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SPRING CLIP BAG HANGER

Filed May 4, 1960

FIG. 1

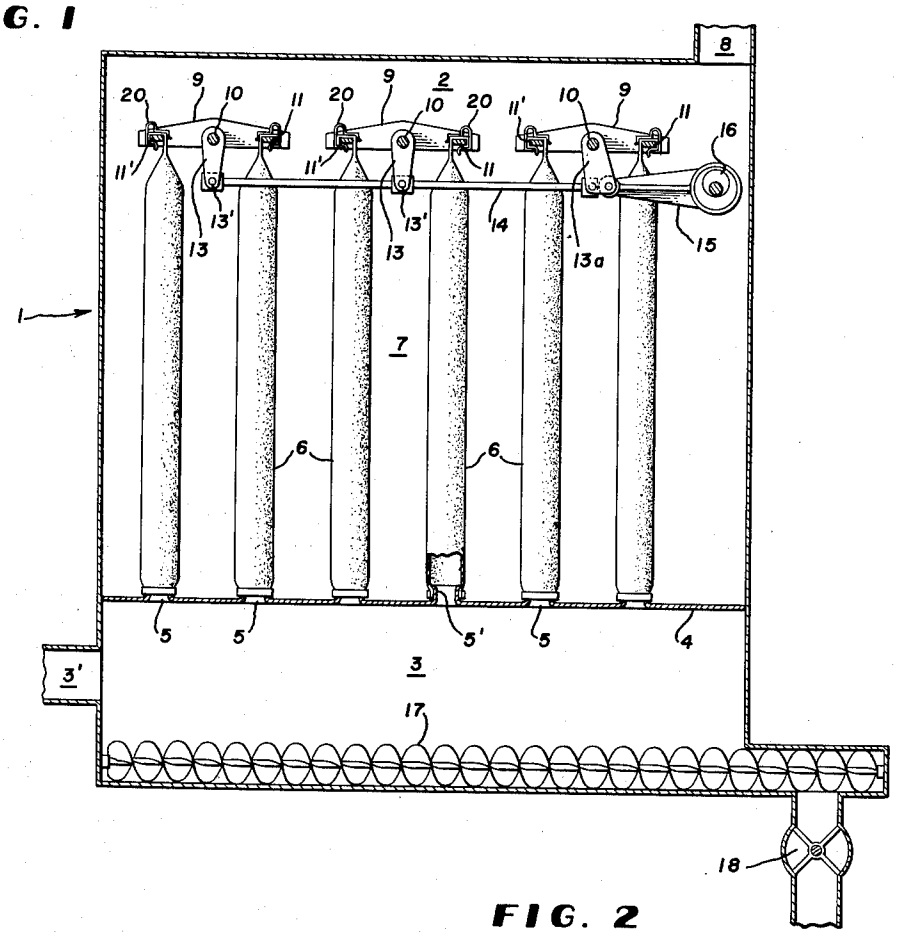


FIG. 2

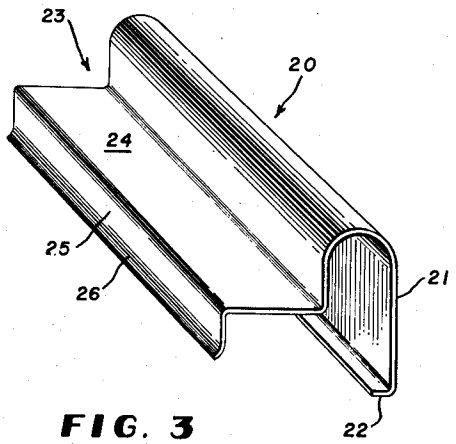
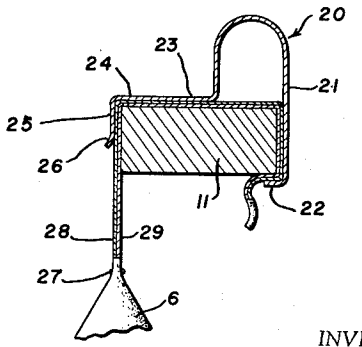


FIG. 3



INVENTORS
GEORGE SCHNEIDER
FRANK BASA

BY Baines & Taylor

ATTORNEYS

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SPRING CLIP BAG HANGER

George Schneider, University Heights, and Frank Basa, Bedford, Ohio, assignors to Fuller Company, a corporation of Delaware

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This invention relates to a spring clip for supporting a bag, particularly a spring clip for clasping to a supporting bar the upper end of a bag for filtering suspended particles from dust-laden gases.

The spring clip is particularly adapted for securing the upper end of filter bags wherein the upper end of the filter bag is closed and the bag is suspended from an upper support in the bag house, while the open lower end of the bag is secured about an opening in a crown sheet which divides the bag house into an upper chamber where the bags are located and a lower chamber into which the dust-laden gas initially is introduced. The dust-laden gas introduced into the lower chamber passes through the opening in the crown sheet and into and through the porous filter bag, which removes the suspended particles, and into the space in the upper chamber surrounding the bags. The cleaned gases pass out of the upper chamber through an exhaust port. The bags may be shaken to dislodge dust deposited on the inside of the bags. Such dislodged dust will fall through the openings in the crown sheet to the bottom of the lower chamber where it is removed.

