Originally published in *The Reel News*, Vol. XIII, No. 1, January, 2003, pp. 4-7

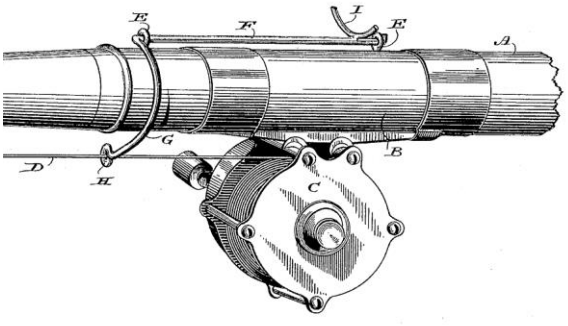
"Windshield-Wiper" Level Winds

by Steven K. Vernon

The vast majority of level-wind reels manufactured during the last century have incorporated devices that ultimately were based on a very old design. Mark Palmer's 1860 line guide slid in a straight line as it swept the incoming line back and forth to wind it evenly on the spool. Most modern level winds employ the same basic design, with guides riding in endless, right-hand and left-hand spiral grooves cut into rotating shafts.

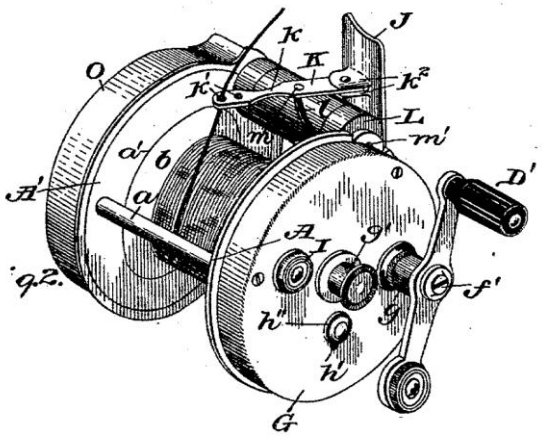
During the last century, inventors came up with many alternative designs to accomplish the same purpose, and the majority of those alternatives have used swiveling line guides. Such guides are swung in a shallow arc in front of a rotating spool and sweep the line similarly to Palmer's invention. To perform this function, the guide normally is placed at the end of a support that is swiveled around either a vertical or horizontal axis. Those guides that swivel around a horizontal axis are frequently called "windshield-wiper" level winds, for obvious reasons.

While doing patent research recently, I was struck by the number of windshield-wiper level winds (WWLWs) that turned up. As I'm sure most collectors find these gadgets as intriguing as I do, I thought it might be useful to describe some of them. Like many features that have appeared on fishing reels, the WWLW had already been used in textile industry winding machines, at least as early as 1877.



The thumb-operated rod attachment patented by Charles Washburn in 1889

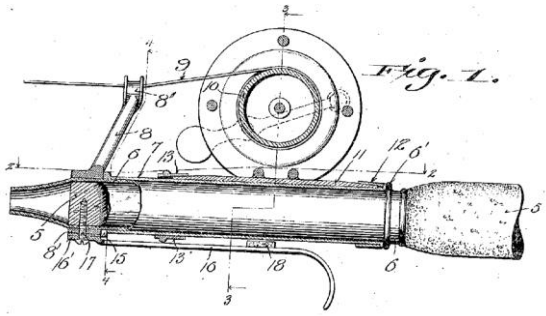
The earliest line guide I have found that swung in windshield-wiper-like fashion was a simple wire gadget that was fastened to the rod on the opposite side from the reel and was swiveled by the angler's thumb. The guide was at the end of a curved support that extended down and around the rod to the front of the reel, which was held beneath the rod. This "proto-WWLW" was patented in 1889 by Charles H. Washburn, of Racine, Wisc.



