening member toward the saw chain.

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BERNARD STICKNEY, Primary Examiner

U.S. Cl. X.R.

51—241; 143—32

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,465,617 Dated September 9, 1969
Inventor(s) Kay Silvon

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 43, after "up" should be inserted
-- by --
Column 3, line 30, "slitting" should be -- slitter
--
Column 8, line 42, should read "the carrier means
including an arm pivotal on and slidable along the pin
means,".

SIGNED AND
SEALED

DEC 2 - 1969

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents