April 5, 1960 M. B. SIEGEL 2,931,366

PIPE CLEANER OR SWAB

Filed Jan. 3, 1956

FIG. 1.

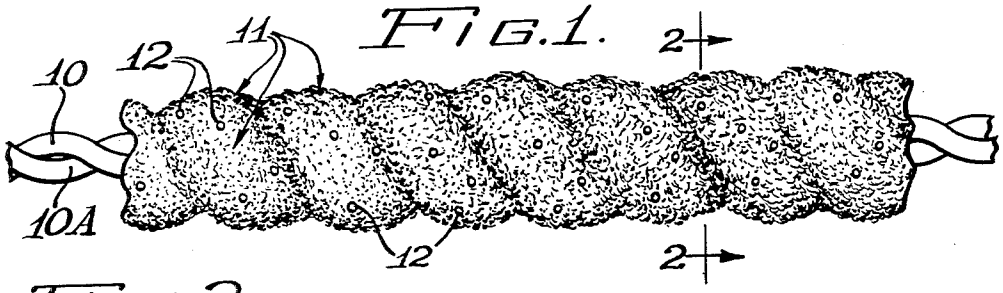


FIG. 2.

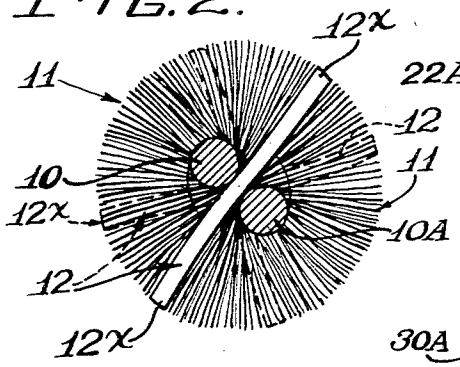


FIG. 3.

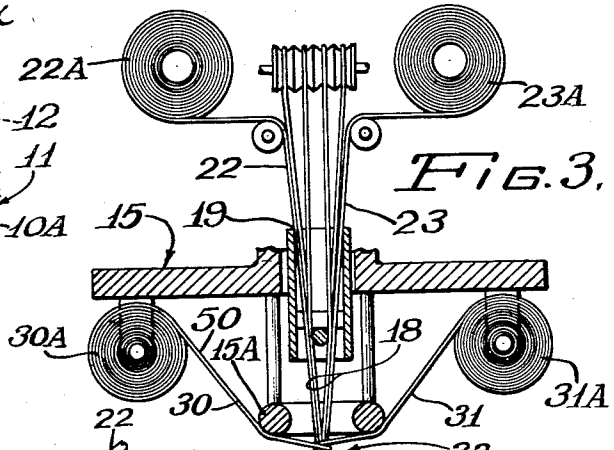
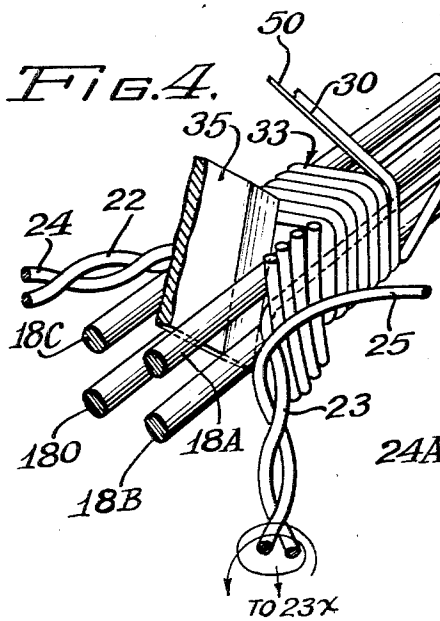
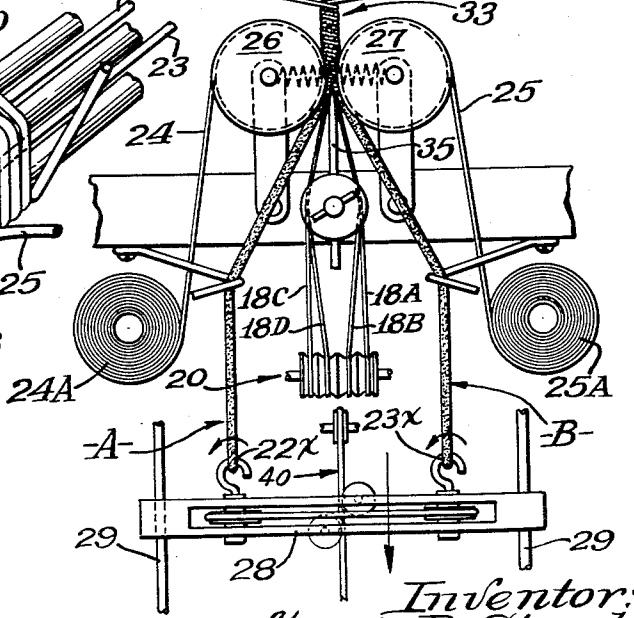