Kruschke's multi-speed reel with its windshield-wiper level wind

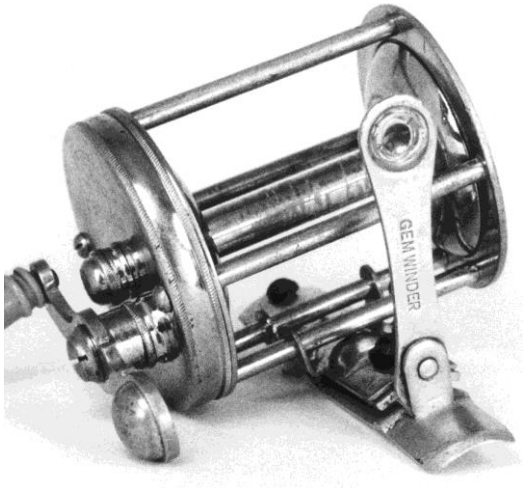
Apparently, the first WWLW attached to a reel was patented in 1897 by Rudoph Kruschke, just months before William Shakespeare, Jr., patented his celebrated dual-shaft level wind. Krushcke's line guide was a hole in the top end of a vertical bar that pivoted at its bottom end, where it was supported on the reel foot. A pin extended backward from the middle of the bar and was engaged in a spiral slot cut into a rotating shaft. When the multiple-speed reel was cranked, the shaft rotated, and the pin rode back and forth in the slot, carrying the line guide with it. Someday, I would like to see a Kruschke reel.

Kruschke's invention did not inspire a lot of imitation right away. The next couple of WWLWs I could find were genuinely "oddball." In 1912, Charles Toepfer, of Milwaukee, patented a device that required the fisherman to rock his reel from side to side behind



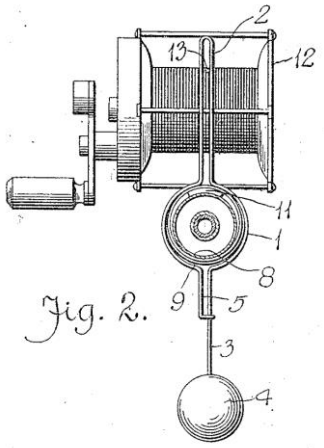
Toepfer's WWLW-like invention. The line guide is static, but the reel swivels toward and away from the viewer on the rotating sleeve.

a stationary line guide supported in front of the reel. Not strictly a WWLW, it provided the same relative motion of guide and reel by having the reel fastened to a rotating reel seat.



A Pennell reel mounted on a "Gem Winder," a WWLW attachment also invented by Toepfer

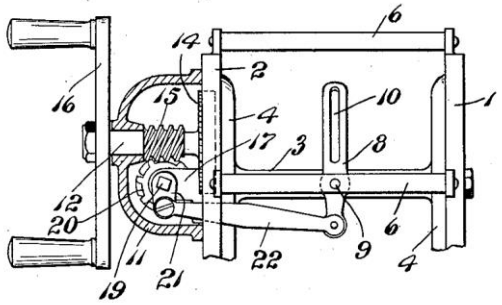
In 1909, a patent had been granted to Edward W. Kurtz, Sr., of Chicago, for a reel seat made of two plates. The reel was attached to the upper plate, which pivoted on the lower plate, and the lower plate was clamped to the rod. The arrangement permitted the reel to be oscillated as it was cranked. Taking advantage of Kurtz's invention, Charles Toepfer improved his earlier level wind by adding a pivoting, upright line guide to an oscillating reel seat in a 1915 patent. The result was the "Gem Winder," an attachment advertised in the Edward vom Hofe Co. catalog, among other places. Toepfer stated that the oscillating motion of the reel would be transferred to



Comparet's pendulum/level wind attachment. It was supposed to stay vertical while the rod was turned left and right.

the "vibratory guide lever," which would then wrap the line "in uniform layers."

