

- [54] **SPRING SECUREMENT MEANS FOR SEALING WEB**
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 [73] Assignee: **Hawley Manufacturing Corporation**, Indianapolis, Ind.

2,811,201	10/1957	Reid, Jr.	160/122
2,897,888	8/1959	Dragonuk	160/122
2,923,227	2/1960	Hawley	98/115 VM
3,478,668	11/1969	Scheel et al.	98/115 VM
3,481,265	12/1969	Scheel	98/115 VM
3,705,545	12/1972	Overmyer et al.	98/115 VM

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[21] Appl. No.: **313,183**

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Attorney, Agent, or Firm—Hood & Coffey

- [52] **U.S. Cl.**..... **98/115 VM, 137/580**
 [51] **Int. Cl.**..... **F23j 11/00**
 [58] **Field of Search** **137/580; 98/115 R, 115 VM**

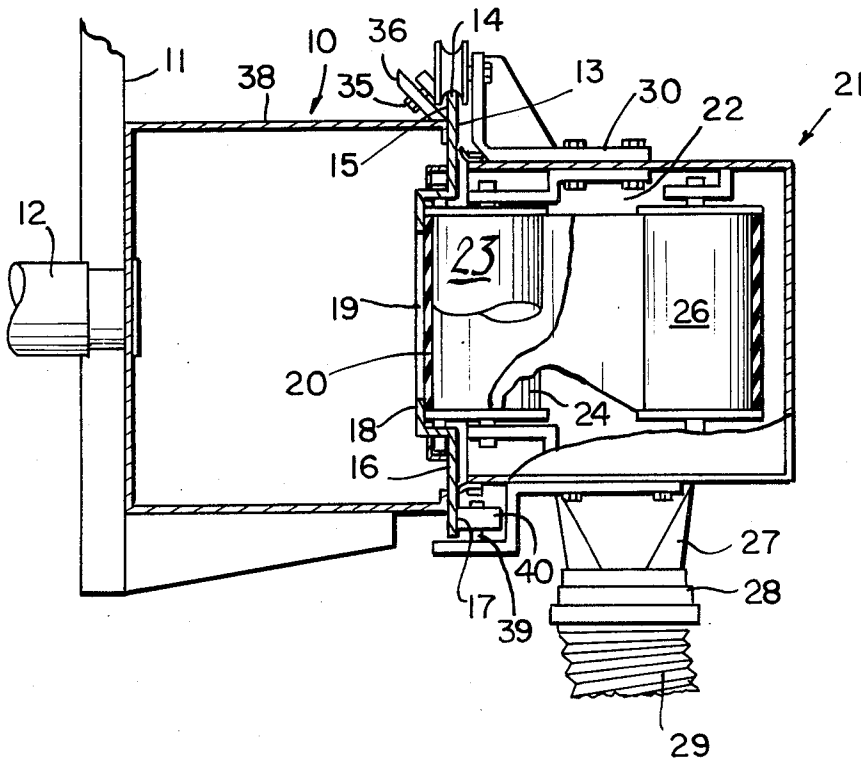
[56] **References Cited**
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2,601,361 6/1952 Blatz 160/122

[57] **ABSTRACT**

Bowed-spring means for releasably retaining the sealing web to the apertured header wall in a "TRAV-L-VENT" type of ventilating system.

7 Claims, 5 Drawing Figures



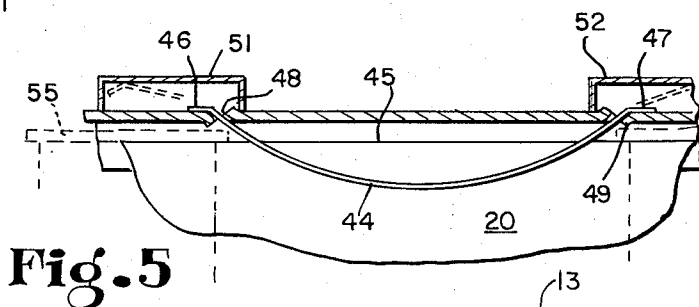
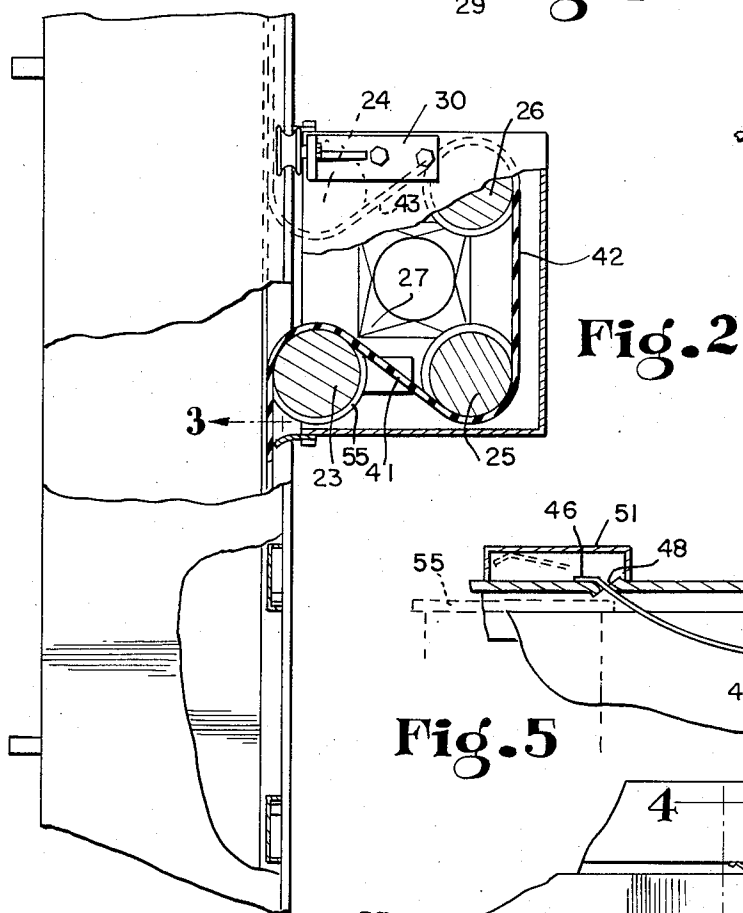
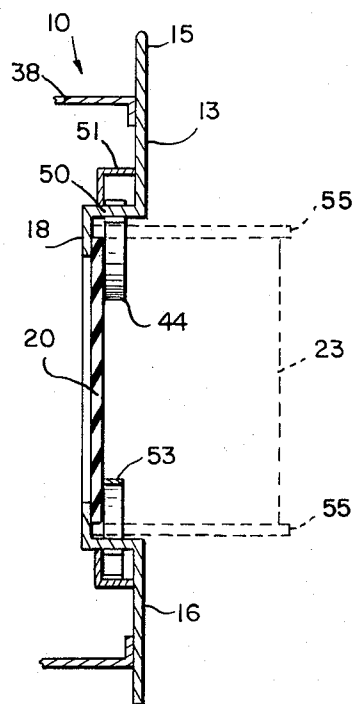
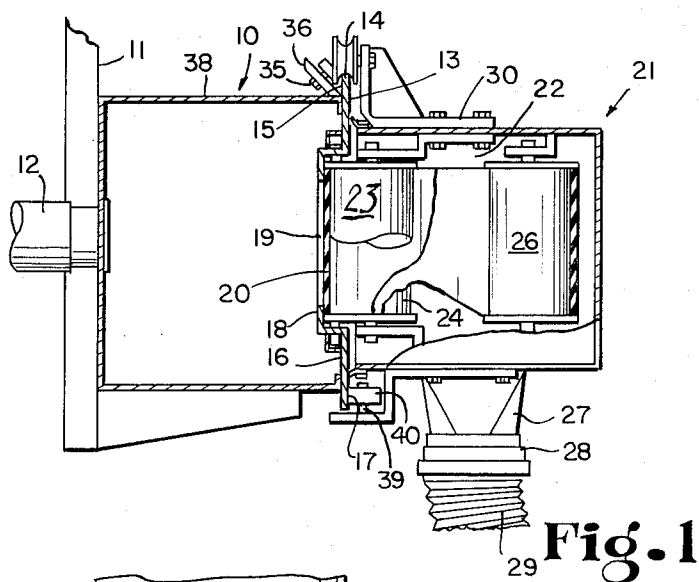
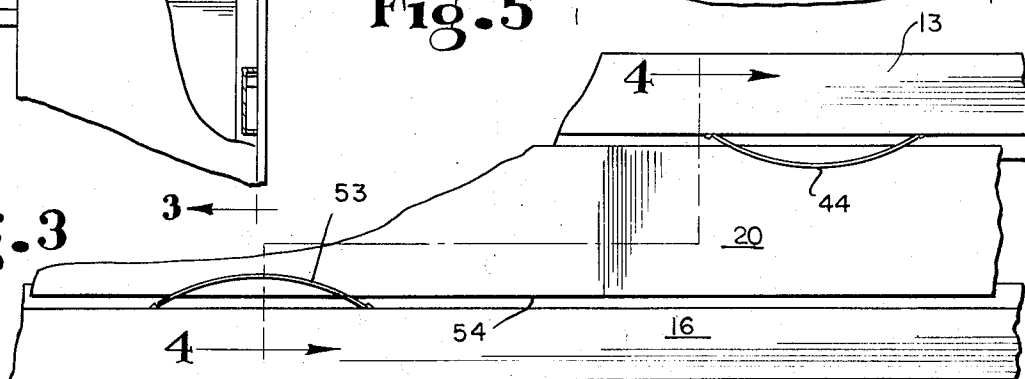


