

July 8, 1941.

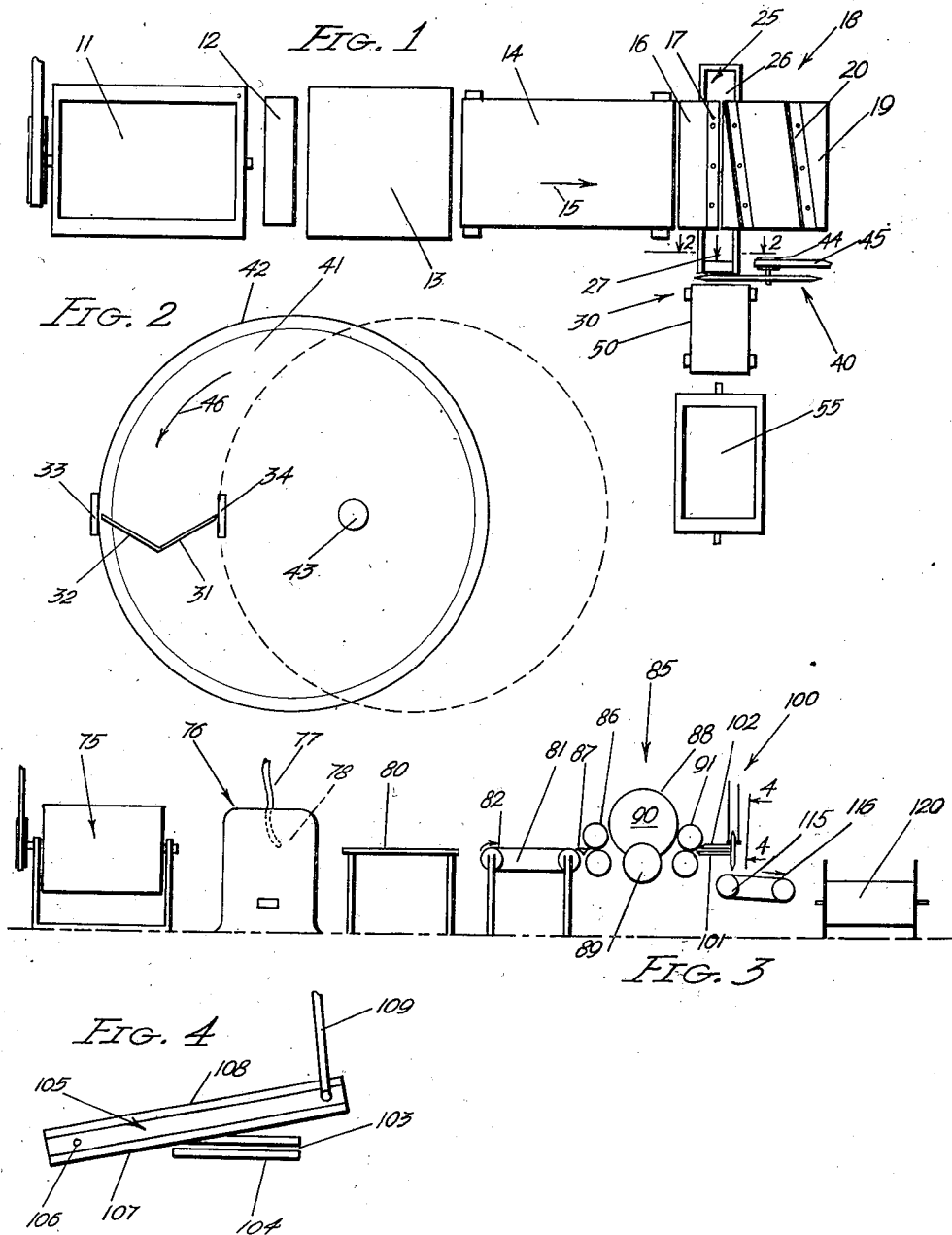
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2,248,131