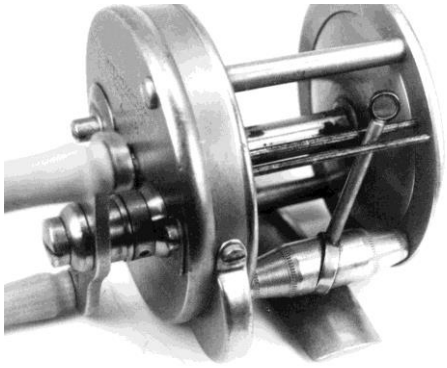
Byron Comparet, of Devil's Lake, Mich., patented a level-wind attachment in 1916 that was simply a pendulum with a line guide at the top. A wire was folded in half to form the narrow guide, and the two "arms" were bent to form a clamp that fit over the band that secured the reel to its seat. A "suitable" weight was suspended from one of the arms. The fisherman was supposed to rock the rod from side to side as he retrieved the line, while the level wind remained vertical, so, again, only the relative motion provided by a WWLW was duplicated.



Clickner's first WWLW invention, assigned to the Shakespeare Co.

Apparently, it was not until 1921 that another genuine WWLW was patented. Earle Clickner, an employee of the Shakespeare Co. in Kalamazoo, Mich., designed a straightforward WWLW that included a worm gear cut

into the reel's crankshaft. The worm turned a gear that slid a bar back and forth across the front of the reel. The end of the bar was pinned to the bottom of the vertical line guide, which pivoted around the point at which it was attached to the reel frame.



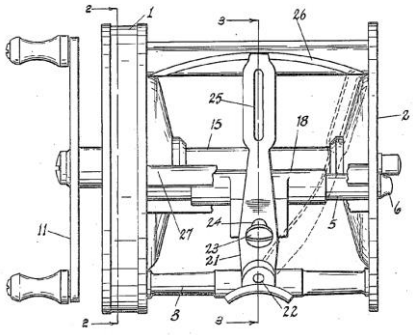
The Heddon "4-18," with Welch's first WWLW design

Clickner's patent set off a flurry of WWLW invention. Two months after the patent was granted, John T. ("Jack") Welch filed a patent application for what would eventually represent the epitome of WWLWs—the reel that would hit the market as the Heddon "4-18." The patent was granted in 1922 and assigned to James Heddon's Sons.

Welch's design, elegant in its simplicity, featured a vertical line guide that was rocked back and forth as a result of its being supported in an obliquely-cut groove in a rotating shaft that spanned the front of the reel. The spool arbor was thicker in the center to avoid a problem faced by any WWLW user. Welch considered the problem in depth:

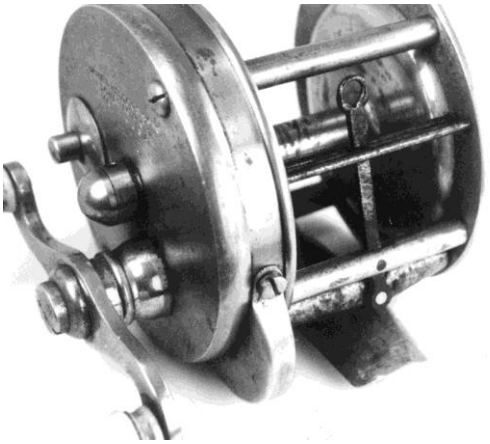
> "These movements of the spooling arm within the arc of its guideway are characterized by variations in speed, particularly noticeable at the end of each stroke where a distinct pause occurs, and inasmuch as the line which is to be wound upon the reel is being drawn constantly through the loop [line guide], there results a tendency to build the windings higher at the reel ends than elsewhere."

In other words, the line would pile up at the sides of a conventional arbor, but the centrally thickened arbor solved that problem.



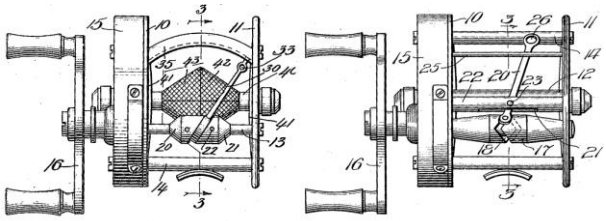
Russell's WWLW, also assigned to the Shakespeare Co.