FIG. 4.





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United States Patent Office 2,931,366 Patented Apr. 5, 1960

2,931,366

PIPE CLEANER OR SWAB

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Application January 3, 1956, Serial No. 557,043

1 Claim. (Cl. 131—245)

This invention provides improvements in probe-type swabs and cleaners such as pipe cleaners which consist of lengths of twisted wire with cotton or other fibres locked-in along the length of the twist.

It has been proposed heretofore to fabricate such cleaners with additional lengths of wire more or less loosely interwoven with the main body wires, these additional lengths of wire being more or less loosely coiled or laid along the cotton fibres for the purpose of providing added scraping and reaming portions substantially harder than the cotton fibres.

According to the present invention, a cleaner or swab of the class described is provided in which lengths of non-metallic plastic filament are intertwined with the cotton threading or filaments and then cut in a manner to afford a multitude of short, stubby lengths of plastic bristles projecting more or less laterally of the length of the cleaner body wire and more or less uniformly distributed amongst the cotton fibres to provide a very effective scouring and scraping action.

The method of fabricating these novel cleaners and the various structural characteristics thereof will appear more fully as the following description proceeds in view of the annexed drawing, in which:

Fig. 1 is a magnified fragmentary elevational view of one of the novel cleaners;

Fig. 2 is a section taken along line 2—2 of Fig. 1;

Fig. 3 is a partial top plan schematic of parts of a known type of forming machine which may be employed in making the cleaners;

Fig. 4 is a partial magnified fragmentary perspective view of a length of the body wires with partially interwound cotton and plastic filaments as conjoined at the forming head.

The length of completed cleaner shown in Fig. 1 consists of at least two body wires 10, 10A twisted together in a running span which is cut to desired lengths (e.g. five inches) convenient for use and packaging.

The body wires are generally annealed iron and have interlocked between the twists thereof short lengths of cotton fibres 11 which form a fluffed absorbent coating about the body wires substantially concealing and insulating the latter from contact with the object to be cleaned.

As seen in Fig. 2, there are also intertwisted and dispersed amongst the cotton fibres a multitude of plastic stubs 12 which are considerably thicker in cross section than the individual sheared cotton fibres; and it will be observed that the general direction of projection of both the cotton and plastic elements tends to be substantially perpendicular to the core or body wires 10, 10A.

One method of forming the novel cleaner relies upon use of a so-called chenille machine, some form of which is employed in the manufacture of most conventional "pipe cleaners" of the general type here under consideration.

Since these forming machines per se do not constitute any part of the present invention and are well known in the art, no detailed structure thereof will be described, the schematic layout of Fig. 3 being sufficient to illustrate the present methods and forming operations for fabricating the novel cleaner.

The tufted cleaner or swab is customarily made by rotating a bobbin head 15 (Fig. 3) carrying bobbins 30A, 31A of multi-strand cotton cord or string, which is wound from opposite sides onto a plurality of steel, skeleton-form wires 18 leading out through a stationary central throat 19 in the head and thence over spindles 20 to take-up reels (not shown).