FILTERING AND PACKING MATERIAL APPARATUS AND METHOD FOR MAKING

Filed Nov. 17, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 7

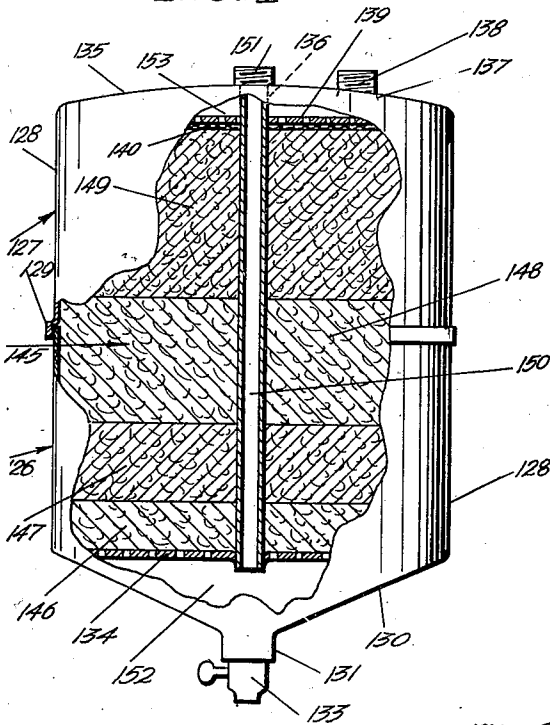


FIG. 6

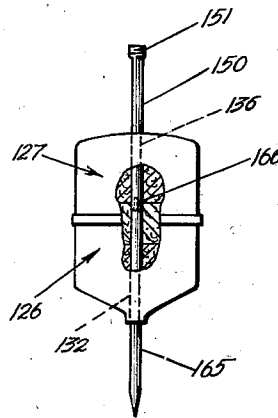


FIG. 8

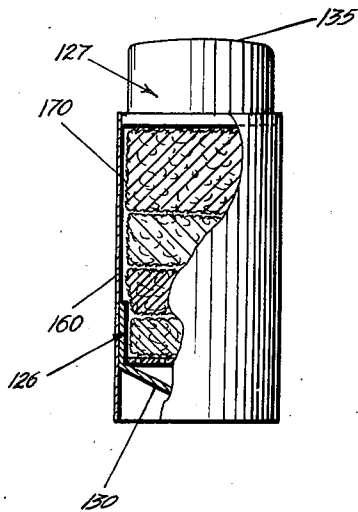
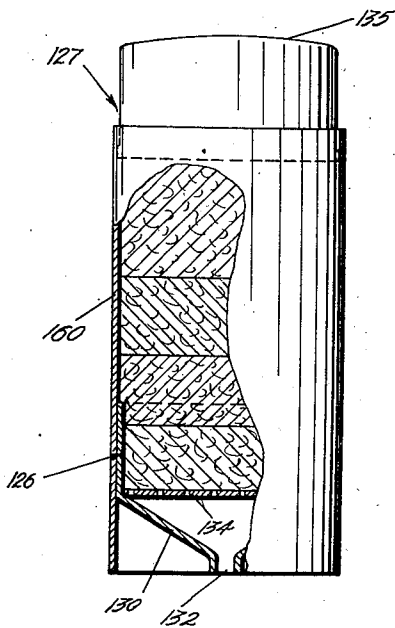


FIG. 5



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UNITED STATES PATENT OFFICE

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FILTERING AND PACKING MATERIAL APPARATUS AND METHOD FOR MAKING

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4 Claims. (Cl. 210—204)

My invention in one of its phases relates to the method, the apparatus for making a filtering and packing material and to such material as a product. I have ascertained that in filtering liquids such as oils and especially in filtering the crank-case oil of an internal combustion engine during the operation of such engine, that a considerable improvement can be made in the filtering by the material used as the packing medium in the filter. Some of the packing materials now used include the so-called cotton waste and other fibers. In some cases it is desirable to treat the packing material with various chemicals to neutralize acids in the oil. In some types of filters clay or similar pellets are utilized which also have a neutralizing action on the acids in the lubricating oils.