Several months after Welch's patent was granted, Samuel G. Russell, of Shakespeare's "Russell" fly reel fame, filed an application for another WWLW whose line guide also pivoted at its lower end, where it was fastened to the reel seat. It was rocked in a manner similar to Kruschke's line guide, but with an interesting variation. The pin in the middle of the guide arm was carried sideways in a double-spiral groove similar to that used by Palmer in his linear level wind of 1860. Russell's patent, assigned to the Shakespeare Co., was granted in 1924.



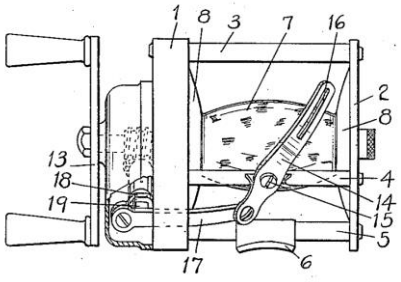
The Heddon "4-15," with Welch's second WWLW design

Not to be outdone, Jack Welch filed for a second WWLW patent only months after Russell's application had been submitted. Unlike his original line guide, the latest version pivoted around a pin, and its bottom end was shifted back and forth as it rode in a short, endless groove cut into a rotating shaft. This invention, too, worked similarly to Kruschke's guide. The patent was granted later that year



Welch's patent drawings for what would become the Heddon "4-18" (left) and "4-15"

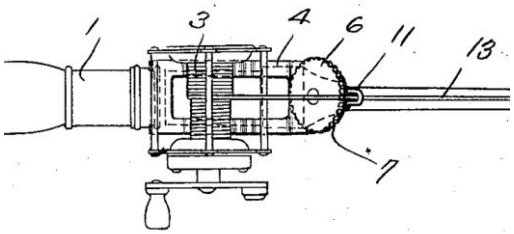
and, like the first, was assigned to James Heddon's Sons. The company manufactured its Heddon "4-15" reel in accord with Welch's design.



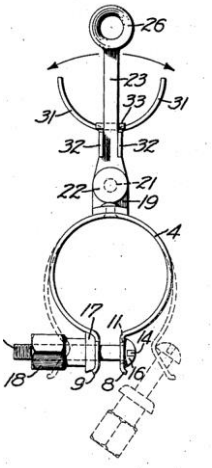
Clickner's second WWLW design, with its corrective spool arbor

By the end of 1924, Earle Clickner received another WWLW patent featuring a "barrel-shaped" spool arbor, provided to combat the problem of line piling up at the ends of the arbor. Otherwise, the design was similar to that shown in his earlier patent.

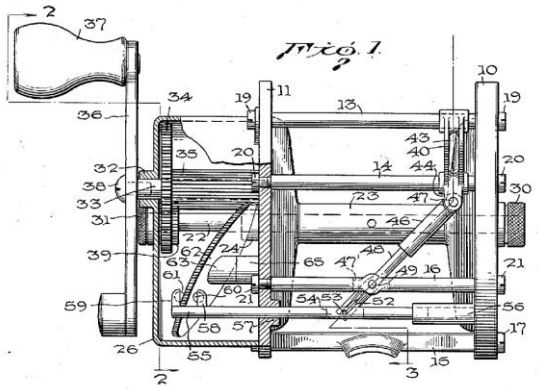
Perhaps inventors believed that the ideal WWLW already had been designed, for I have been able to find patents only for two attachments during the next two decades. William H. Greene, of Long Beach, Cal., was granted a patent in 1931 for a device mounted in front of the reel with a wire guide extending from a rotating wheel with a milled edge. The angler's thumb turned the wheel and swung the guide back and forth. Another attachment, patented in 1939 by Max H. Reitinger, of Oakland, Cal., consisted of an upright, swiveling guide that was swung back and forth using the attached, semicircular thumb-rest. The device was mounted on a rod clamp.



Top view of the "dial" level wind attachment of William Greene. The support extends up at a 45° angle from the rod.