The skeleton or forming wires 18 are used over and over and simply provide a temporary framework upon which the forming operations are performed.

Also feeding into the throat 19 are a first pair of iron body wires 22, 23 hauled out from spools 22A, 23A, and a second or trailing pair of body wires 24 and 25 payed out from spools 24A and 25A over forming rollers 26, 27 into conjunction with the other two body wires, so that both pairs of body wires ultimately emerge for attachment, as at 22X, 23X, to an outhaul bar 28.

In the foregoing conjunctive feeding of the body wires, the rearmost wire 22 will become intertwisted with the corresponding foremost wire 24 for attachment as a pair at 22X; and the other rearward or leading wire 23 will become similarly married or intertwisted with the other forward wire 25 for attachment as another pair at 23X to said outhaul, which is a simple, wooden cross bar carried horizontally on a pair of steel trolly wires 29 and is hauled out by means not shown commensurately with the forming up of the two stock lengths A, B of completed cleaner twist.

The forming apparatus thus far described is old in the art, but its operation in laying-on, intertwisting, and cutting the two kinds of filament employed in the novel construction, must be understood in order to comprehend how the resulting cleaner with laterally-projecting plastic stubble is achieved on a production basis.

In fabricating the ordinary old-style, simple pipe cleaner on a machine of the class described, filaments 30, 31 of cotton string (each consisting of several smaller strands of finer cotton thread intertwined) are payed off spools 30A, 31A across the rotating ring 15A on the bobbin head, so as to be laid from opposite directions onto the forming wires 18 just in advance of the forming wheels 26, 27, as at 33, to be spirally twisted onto said wires and also around only the first or leading pair of body wires 22, 23 (see also Fig. 4).

Located at the point of conjunction or marrying of the trailing pair of body wires 24—25 with the wrapped form of string 33 at forming wheels 22, 27, is a splitting knife 35, shown also schematically in Fig. 4, and which is situated in between each pair of skeleton or frame wires 18A, 18B, on one side, and 18C, 18D (Fig. 4) on the other, so as to split the total cotton wrap down the middle.

The aforesaid "splitting," however, occurs just at the point where the body wires 24, 25 conjoin with the spiral wrap, and because each of the two outhaul portions of the finished wires is being constantly rotated at points 22X, 23X by known continuous-circuit pulley drive means 40, and further because the machine is started with the forward ends of the pairs of wires 24 and 25 each respectively twisted onto one of the trailing wires 22, 23 at 22X, 23X, the conjoining body wires 22 and 24 on the left-hand, and 23 and 25 on the right-hand, become intertwisted at wheels 26, 27, and more precisely at the point of severance by knife 35 of the cotton threads on the skeleton form wires, with the result that the multitudes of cut cotton threads are successively caught in between intertwisting pairs of body wires and tend to project more or less radially and fluff-out, as depicted in Fig. 2.

Up to this point, the method and operation of the forming machine is old and well known.

The manufacture of cleaners in accordance with the invention involves the intertwisting of at least one relatively heavy plastic filament **50** (Fig. 4) with the cotton string **30**, this plastic filament being preferably prewound on the spool **30A** along with the cotton.

In practice, both spools **30A**, **31A**, preferably will carry the added plastic filament; however, in order to simplify drawing the rather difficult view of Fig. 4, the second plastic strand on spool **31A** has been omitted.

As will appear from Fig. 4, the plastic strand **50** is spirally wound from the bobbin **30A** onto the form wires conjointly with the first or leading cotton strings **22**, **23**, with the result that it is cut by knife **35** in the same manner as the cotton strands, and the short cut plastic stubs **12** are thereupon caught between the intertwisting iron body wires **23**, **25**, it being understood that there will actually be multitudes of the sheared cotton strands forming a fluff, and many more of the plastic stubs than can practically be shown in a view such as that in Fig. 4, so that the ultimate appearance of the finished span is fuzzy and full (as in Figs. 1 and 2, and as is sought to be portrayed at the outhaul ends **22X**, **23X** in Fig. 3).

In effect, therefore, the combination cotton and plastic filaments are first spirally wound onto a set of moving form or skeleton wires **18** with certain body wires **22**, **23** fed along in the interstices of the skeleton frame to conjoin and intertwist with other body wires at the cutting station exactly at the point where the filamentary spiral (of cotton and plastic) is split apart, so that the cut pieces of both materials would fall away from the wire supporting frame if they were not at this point caught up in the intertwisting sets of body wires.

The outhaul means **28**, **29**, etc., will generally run the length of an alley some 50 or more feet in length, and the two finished spans of cleaner wire will be wound as stock on reels (not shown) later to be cut into short lengths for packaging as pipe cleaners, utensil cleaners, or swabs for cleaning small bores in various objects.

Because of its finer and more multitudinous character, the cotton fibres tend to form a soft, fuzzy jacket about the twisted body wires **22**, **24** (Fig. 2), whereas the stiffer, thicker plastic stubs **12** tend to thrust out in a more definitely radial sense and to present, especially at their free outer ends **12X**, a relatively hard point affording a scraping action when a length of the cleaner is passed through the bore of a smoker's pipe or the like, thereby loosening matter not dislodged by the cotton.

Attempts have been made to wind lengths of thin copper wire about the outside of such cleaners to achieve a more satisfactory scouring action, but such expediencies are not effective because the wire tends to bed down into the body of cotton whereas the present method of interlocking short stubbles of the harder material into the twist for radial projection presents a multitude of relatively sharp ends and fingers which coact with the softer fibres

in the cleansing action as the cleaner moves longitudinally along the bore in the stem of a smoker's pipe, for instance.

The interlocked scouring stubbles **12** may be metal instead of plastic, by spooling suitably thin copper or other wire with the cotton string stock as with the plastic; however, the metal stubble requires harder cutting edges and more frequent dressing of the splitting knives **35**, while the plastic filament **50** provides a satisfactory scouring stubble and does not appear to dull the cutters appreciably more than does the cotton string.

The invention is not restricted to smoking-pipe cleaners nor to elongated swabs or brushes, but contemplates the use of relatively stiffer or harder material in the place of cotton fibres, as well as stiffer and harder materials in place of the plastic filament. For example, relatively thin and thick filaments of either non-metallic vegetable or synthetic fibres may be used in place of either or both the cotton and the plastic cords, one of the important features of the invention being the interspersal of a body of very numerous main fibres and interspersed heavier, stiffer stubbles, all projecting radially from the intertwisted body wires.

I claim:

A pipe cleaner comprising lengths of wire having entwisted therewith a multitude of short lengths of soft fibres of absorbent material of the class of cotton; and said wires having also entwisted therewith a substantially lesser number of similarly short lengths of coarser, stiffer, and harder filaments which are non-absorbent, the first-mentioned soft fibres being in such quantity and such uniformity of length and distribution lengthwise along and about the wire as to form an uninterrupted fluffy, soft, and absorbent sheath thereabout, and the aforesaid lesser number of harder filaments being in such lesser quantity as to be thinly but uniformly scattered in intermixture with said softer fibres and of such length relative to the latter that the respective stub ends of the harder filaments lie exposed substantially at the peripheral boundary of said soft sheath, all of said fibres and filaments extending substantially perpendicular to the long axis of the wires and of a length adapted to fit into the duct of a smoking pipe.

References Cited in the file of this patent

UNITED STATES PATENTS

1,811,205	Lee	June 23, 1931
2,077,087	Alibert	Apr. 13, 1937
2,080,905	Bartell	May 18, 1937
2,194,916	Somers	Mar. 26, 1940
2,304,281	Riley	Dec. 8, 1942
2,576,430	Weller	Nov. 27, 1951

FOREIGN PATENTS

121,210	Australia	Mar. 18, 1946
454,114	Great Britain	Sept. 24, 1936