In using the spring clip, the closed upper end of the filter bag is wrapped partially around the supporting bar. The spring clip is then placed over the bar and securely holds the closed end of the bag to it. While the bar may be rigidly attached to the sides of the upper housing and the dust which accumulates on the inside walls of the bag may be dislodged by sonic or supersonic waves, it is preferred to attach the upper ends of the bags to a shaker machinism which will impart a positive shaking action to the bags to dislodge the accumulated dust.

The spring clip of the present invention is of modified U-shape. It has one leg extending straight out from the base of the U to engage one side of the supporting bar about which the closed end of the bag is wrapped, with the outer end of this leg having a short inturned flange to engage the bottom of the supporting bar. The other leg extends outwardly from the base of the U for a distance equal to about one-half the length of the first leg. It then extends laterally outwardly substantially at right angles to provide a portion to engage the top of the supporting bar, and then extends outwardly in a direction away from the base of the U at substantially right angles to lie parallel to the first leg, to provide a portion to engage the side of the bar opposite from that engaged by the first leg. The outer end of the last described portion of the second leg is flared outwardly to assist in applying the clip to the bar. Thus, when the clip is applied to a supporting bar about which the closed end of the bag is wrapped, portions thereof will clasp the end of the bag against the top and bottom of the bar, as well as against both sides thereof, thereby securely holding the closed end of the bag to the supporting bar.

The invention will be further described in connection with the accompanying drawing in which the preferred form of the spring clip is illustrated.

In the drawings:

FIG. 1 is a vertical sectional view of a dust filter unit showing the manner in which the spring clips of the invention hold the closed ends of the bags to the supporting bars;

FIG. 2 is an enlarged transverse sectional view showing the spring clip holding the closed end of a bag to a supporting bar and;

FIG. 3 is a view of the spring clip in perspective.

Referring now to the drawings and first to FIG. 1, the filter unit comprises a housing or bag house **1** which is divided into an upper chamber **2** and a lower chamber **3** by a horizontal partition or crown sheet **4**. The dust-laden gas is introduced into the lower chamber **3** through a gas inlet duct **3'**. The crown sheet **4** has a plurality of openings **5** surrounded by upstanding flanges **5'** about which filter bags **6** are clamped in any desired manner. The dust-laden gas passes through the openings **5** into and through the bag **6**. As the gas passes through the bag **6**, the entrained dust is deposited on the inner walls of the bags and the gas enters the free space **7** of the upper chamber in a substantially clean state. The clean gases are discharged from the upper chamber **2** through a discharge duct **8**.

A plurality of shaker frames **9** are located in the upper portion of the upper chamber **2**. The shaker frames are mounted for oscillation about pivots **10** positioned midway of the length of the frames. The outer ends of each of the shaker frames carry shaker bars for supports **11** and **11'** to which the upper ends of filter bags **6** are attached. In securing the upper ends of the filter bags **6** to the shaker bars **11** and **11'**, the top of the filter bags, which are stitched together, are wrapped around the shaker bars and clasped to it by a clip **20**.

An arm **13** extends downwardly from each shaker frame **9** directly beneath its pivot **10**. The lower end of each arm **13** is pivotally connected at **13'** to a bar **14**. The lower end of the arm **13***a* of the shaker frame **9** at one end of the bag house is pivotally connected to a connecting rod **15** driven from an eccentric **16** in a known manner. When the eccentric **16** is rotated, connecting rod **15** and bar **14** connected thereto are caused to reciprocate. As the bar **14** reciprocates back and forth, shaker frames **9** are caused to oscillate about their pivots **10**, moving the shaker bars **11** and **11'** up and down and shaking the bag **6** connected to them. This shaking of the bags causes dust which has collected on the inside of the bag walls to be dislodged and to fall through the open lower ends of the bags and the openings in the crown sheet to the bottom of the lower chamber **3** from which it is removed by a screw conveyor **17** through a suitable air lock **18**.

The spring clip **20** which clasps the closed ends of the bags to the shaker bars or supports **11**, **11'** is more particularly shown in FIGS. 2 and 3. This clip, which is made of spring steel or other suitably resilient material, is of modified U-shape and comprises a long leg **21** extending straight out from the base of the U. The outer or free end of this leg is turned inwardly substantially at right angles to provide a flange **22**, which, when the clip is in position to clasp the closed end of a bag to a shaker bar **11**, as shown in FIG. 2, underlies one edge portion of the bar and holds the bag against the bottom of the bar. The other leg **23** extends outwardly from the base of the U substantially parallel to the leg **21** for a distance substantially equal to one-half the length of leg **21**, and then extends laterally outwardly substantially at right angles to provide the portion **24**. At the outer end of the portion **24** the leg **23** makes another right angle turn to provide the portion **25** which also extends substantially parallel to leg **21**. The outer edge of the portion **25** is flared outwardly as at **26** to assist in clamping the spring clip **20** about a shaker bar around which the closed end of a bag has been wrapped.