Fig. 3



SPRING SECUREMENT MEANS FOR SEALING WEB

The United States Patent to Hawley No. 2,923,227 issued Feb. 2, 1960 discloses a traveling aspirator system in which a continuous web closes an apertured wall of an elongated continuously evacuated header, except in the region of a carriage which is mounted on the header to travel therealong and which is formed to provide a chamber enveloping a short section of the web and carrying means engageable with the web to hold the enveloped section thereof out of sealing relation with the apertured header wall. Thus, the carriage chamber is always in open communication with the interior of the evacuated header, even during travel of the carriage along the header, while all portions of the header except that portion with which the carriage chamber is currently in registry, are effectively sealed from the atmosphere. Through suitable means, an aspirator hood or its equivalent is connected to the interior of the carriage chamber.

One form of the Hawley system, illustrated in FIGS. 3 and 4 of the said patent, includes a header whose ported wall is vertical, instead of horizontal, so that the sealing web stands vertically edgewise. That form is so designed in order to facilitate application of the basic concept of the Hawley system to an arrangement in which the generally-horizontally extending path of the carriage must include one or more curves. Obviously, it is difficult to manage an elongated web of conventional construction in a system and arrangement such as that illustrated in FIGS. 5 to 8 of the said Hawley patent.

In practical use, it is found that, in installations of the character generally illustrated in FIGS. 3 and 4 of the said U.S. Pat. No. 2,923,227, while such a system performs satisfactorily whenever the header is under continuous evacuation, difficulties arise during shutdown periods, and particularly in regions wherein the ported wall is on the inside of a curve in the header, in that the web tends to fall away from the header so that, when the system is to be put back into use, it is found to be necessary to initiate header evacuation and then manually reposition the web to cooperative association with the ported wall of the header throughout at least a part of its longitudinal extent.