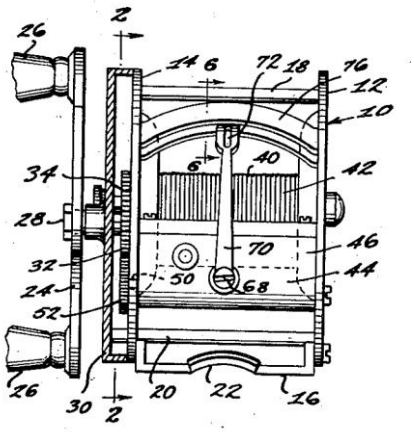


Reitinger's WWLW attachment has a thumb rest (31) and is mounted on a rod clamp.



Coleman's heavy-duty WWLW. The guide slides linearly.

Then, in 1945, Philip Coleman, of Jacksonville, Fla., patented a heavy-duty WWLW for a salt-water reel. The bottom of the guide arm was shifted by a reciprocating rod that was slid back and forth by a large cam-disc in the reel's thick gear housing. The guide itself was pivotally pinned to the top of its supporting arm and slid along the two pillars to which it was anchored. Unlike other WWLWs, Coleman's produced a reciprocating linear motion of the guide. The problem of arbor-end line piling was avoided.

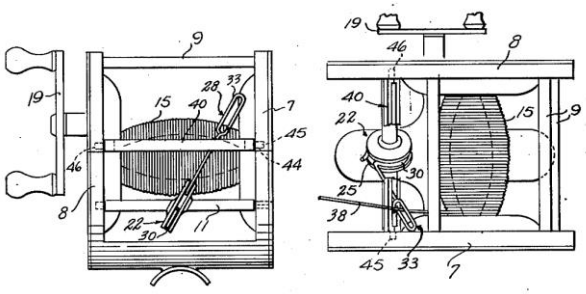


The Tschus WWLW is driven by a worm gear and rack in the housing.

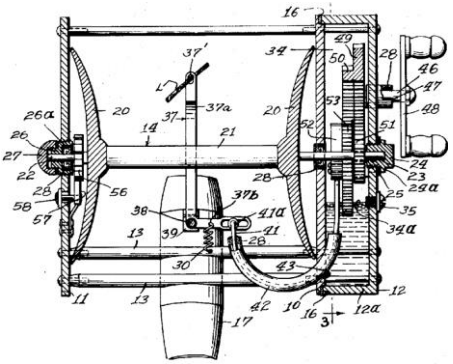
Reel inventors were especially busy during the decade following World War II. They improved baitcasting reels, they invented a wide variety of closed-face spinning reels, they designed open-faced spinning reels to compete with European imports. A number of WWLW patents also appeared.

A complicated WWLW driving mechanism was invented by Louis Tschus, of Columbus, Ohio, who applied in 1947 for a patent granted in early 1950. His line guide, pivoted at the bottom, was rocked through a worm gear and reciprocating rack enclosed within a cylindrical housing.

The Heddon "4-18" rocking mechanism was the inspiration for a WWLW patented by Kjall Guhlin and Nils Guhlin, of Houston, Tex., in 1952. A removable, bent-wire line guide swiveled back and forth as it rode in an obliquely-mounted cam on a rotating shaft. The inventors alleged that the line could be easily inserted in, or removed from, the wire guide. They also provided a thickened spool



Front (left) and top views of the Guhlins' WWLW. The guide swivels in the same way as the guide of the Heddon "4-18."

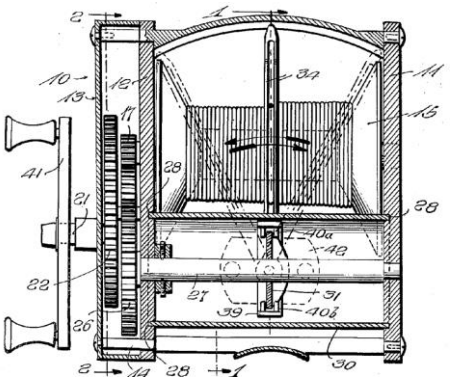


Breedlove's WWLW reel, viewed from the back. The curved wire "plunger" moves the line guide.

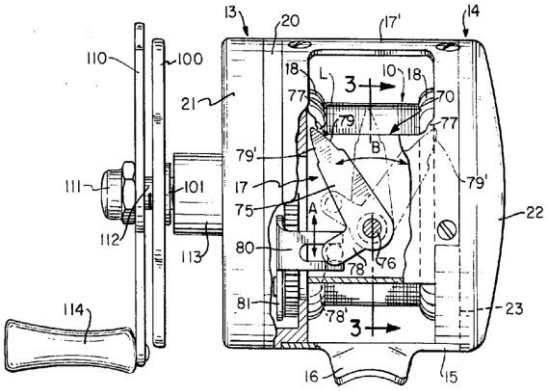
arbor to combat the line-piling problem. I would guess that a fisherman could make a new guide from a paper clip within a minute or two. It's likely that the Guhlins ended up in Texas after misconstruing the classic invitation "Y'all come back now."

Sam Breedlove, of Columbus, Ga., also applied for a WWLW patent in 1947, but it was not granted until 1952. His line guide, pivoting at the reel foot, was swiveled by a "plunger," a wire that ran through a curved guide tube. One end of the wire was pushed by a cam wheel mounted coaxially with two of the four multiplying gears. A spring attached to the guide pushed the wire back as the cam rotated.

Yet another 1947 application resulted in a 1953 patent granted to Joe W. Miller, of Port Orange, Fla. Miller's WWLW guide was swiveled by a tilted cam-disc that rotated within a large, cylindrical housing. The cam was designed to speed up the lateral movement of the guide at the ends of its arcs, thus



The Miller WWLW, viewed from the front. The cam-disk (31) is tilted as the reel is cranked.



Hull's WWLW, with its "non-trapping" line guide

eliminating the line-piling problem at the arbor ends.

The next WWLW I've been able to find was designed by a reelmaking legend. In 1977, R.D. Hull received a patent for a conventional casting reel equipped with a "non-line trapping" MMLW. The line guide, lacking a hole, simply pushed the line to one side as it was retrieved. The pointed guide traveled far enough in each direction to release the line, after which it swung back and pushed the line in the other direction. Hull, of course, had invented the Zero Hour Bomb Company's closed-face spinning reel, the first of the now-ubiquitous Zebco reels.

The latest U.S. patent I have found for an WWLW was granted to Masaru Watanabe and Ichiro Tabei, both of Ashikaga, Japan. They

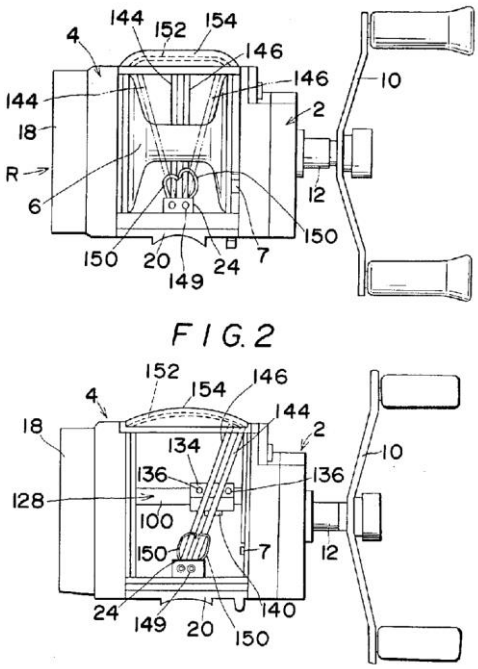


FIG. 2

The Watanabe and Tabei WWLW, shown with the guide arms separated (top) and parallel

assigned their 1989 patent to Copal Electronics Co., Ltd., of Tokyo. The line guide consisted of two vertical arms that were separated from each other to free the line during the cast. During retrieval, the arms closed to a parallel position and traveled together as they swept across in front of the spool.

Has the history of the "windshield-wiper" level wind closed? I hope not.