The leg **21** and its inturned flange **22** and the portions **24** and **25** of leg **23** are so correlated to one another and to the shape and dimensions of the shaker bar about which the closed end of the bag is wrapped, that when

the spring clip is in clasping position, as shown in FIG. 2, the outer portion of leg 21 and the portion 25 of leg 23 will exert a compressive force against the portions of the bag which extend along the sides of the shaker bar while the portion 24 of leg 23 and the inturned flange 22 of leg 21 will exert compressive forces against the portions of the bag which engage the top and bottom of the shaker bar, respectively. Thus, the folded bag portions are compressively engaged and held against the four sides of the shaker bar and the upper, closed end of the bag securely held to the shaker bar.

To secure the spring clip about a shaker bar after the closed end of the bag has been wrapped about the bar, the inturned flange 22 of leg 21 is first engaged beneath the side portion of the shaker bar having the free end of the bag extending around it. The clip is then rocked to cause the outer end portion 25 of the leg 23 to snap over the other side portion of the shaker bar to bring the spring clip to the position shown in FIG. 2. The resiliency provided by the parallel portions of legs 21 and 23 adjacent the base of the U and which are not in contact with the shaker bar enables the leg 23 to spring outwardly sufficiently to permit the outer portion 25 thereof to engage the side of the shaker bar opposite that engaged by leg 21.

When it is desired to remove the spring clip to release the bag from the shaker bar, pressure is applied against the portion of leg 23 adjacent the base of the U. This rocks the spring clip in a direction to release the portion 25 from its engaging position with the shaker bar and permits ready removal of the spring clip.

From the foregoing it will be seen that the substantially parallel portions of the legs 21 and 23 adjacent the base of the U which extend outwardly and away from the shaker bar when the spring clip is in clasping position perform an essential part both in placing the spring clip in clasping position and in removing it from a shaker bar when it is desired to unfasten the upper end of a bag.

As shown in FIG. 2, the upper ends of the filter bag 6 are brought together and stitched as at 27. This stitching counteracts the tendency of the air pressure in the filter bag 6 to expand opposite sides 28 and 29 of the bag. If it were not for the stitching together of the sides 28 and 29 of the bag, the bag might expand substantially adjacent the supporting bars to cause the spring clips 20 to slip and release the shaker bags from the shaker bars.

It is to be understood that the specific form of filtering unit described herein is merely exemplary of such units which have bars to which the closed ends of filtering bags are attached, and the invention is in the combination of the means for securing the closed ends of the bags to their respective supporting bars, rather than in the other parts of the filtering unit.

We claim:

1. Filtering apparatus having a filter through which dust-laden gases are adapted to pass, a support for one end of said filter, a resilient clip for clasping said end of the filter to the support, said clip comprising a single piece of resilient material including a first part clasping said end of the filter to one side of said support, said first part having a free end turned inwardly providing a flange which engages said end of the filter and clasps it to one side of said support, a second part clasping said end of the filter to the opposite side of said support, and a third part attached to said first two parts and projecting away from the support a substantial distance to assist in the removal of the clip and thereby in the detachment of said filter from said support, said third part being reversely bent to provide two legs spaced a substantial distance apart and extending parallel to said first and second parts.

2. Filtering apparatus as set forth in claim 1 in which said second part has a portion clasping said end of the filter to the side of said support opposite the side engaged by said inwardly-turned flange of said first part, and another portion lying substantially parallel to said first part and clasping said end of the filter to the side of said support opposite the side engaged by said first part, the said another portion having an outwardly-flared free end to assist in placing said clip over said end of the filter and on said support.

3. Filtering apparatus as set forth in claim 2 in which said supporting bar is substantially rectangular.

4. Filtering apparatus for dust-laden gases of the type wherein one end of a flexible filtering member is brought together and clasped to a substantially rectangular supporting bar and the other end of said filtering member is clasped about a crown sheet flanged opening through which the dust-laden gases pass into the filtering member to be filtered; the combination with said rectangular supporting bar about which said one end of the filtering member is clasped of a resilient, generally U-shaped clip, one leg of which extends outwardly from the base of the U and clasps a part of said one end of the filtering member to one side of said supporting bar, the outer end of said leg having an inturned flange clasping another part of said one end of the filtering member to a second side of said supporting bar, the other leg having a first part extending outwardly from the base of the U, a second part attached to the outer end of said first part and extending laterally outwardly substantially at right angles to said first part and clasping another part of said one end of the filtering member to the side of said supporting bar opposite the side clasped by said inturned flange, and a third part attached to the outer end of said second part and extending outwardly substantially at right angles to said second part and substantially parallel to said one leg and clasping another part of said one end of the filtering member to the side of said supporting bar opposite to that clasped by said one leg, whereby portions of both legs adjacent the base of the U extend outwardly from said supporting bar to facilitate applying the clip to and removing the clip from said supporting bar.

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