The patent to John R. Scheel and Adolph J. Nordman, Jr., U.S. Pat. No. 3,478,668, issued Nov. 18, 1969, discloses an effective solution to this problem. The present invention, however, is an improvement upon that solution in that it eliminates a multiplicity of moving parts which are subject to damage and to jamming and that it eliminates, as well, overhanging parts on the traveling carriage.

Still other types of web retainer means are disclosed in the patent to Robert C. Overmyer and Adolph J. Nordman, U.S. Pat. No. 3,705,545 to issue Dec. 12, 1972, but those types also appear to me to be less than perfect.

The primary object of the present invention, then, is to improve the means whereby the sealing relation between an apertured header wall and a closure web may be maintained, without interfering with the separation of a portion of said web within the carriage chamber as the carriage travels along the header.

A further object of the invention is to provide improved means for releasably securing a flexible web in

sealing relation to an apertured wall, while providing for ready and automatic release and separation of a portion of said web which is currently within a carriage traveling along said wall.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is a transverse vertical section through a header, a sealing web and a cooperating carriage constructed in accordance with the present invention, parts being broken away for clarity of illustration;

FIG. 1 is a horizontal section through the embodiment of FIG. 1;

FIG. 3 is a fragmentary section taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged section taken substantially on the line 4—4 of FIG. 3; and

FIG. 5 is an enlarged, fragmentary section showing the mounting details of a bowed spring and suggesting the manner in which it is operated.

Referring more particularly to FIGS. 1 and 2 of the drawings, it will be seen that I have illustrated a header indicated generally by the reference numeral 10. Such a header is usually mounted above head height upon support means suggested at 11, the header extending longitudinally in a generally horizontal plane and, in many installations, including one or more curves in its extent as viewed from above. Such curves may be of varying radii and direction so that, in some installations, the header may be described as sinuous in contour. One or more evacuator conduits, as suggested at 12, may be connected with the interior of the header 10 and will lead to evacuator means such as a continuously-operating blower (not shown), a vacuum tank being included in the connection if desired. The means for maintaining evacuation of the header forms no part of the present invention and therefore is not illustrated or described in detail.

The header 10 may be of any cross sectional configuration but will preferably include a generally vertical, outer wall 13. In the preferred embodiment of the invention, the header is provided with an upstanding rail 14 formed to provide an inwardly facing surface 15, and with a depending rail 16 formed to provide an outwardly facing surface 17, all for a purpose to be explained.

As shown, the wall 13 is formed to provide an inset portion 18 which is apertured, as shown. While the port means may constitute a continuous, longitudinal slot as illustrated in the Hawley U.S. Pat. No. 2,923,227, I presently prefer the use of a series of slightly-separated ports or openings 19, as shown in FIG. 4 of the Scheel et al. U.S. Pat. No. 3,478,668, in order to provide improved support for the transversely median portion of the elongated flexible web 20 which is disposed, as shown, against the outer surface of the inset portion 18 of the wall 13. Of course, when the header 10 is evacuated, atmospheric pressure against the outer surface of the web 20 will hold said web in sealing association

with the port means of the wall 13 to prevent fluid flow therethrough.

A carriage indicated generally by the reference numeral 21 is formed to provide top, bottom, end and outer walls defining a chamber 22 which is open at its inner side. Journal mounted within the chamber 22, upon vertical axes, are inner rolls 23 and 24 located near the opposite ends of the carriage and so constructed and arranged as to project peripherally through the open inner side of the carriage, and outer rolls 25 and 26, likewise disposed on vertical axes near the opposite ends of the carriage but adjacent the outer wall thereof, all for a purpose to be explained.

The bottom wall of the carriage is ported and is provided with a reducing connection 27 shaped at its lower end for acceptance of a fitting 28 at the proximal end of a flexible conduit 29 which may carry at its distal end a hood (not shown) such as that illustrated in the above-mentioned Hawley patent, or any other kind of aspirator fixture.

As has been pointed out above, the carriage 21 is adapted to be supported from the header 10 for longitudinal travel therealong. As shown, bracket means comprising two identical straps 30 may be adjustably secured to the top wall of the carriage.