My invention as it relates to the filtering includes the manufacture of what I have termed a flock or flock pellets. These are preferably cut from waste rags of either woven or knitted fabrics by cuts which are made at right angles one to the other, thus for instance presuming the rags are operated through the mill, a first cut may be transverse to the leading edge forming a series of transverse strings and then this bundle of strings is again cut by cuts transverse to the ends of the strings. In another way of manufacturing, the rags may be first slitted longitudinally and thus form a series of parallel threads or narrow ribbons passing through the mill, such threads are then chopped into short lengths by a transverse cut.

The flock pellets may be made from various fabrics and have different characteristics depending on the type of fabric. For instance, they may be made from all wool, cotton cloth or various grades of cotton and wool mixtures. For certain types of filters or other use, burlap, linen, silks or equivalent materials may also form the base. As to the filter and similar use materials, my invention also comprehends making these of other waste products such as from paper, cardboard or similar products of wood or paper pulp and many types of other fabrics or materials which may be chopped in this form. I find that for certain purposes suitable pellets may be made from scrap leather, particularly where such scrap is in sheets and thus given the various cuts to develop the small pellets.

A characteristic of these flock pellets is that the fibers have distinct and definite cut ends which present cut end surfaces of the fibers and each end apparently having considerable absorbent value in filtration: and the cut fibers form

an improved article over shredded or torn fibrous material such as cotton waste or similar products. Moreover in the spinning of thread, in weaving and knitting of fabrics, the thread or yarn is twisted and the fibers and threads develop substantially permanent kinks. This permanent kinkiness appears to be due in great part to the material being spun and woven or knitted in fabrics and having this permanent set usually for a long period during which the fabric from which the rags have been obtained has been washed or cleaned many times. Due to repeated washing and cleaning, the fibers are more absorbent.

Therefore the flock pellets formed from woven or knitted materials especially, have the characteristics of individual small cut pellets in which there are distinct end cuts: and the fibers having the twist and the kinks develops a certain springiness resisting the tight packing of a mass of such pellets. Therefore I attain not only a better and an improved filtering material but also a product which has many advantages for packing various products.

Another feature of my invention relates to the treatment of the flock pellets to provide these with a chemical characteristic, in which case clean rags either damp or dry are impregnated with the chemical solution. The surplus of the chemical solution is removed, which may be done by drying rolls or by using a centrifugal drier; however the rags if slightly damp when subjected to the cross cutting action are more readily cut with true and clean distinct cuts as distinguished from a tearing operation. In another procedure to develop a flock for oil filters, the washed rags after being rinsed may be partially dried as in a centrifugal machine, oil may then be added, the oil displacing the water so that the oiled rags are subjected to the cutting. In this case an improved cutting action is developed due to the rags being damp with the oil and the oil functions as a lubricant with the cutting knives in both of the cross cuts. Other materials, such as the flock cut from other types of sheet fiber material, may be likewise treated with chemical solutions or oils or both if desired to produce a product suitable for particular purposes.

Another object and feature of my invention is to develop a flock with which clay granules may be mixed, this being especially adapted for oil filtration in which the clay has a neutralizing and refining action on the oil or gives other treatment. There are many oil filters in which various clay products are used in the filtration

and in some instances the clay has been made in the form of grains or pellets but usually in order to prevent these breaking down and packing, somewhat hard clays are used. I find that with my invention and employing the flock, a soft clay of a Bentonite type may be utilized. When this is in a granulated form it would be difficult to prevent the breaking down of the granules. However when mixed with the flock which is one of the products of my invention, the packing of the flock around the individual granules of clay acts as a cushion in reducing the tendency of such granules to crush and disintegrate. The flock spaces the clay granules out of direct contact one with another. Therefore the combination of a mixture of the flock and the clay granules forms an improved mixture for use as a filter-refiner.

As a subsidiary development in making the clay granules for use with the flock, I find it advantageous to use certain binders with the clay. This may be in the form of a liquid binder such as silicate of soda mixed with the clay and after drying the granules any dust may be removed by screening. Another manner of making the clay granules is by mixing a fibrous type of binder such as asbestos.

Another use of the flock made in the form of pellets is that it forms an excellent air filter in air conditioning or the like. Such flock may be treated with an antiseptic or chemical and not only remove the dust but also acid gases and other obnoxious gases from the air. Another development is in mixing activated carbon in the form of granules with the flock in which case the flock prevents crushing of the granules. The advantage of mixing a porous, absorbent material with the refining or purifying granules is that a freer passage of the gas or liquid through the filter-refiner is allowed; also in holding the refining particles separate from each other, the incoming gas or liquid can contact the entire surface of each refining particle. This may be used in air and gas purification. Manifestly the flock may be used in many other types of air filters such as those for internal combustion engines.

The flock made from various materials also forms an excellent heat insulator for use at moderate or low temperatures. Certain grades of flock may be used for upholstery, packing fragile articles, etc.

My invention is illustrated in connection with the accompanying drawings, in which:

Fig. 1 is a plan in diagram of a plant or equipment for cross cutting the layers of sheet material or fabric followed by end cuts on the strings or ribbons.

Fig. 2 is a vertical section on the line 2-2 of Fig. 1 illustrating a type of eccentric cutting knife to cut the threads, strings or ribbons into short lengths.

Fig. 3 is a side elevation in diagram of a plant for first slitting the layers of sheet material or fabric to form longitudinal strings or ribbons followed by a cross or transverse cut to develop the flock.

Fig. 4 is a front elevation on the line 4-4 of Fig. 3 showing a double acting shearing knife.

Fig. 5 is an elevation of equipment for packing a filter, such being partly broken away and showing lower and upper sections of the filter with the filter material confined by a removable sleeve.

Fig. 6 is a side elevation partly broken away of

the filter made from the procedure of Fig. 5 and illustrating the manner of inserting the oil feed tube into the packed filter.

Fig. 7 is a side elevation broken away of a filter unit adapted for oil filtration illustrating a unit made by the procedure of Figs. 5 and 6.

Fig. 8 is an elevation similar to Fig. 5 showing another manner of packing.

Referring first to the construction of Figs. 1 and 2, a washing, rinsing or solution applying machine is indicated by the numeral 11, this being shown as having a rotating drum of the type used for laundering and rinsing fabrics or other similar material. It will be understood however that the rags or other material in sheet form may if desired be washed or cleaned by prior equipment not illustrated and the drum or similar machine designated by 11 may be used for adding a chemical solution as hereinafter detailed.

Following the treatment in the washer, rinser or solution machine 11, the sheets are passed through a pair of drying rolls 12. These are of a known type and may be heated in any suitable manner and driven to feed the material between the upper and lower rolls or there may be a set of rolls of varying temperatures. From the drying roll assembly the dried or partly dried material is shifted to the sorting table 13. On this table the operatives may spread the fabrics or other sheet material sorting the rags where such are used to feed those of a similar type to the cutting part of the machine. It is however preferable to pass similar types of material through the machine 11 and the drying rolls at the same time in which case the sorting table is used to flatten the articles spreading these for the further operation.

The spread sheet material such as fabric is then transferred to a conveyor 14, this being illustrated as an endless belt type, the sheets being placed on the upper run, this upper run moving in the direction of the arrow 15. This conveyor may be of quite considerable length affording opportunity for the operatives to continue the spreading of the rags or other material to obtain the desired cut. It will be understood that for instance dealing with rags, it is not necessary that the cuts be made parallel to the wool or the warp of woven fabrics as the cuts may be made on the bias. This also applies to knitted materials. Therefore it is not necessary to take particular care as to the exact arrangement of the materials to be cut on the conveyor and in leading these to the cutter.

The sheet material when properly arranged on the conveyor is next engaged by a pair of feed rolls indicated at 16, such being an upper and a lower pair of any conventional assembly for feeding sheet material. Such material is conveyed over a stationary knife 17 mounted on a substantial table.

The sheet material is then cut by a chopper 18. This has a drum-like structure 19 with a series of knives 20, the knives being arranged at an inclination in reference to a longitudinal line on the drum in order to give a shearing cut. Such drum or chopper may be rotated in any suitable manner and at the desired speed so that the knives 20 coact with the stationary knife 17 and make a series of complete transverse cuts through the layers of sheet material being fed to the cutter. This develops a multitude of strings, threads or ribbons by distinct cross cuts or cross chopping.

The material so cut into the strings, ribbons or the like falls by gravity from the stationary knife 17 and in part forced downwardly by the rotating blades 20 onto a cross feed conveyor 25. This is illustrated as of the endless belt type having an upper run 26 operating in the direction of the arrow 27. This conveyor may be quite narrow as the strings or ribbons drop downwardly in bunches according to the number of layers chopped by each of the knives 20 in the sequence of its rotational operation.

At the discharge end of the conveyor 25 I employ a second stationary knife assembly 30. This is illustrated in Fig. 2 as having two flat elongated blades 31 and 32 sloping downwardly and therefore forming a V shaped trough. On opposite sides of the trough there are side bars 33 and 34 which are preferably provided with cutting edges on their ends. The cutting ends of the trough and of the side bars are preferably in vertical alignment. The trough causes the bunches of strings or ribbons to be more or less located at the bottom of the V from which they are not readily displaced.

The next operation is by a cross cut knife designated by the assembly 40. This as shown in detail in Fig. 2 has a rotating disc 41 with a complete peripheral cutting edge 42. The center of rotation such as by the drive shaft 43 is eccentric to the disc. This cutting disc is shown as being operated at a relatively high peripheral speed through the medium of a pulley 44 and a drive belt 45. Due to the eccentric mounting of the cutting disc or wheel on its shaft, a type of combination shearing and slicing cut is developed. The direction of rotation is indicated by the arrow 46. The peripheral cutting edge thus crowds the bunches of strings or ribbons into the inverted apex of the V shaped trough and gives a shearing action in conjunction with the end edges of the blades 31 and 32. If any material is crowded over to the bars 33 and 34 it is cut as the periphery of the blade reaches the remote bar. Due to the rapid rotation of the cutting disc in reference to the speed of the conveyor 25, there can be very little of the bunches of threads pile up against the advance side of the disc cutter.

The double cut material then in the form of flock is deposited on an endless conveyor 50, there being a suitable transfer apron located below the travel of the knife 42 and below the trough. This conveyor is illustrated as of the endless belt type and moves the flock laterally in reference to the first mentioned part of the machine or if desired this conveyor may take the double chopped flock in any desired direction.

For certain purposes of use of the flock if it is too damp, even after passing through the drying rolls 12, I submit the flock to a dryer 55. This is illustrated as a rotary dryer in which the axis extends longitudinally in reference to the travel of the material and at a downward inclination. Therefore the flock is fed forwardly and at the same time tumbled in this rotary dryer. I find that in cutting sheet material such as flock made from rags or the like, that a much cleaner chopping job may be done by having the layers of material damp instead of as dry as possible. The knives both of the chopper 18 and of the end cutting disc give much cleaner cuts on slightly damp material than on thoroughly dried fabrics or the like and produce much less lint or material too fine for the various purposes to which my type of flock may be applied.

Dealing next with the plant of Figs. 3 and 4, which as to certain features is designed to extract moisture from the fabrics or sheet material and to then impregnate the material with an oil or other liquid to displace the rinsing water or the like. In this construction the sheet material is first slitted longitudinally and then the strings or ribbons given the transverse end cuts. In this construction a washer or rinser is indicated by the assembly numeral 75. This may be a rotary laundering drum or equivalent machine. The rags and the sheet material are then transferred to a centrifugal dryer 76 which may be of an ordinary type operated to reduce the water or moisture content to a greater degree than for instance the drying rolls 12 of Fig. 1. A liquid supply pipe 77 is positioned to be introduced into the centrifugal dryer and this has spray jets 78 positioned to discharge a spray of liquid on the material after subjecting to drying or partial drying. This spray assembly may be utilized to discharge oil into the centrifugal dryer. The oil first sprays on the material while it clings to the walls of the centrifugal dryer basket by a centrifugal force. This develops an outward flow of oil causing a displacement of the rinse water until all of the material in the centrifugal dryer is dampened to a desired degree with the oil. The sheet material is then removed from the dryer and transferred to a sorting table 80 which may be utilized as the sorting table 13 of Fig. 1. The sheet material may be spread out flat and built up in a number of layers. An endless belt conveyor 81 having its upper run moving in the direction of the arrow 82 then carries the material to a slitting machine 85. This has an initial pair of feed rollers 86 positioned one above the other and having a transfer apron 87. These rollers smooth the layers of sheet material which are then passed through slitting discs 88, this being shown as having a lower assembly 89 and an upper and larger set of knives 90. These may be of a known and standard type for slitting material into very narrow strips such as long strings or ribbons. After slitting these are next picked up by a pair of outfeeding rollers or drums 91, one being positioned above the other. If desired transfer aprons or the like are utilized.

The longitudinally slit material is then delivered to a transverse cutting machine 100. This has lower and upper guide plates 101 and 102, note Fig. 4, with a space 103 therebetween for the passage of the strings or ribbons. Each of these guide plates is provided with a cutting end or blade 104 and coacting with these is a double acting shearing blade 105 pivoted at 106 to a fixed structure. This blade has upper and lower cutting edges 107 and 108 and is oscillated by means of an operating link 109 or the equivalent.

The flock thus formed by the slitting machine and the transverse cut for the cords or ribbon drops to an outfeeding conveyor 115. This is illustrated as of the endless belt type, the upper run operating in the direction of the arrow 116. If the flock is not sufficiently dry it is then transferred to a mechanical dryer 120. This is preferably a heating dryer of the type having a rotating drum. It will thus be seen that by the equipment of Figs. 3 and 4 the raw sheet material may be treated to wash and rinse, remove a desired proportion of the water or other cleansing solution by the centrifuge. Oil or other liquid may be added to the fabrics. These after proper spreading and building up in layers are then sub-

jected to the slitting machine. Incidentally this slitting for woven or knitted fabrics or the like may be parallel to the threads or on the bias. By proper construction of the slitting machine the desired width of cords or ribbons may be obtained and then these cut or chopped by the oscillating knife to the desired length.

It is manifest that the flock may be cut from graded and sorted materials and cut or chopped to form pellets of different sizes depending on the purpose for which the flock material is to be used. I find it is difficult to screen the flock pellets to various sizes and the control of the size is better obtained by regulating the cutting and chopping. However for coarse material I cut and chop the flock to pass through for instance $\frac{1}{4}$ inch mesh and this may be graduated in size by fine cutting to form a lint which would pass for instance, 50 mesh.

Moreover where it is desired to have flock pellets which will provide a coarse screen, it is preferable to cut these from all wool fabrics of a good quality. A finer filtering and screening material may be made from cloth rags of a cotton wool mixture. The finer materials for use in filters or the like is preferably made from all cotton or linen fabrics.

In some cases for various types of operations I mix with the flock granules of different materials such as clay granules or those of activated carbon. Granules may be made of calcium hydroxide or silicate of soda for neutralizing oil. Clay granules are used for neutralizing and removing unsaturates from the oil. These granules may be made in any suitable manner and may be graded in sizes say from those passing a $\frac{1}{4}$ inch mesh to a so-called 40 mesh. The flock may be treated with a number of chemicals depending on the use to which the material is put and as above mentioned it is preferable to treat the raw material from which the flock is cut or chopped prior to this cutting and chopping operation. For the purpose of neutralizing the acidity of oil I may treat the flock for instance with a solution of silicate of soda, sodium carbonate or triethanolamine. This material may also be used for removing acid gases from air and this type of flock forms an excellent material for use in air conditioning plants as an air filter. It may be saturated with antiseptics or odor removing chemicals such as hexyl resorcinol.

An important characteristic of the flock when used with clay granules, granules of activated carbon and other readily crushable material in small particles is that when properly mixed with more or less coarse flock the flock holds the granules in position and not only prevents their packing but breaking down into fines which for most purposes is disadvantageous. Therefore I secure an improved mixture by using the flock in the form of pellets made from cut and chopped material with the granules of other materials.

In order to show an application of my invention in the use of the flock and granules, in Figs. 5 through 8 I illustrate the procedures for packing filters and a filter adapted for filtering cylinder oil of an internal combustion engine. Referring first to the completed filter of Fig. 7, this has a metal shell provided with a bottom cup 126 and an upper cup 127. Each of these has a cylindrical side wall 128 and connected by an overlapping joint 129. This joint if desired may be a spun or crimped joint or may be soldered or welded. The bottom cup has a conical lower head 130 terminating in a sump 131, such sump

having an opening 132. A drain-cock 133 is attached to the sump for cleaning dirt or other material accumulating in the cone and the sump. A perforated disc and/or screen 134 is placed in the bottom cup engaging the cone at its base, that is, at the junction line with the cylindrical side wall. The upper cup has a slightly domed head 135 and is provided with a central opening 136 and also with one or more additional openings 137. At each of these latter openings an outlet connecting ferrule 138 is attached. A perforated metal disc and/or screen 139 is fitted in the upper cup below the dome and adjacent thereto I have one or more pads of felt or cotton indicated at 140. The packing indicated by the assembly numeral 145 has a lower coarse layer 146 preferably made of flock pellets from pure wool fabric and cut or chopped rather coarse. Above this there is a second layer 147 preferably made of pellets from a cotton and wool mixture, these being of smaller size. The chemically treated layer 148 has incorporated therewith clay granules or granules of other suitable material mixed with the flock pellets. These flock pellets may be chemically treated if desired. The upper layer 149 is preferably made of flock cut from cotton rags or the like and has the finest cut. An oil supply tube 150 extends downwardly through both of the cups and has a screw threaded nipple 151 for attachment of an oil feed pipe. The pipe is sealed by known practice to the head 135 at the opening 136. It extends downwardly through the upper perforated disc 139, the layers of fabric and also through the lower perforated disc 134 leading to the oil chamber 152 in the cone section at the bottom for the dirty oil, the oil passes upwardly through the filter pack and accumulates in the clean oil space 153 above the upper disc from which it flows outwardly through the ferrule connections 138.

The preferred manner of filling such a filter is shown in Fig. 5 in which the lower cup is suitably supported and around this is fitted a packing sleeve 160. This is cylindrical and has a close fit outside of the cups. The packing is then placed in the lower cup and in this sleeve in layers which layers need not be separated by any definite line. The upper cup 127 is then forced downwardly on the mass of more or less loose packing and compresses this until the two cups engage at the joint 129. The sleeve may then be removed and this joint finished to make an oil tight connection of the upper and lower cups. When so connected however the layers of packing extend across the whole diameter of the cups and it is necessary to insert the tube 150. This is done by the procedure shown in connection with Fig. 6 in which a pointed needle 165 has a projecting stud 166 and from the top and over this is fitted the tube 150. The assembly of the needle and the tube is then inserted through the opening 136 in the dome 135, the point of the needle forcing an opening through the perforated metallic disc 139. It also pierces and spreads the felt or fabric layers 140 and is forced through the various layers of the packing causing a lateral spreading, perforating the lower perforated disc 134 and the needle being pulled out through the sump 131, and the bottom opening 132. This leaves the tube 150 extending through the complete packing which is retained in place by the upper and lower perforated discs. The forcing of the needle through these discs forms a slight downturned burr which is operative to frictionally engage the tube. However as above mentioned, the tube is

held in place by the attachment of the threaded nipple end 151 to the dome 135 either by soldering, welding or by a screw threaded connection. The manner in which the needle 165 is thrust through perforated discs or screens such as 139 and 134 is apparent to those skilled in the art, the needle being mainly used as a guide for the tube 150 and to form an opening through the packing or similar material for such tube. The tube thus extends above the upper perforated disc or screen 139 and preferably slightly below the lower disc or screen 134. Manifestly the perforations through the screens or discs made by the needle should be such that the oil does not tend to flow along the periphery of the tube 150 through the filter material.

In Fig. 8 I show an alternative manner of filling the filters. In this case the various layers of the packing are placed in a sack or sacks indicated at 170. The sacks are of such a diameter that they may be conveniently fitted in the lower cup of the filter and confined by the sleeve 160. Then when the upper cup is forced downwardly it compresses the packing and stretches the cloth sacks forming a close contact with the inner walls of the filter shell. When the joint 129 is sealed, the tube 150 may be inserted in the manner illustrated and described in connection with Fig. 6, thus completing the filter.

It will be understood that I vary the pack in the filters depending on the particular purpose to be accomplished but it is preferable to have the flock graded as shown in the construction of Figs. 5 and 7 and also in the construction of Fig. 8 the flock may be graded in the sack or cloth casing or a series of small sacks may be made one with each type of layer and the pack made by inserting a plurality of small sacks. The flock, whether or no it incorporates granules of other materials, should not be so tight as to require excessive oil pressure but likewise the pack must not be sufficiently loose so that the oil will develop a free passage therethrough. I find however by using flock made in accordance with my invention there is less tendency for a more or less loose filter to open and allow channels for the passing of oil than in filters made with materials now used. One of the difficulties in filtering crank case oil of internal combustion engines is that practically all of these oils develop an emulsion which tends to clog the filter. With my filter pack properly made it will retain these emulsions. In some cases I find it of an advantage to incorporate in the flock a permanent emulsion of oil and water and this may be done by adding a certain amount of a soap or soap ingredients such as triethanolamine and oleic acid in which the soap may vary from about 3 to not more than 10% of the emulsion of oil and water with water soluble chemicals.

It is to be understood also that the flock may be utilized to incorporate granules of hard materials as well as those readily pulverized and in addition to reducing the crushing or disintegration of the granules, the flock retains these spaced apart so that the liquids or gases passing through the filter may come in contact with the complete surface of the granules. While I have described the flock as made mainly from fabrics, it is to be understood that I may also make this from raw fibrous material such as cotton, wool, linen, hair or other suitable fibers and in these instances it is also desirable to make the cuts at substantially right angles one to the other. This may therefore produce either extremely short

fibers or those of considerable length. It is manifest that the flock made from fabrics may be cut so fine that the individual fibers are practically separate one from the other. One of the features that develops excellent absorbing qualities is due to the sharp cuts on the ends of the fibers exposing such ends for an absorbing action.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In the method of making flocculent pellets of the type described, characterized by short tubular chemically reactive intersecting fibers comprising utilizing sheet material having a multitude of relatively long tubular fibers similar to woven, knitted or felted materials, moistening the sheets with a chemical having the characteristics of being reactive when filtering, subjecting the sheet materials to a succession of cuts to first produce string-like strands and then cut the strands into short lengths to produce the pellets of the desired size, all of the cuts leaving clean-non-crushed ends of the tubes of the fibers whereby such ends may function in the absorption of liquids, mixing the chemically saturated pellets with granular material of a type readily pulverized to thereby embed the granules in the flocculent pellets with the pellets forming a cushion for the granules and then shaping the mass of pellets and the granules to form a filter.

2. In the method of making a filter from a base absorbent material of kinky twisted organic tubular fibers comprising moistening the base material with a chemical which is reactive when filtering, cutting the base material and re-cutting the cuttings to produce flocculent pellets with individual fibers having clean cut non-crushed ends of the tubular fibers, the cutting and re-cutting forming as to individual fibers a capillary tube open at both ends whereby such ends function in absorption of liquid, mixing the chemically saturated pellets with a chemically reactive and adsorbent granular material of a type readily pulverized to thereby embed the granules in the flocculent pellets with the pellets forming a cushion for the pulverizable granules and then shaping the mass of pellets and the granules to form a filter.

3. In the method of making an oil filter comprising utilizing a base organic absorbent material having kinky twisted tubular fibers, moistening the base material with oil to drive out water, cutting the base material and re-cutting the cuttings to produce flocculent pellets with individual fibers having clean-cut non-crushed ends of the tubes of the fiber to develop as to individual fibers a capillary tube open at both ends whereby such tubes function in a capillary manner in the absorption of the oil and then shaping the mass of pellets to form a filter.

4. In the method of making a filter comprising using a base organic absorbent material having kinky twisted tubular fibers, cutting the base material and re-cutting cuttings to form flocculent pellets composed of kinky twisted tubular fibers with non-crushed open ends of the tubes, producing the sharp cut fibers in sufficiently short length that individual fibers are operative as capillary tubes, having absorption properties of liquid through the two open ends of a short tubular fiber and then shaping the mass of pellets to form a filter.

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