Near its distal end, each strap 30 carries an axle 35 disposed upon an axis which is inclined between the horizontal and the vertical; and a roller 36 is supported from each such axle for rotation in an inclined plane. The straps 30 are so proportioned and designed as to extend significantly beyond the open side of the carriage so that, when the carriage is arranged with its open side adjacent the wall 13 of the header 10, the rollers 36 will bear against the inwardly facing surface 15 of the rail 14 and against the top wall of the header 21 to support the carriage from the header. Preferably, the peripheral surfaces of the rollers 36 are rounded or radiused so that, as the carriage moves along the length of the header, the rollers 36 will have line contacts with the surface 15 and with the top 38 of the header 10.

Axles 39 depend from the bottom wall of the carriage 21, near the opposite ends thereof, and rollers 40 are supported from said axles to rotate in a substantially horizontal plane, said rollers bearing against the outwardly facing surface 17 of the rail 16. It will be obvious that, by adjustment of the straps 30, the carriage 21 may be positioned, relative to the header wall 13, so that the axes of the rolls 23 and 24 are parallel with said wall 13.

As is most clearly to be seen in FIG. 2, the web 20 is threaded around the roll 23 away from the header and thus into the chamber 22, thence around the roll 25, around the roll 26 and around the roll 24 back into contact with the offset portion 18 of the header wall 13. Within the chamber 22, therefore, there is enveloped a short section of the web 20, comprising the reach 41 between the rolls 23 and 25, a reach 42 between the rolls 25 and 26 and a reach 43 between the rolls 26 and 24, which is affirmatively held in spaced relation to, and therefore out of sealing contact with, the apertured wall of the header, the enumerated rolls constituting guide means for the enveloped section of the web. In this manner, the chamber 22 is maintained always in open communication with the evacuated interior of the header 10.

As is well known in the art, the web 20 is sufficiently stiff so that it is transversely self-sustaining and will not

simply slump upon itself when it stands on one edge. However, unless it is in some way sustained, it may tilt and fall away from the wall 13, particularly in the region of the inside radius of a curve in the header 10. Further, the web is preferably maintained under longitudinal tension. So long as the interior of the header is evacuated, atmospheric pressure will hold the web sealingly against the external surface of the inset portion 18 of the wall 13; but in the absence of restraining means, the web may very well move so far away from said section 18 when the header is not evacuated, that it will not be moved back into sealing engagement with said section when the header next is evacuated.

According to the present invention, the web is restrained against undue movement away from said section 18 by means of a plurality of bowed springs 44 arranged at spaced intervals along the upper edge 45 of the web 20. Each such spring is preferably formed at its opposite ends with substantially coplanar toes 46 and 47 which are thrust through slots 48 and 49, respectively, in the side walls 50 bounding the inset portion 18 of the header wall 13. As will be most readily seen in FIG. 5, the inherent resiliency of the spring 44 will tend to hold the toes 46 and 47 closely adjacent their respective slots and the major body of the spring will bow inwardly to overlap the upper edge portion of the web.

Preferably, and in order to avoid wasteful air flow, the slots 48 and 49 are housed as, for instance, by small, closed box-like elements 51 and 52.

Preferably, a similar series of spaced springs 53 is similarly arranged adjacent the web edge 54, the springs of the 53 series being preferably staggered relative to the springs of the 44 series.

Each of the rollers 23 and 24 is formed at each end with a lip or radial flange 55. It will be perceived that, as the carriage moves downwardly as viewed in FIG. 2, for instance, the flange 55 of its roller 23 will encounter a spring to depress or flatten its bow before the web 20 begins to move around the roller 23, so that the edge of the web will be released, by flattening of the spring bow, to permit the web to follow around the roller 23 and move away from the wall section 18. Then, as the roller 24 follows the roller 23, it will lay the web firmly against the wall section 18 while its own flange flattens the next spring and, as the carriage 21 moves on past such next spring, the roller flange will release the spring to return to its bowed condition overlying the edge of the web.

Thus, the springs 44 and 53 will always retain those portions of the web which are outside the carriage 21 in cooperative association with the ported wall 18; but as the carriage moves along the header, the springs will be flattened just in time to permit newly-enchambered portions of the web to leave the wall 18, and other springs will be depressed and then released just in time to permit sections of the web which are about to leave the chamber 22 to be pressed against the wall 18 and then to be restrained by springs returning to their bowed condition.

It will be apparent that the ported wall of the header 10 may be its bottom wall, in which case the carriage 21 will be suspended from front and rear rails at the bottom of the header and by wheels generally similar to the wheels 36.

I claim as my invention:

1. In combination, an elongated header having one transversely-planar, apertured wall, a flexible web substantially coextensive with said wall and proportioned and designed to span the apertured region thereof, a series of bowed leaf springs arranged adjacent at least one lateral edge of said web, each such spring having its opposite ends movably supported from said wall at longitudinally spaced points and having its bowed portion normally overlying said web edge to retain said web edge against movement away from said wall, a carriage mounted to travel longitudinally of said wall and to span said apertured region and said web, said carriage defining a chamber open to said wall, means within said chamber for lifting and holding away from said wall a section of said web currently within said chamber as said carriage travels along said header, means traveling with said carriage to engage and flatten said springs successively to release the web edge portion currently entering said chamber and to permit return to wall contact of the web edge portion currently leaving said chamber and return of said spring bowed regions successively to overlie said web edge as said carriage travels in either direction.

2. The combination of claim 1 in which said wall and said web are disposed substantially in a vertical plane and said one web edge is its upper edge.

3. The combination of claim 1 in which the apertured region of said wall is recessed between outwardly extending ledges, each spring being mounted from one of said ledges by extending its opposite ends through slots in said ledge, and an enclosure for each spring end and slot.

4. The combination of claim 1 including a second series of similar springs similarly mounted for similar cooperation with the opposite edge of said web and with said carriage.

5. The combination of claim 4 in which the springs of said second series are longitudinally staggered relative to the springs of said first-named series.

6. In combination, an elongated header having one transversely-planar, apertured wall, a flexible web substantially coextensive with said wall and proportioned and designed to span the apertured region thereof, a carriage mounted to travel longitudinally of said header and to span said apertured region and said web, a series of bowed leaf springs arranged adjacent at least one lateral edge of said web, each such spring having its opposite ends movably supported relative to said wall and having its bowed portion normally overlying a portion of said web edge to retain said web edge against movement away from said wall, said carriage being formed to define a chamber, and guide means within said chamber, a first portion of said guide means being located adjacent one end of said chamber and closely adjacent said wall, a second portion of said guide means being located adjacent the other end of said chamber and closely adjacent said wall, and an intermediate portion of said guide means being located between said first and second portions and remote from said wall, said web being trained, within said chamber, about said first portion, thence about said intermediate portion and thence about said second portion, means traveling with said carriage at each end to engage said springs successively, as said carriage travels in either direction longitudinally of said header, to flatten said springs to clear and release said web edge, whereby, as said carriage travels longitudinally of said header, an advancing portion of said web within said chamber will be released and moved away from said wall for a period and then, as said web portion emerges from said chamber, will be recaptured by one of said springs.

7. The combination of claim 2 in which said first portion of said guide means comprises a roller, said second portion of said guide means comprises a roller, and said means to engage said springs comprises a lip or radial flange at each end of each roller.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,788,208 Dated January 29, 1974

Inventor(s) Billy M. Brumett

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

Column 2, line 19, "FIG. 1" should be -- FIG. 2 --.
Column 6, line 33, (Claim 7, line 1), "claim 2" should be
-- claim 6 --.

Signed and sealed this 18th day of June 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents