July 9, 1957 J. J. BAKER ET AL 2,798,506

FLUID CONDUCTOR AND TAKE-OFF

Filed Dec. 28, 1953 3 Sheets-Sheet 1

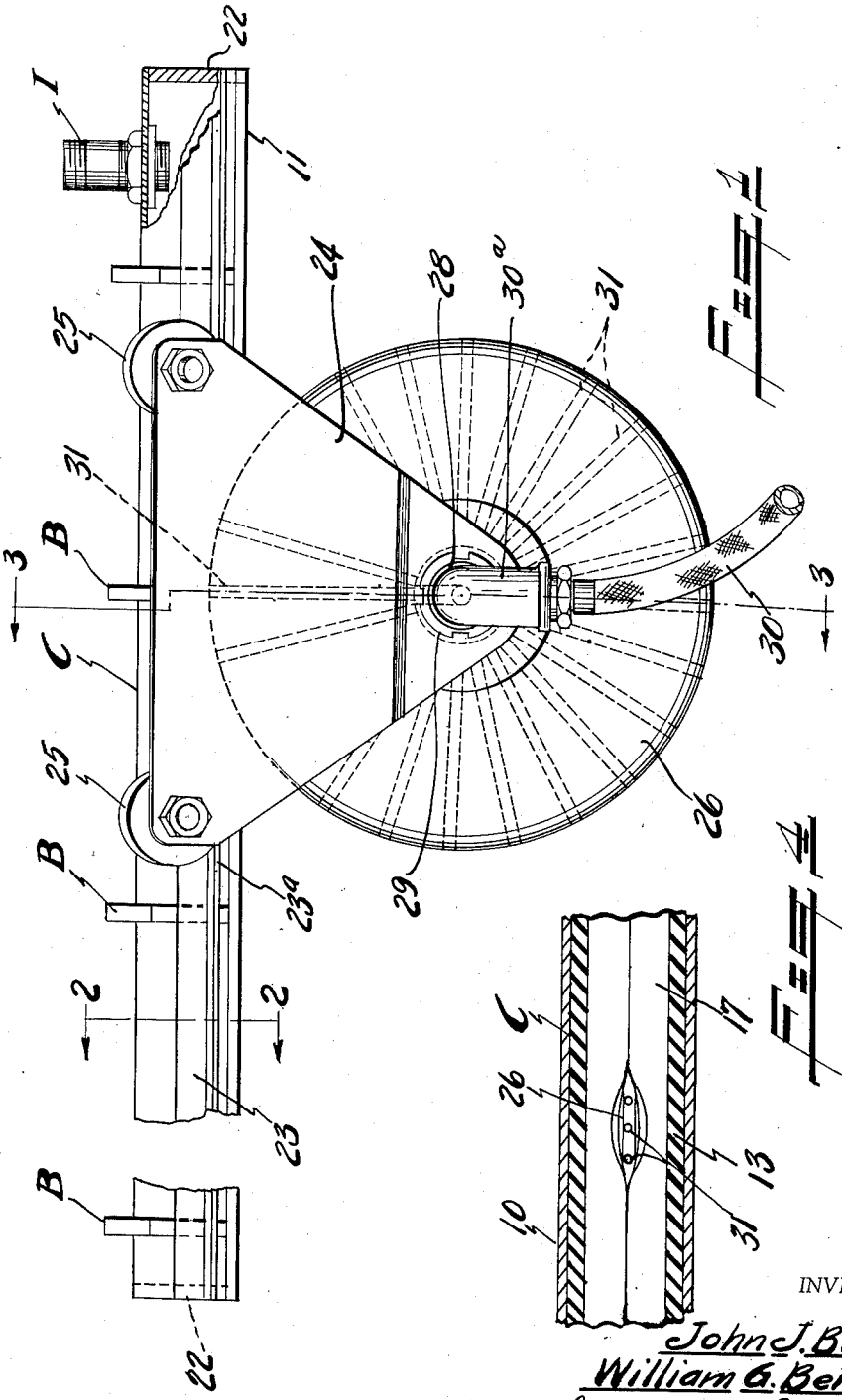


Fig. 1

Fig. 4

INVENTORS
John J. Baker.
William G. Benjey.

BY Learman & Learman.
ATTORNEY

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FLUID CONDUCTOR AND TAKE-OFF

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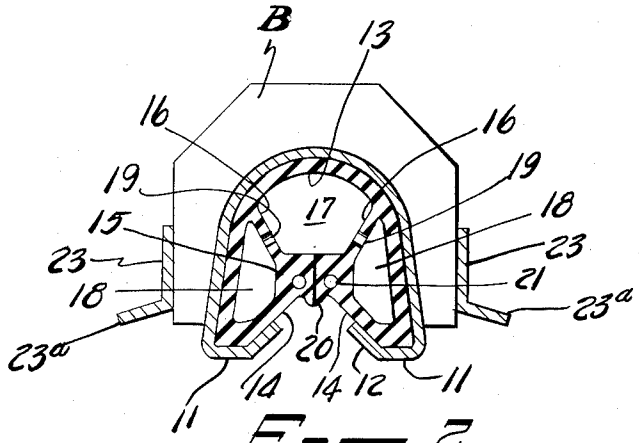


Fig. 2

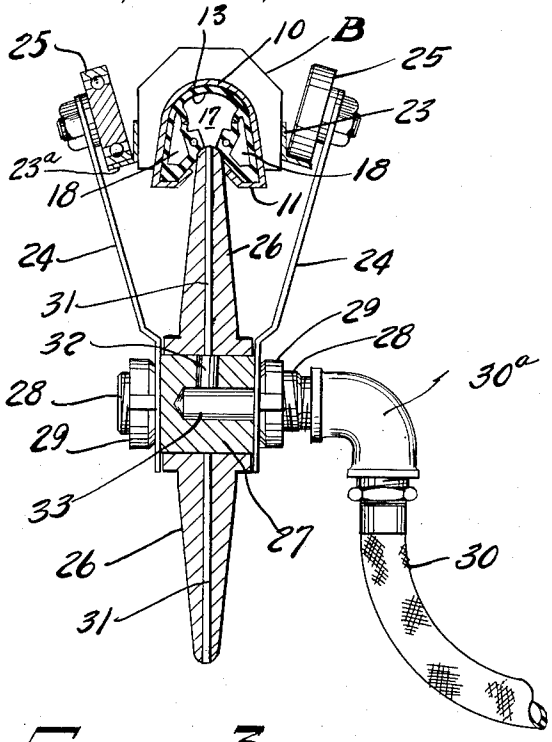


Fig. 3

INVENTORS

John J. Baker
William G. Bengey.

BY Fearman & Fearman.

ATTORNEYS

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Filed Dec. 28, 1953 3 Sheets-Sheet 3

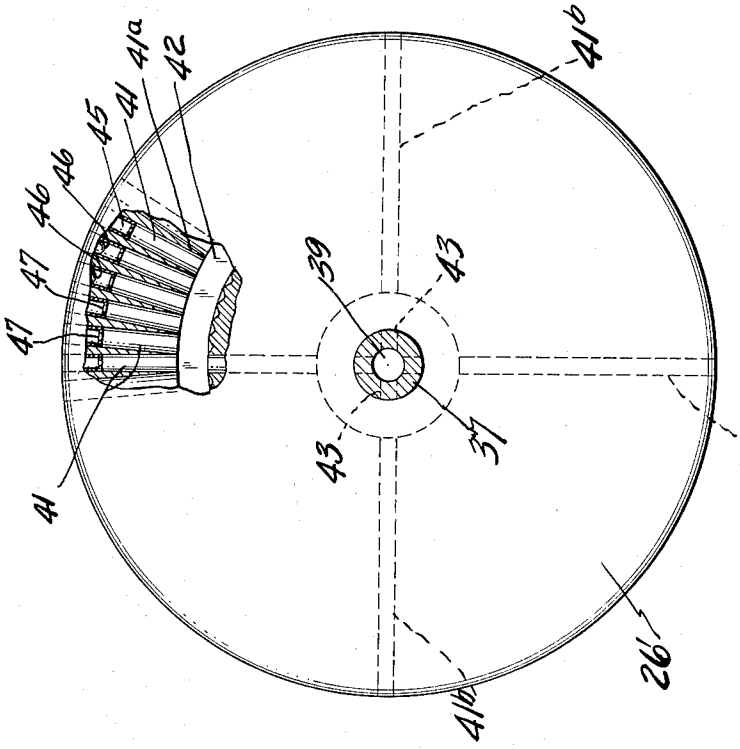


Fig. 6

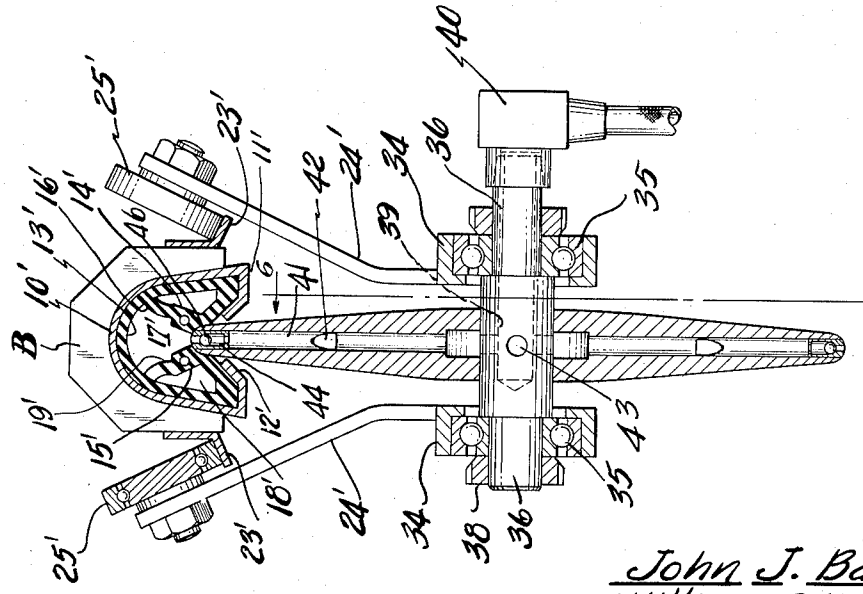


Fig. 5

INVENTORS,
John J. Baker
William G. Benjey.

BY Fairman & Fairman
ATTORNEYS.

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FLUID CONDUCTOR AND TAKE-OFF

John J. Baker and William G. Benjey, Alpena, Mich.

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18 Claims. (Cl. 137—580)

This invention relates to fluid conductors or supply lines and fluid take-off means therefor, and more particularly to a conductor and take-off assembly for supplying pressure fluid to operate mobile and stationary machines of various kinds in factories, machine shops and the like.

One of the prime objects of the invention is to design a fluid pressure conductor and take-off means connected thereto which is movable along the conductor without losing contact with the supply of fluid in the conductor so that pressure-operated machines such as hoists, cranes and the like may be continuously supplied, at various desired locations in the factory without necessitating the provision of a plurality of fluid reservoirs or air compressors, or the employment of long lengths of hose which would obstruct floor space.

A further object of the invention is to provide an assembly of the type described which eliminates the time-consuming and costly necessity of tapping into an existing supply line or conductor at a plurality of points when pressure fluid supplied machines are moved from one location to another in the factory.

Another object of the invention is to design a conductor and fluid take-off assembly of simple and practical construction which is leak-proof, and will not permit the escape and consequent loss of the pressure fluid.

A still further object of the invention is to design a pressure fluid conductor and take-off unit assembly which can be economically manufactured, and readily assembled and installed with a minimum of difficulty and expense.

Briefly, the invention comprises a normally sealed, longitudinally split conductor line formed of a resilient, deformable material in combination with a radially ported, revolvable fluid take-off wheel which is supported so as to be movable along the line, and extends into the line to spread the split wall thereof and provide an outlet opening at any desired point intermediate the length of said line. Certain of the ports in the wheel are in communication with the outlet opening and a passage leading to a delivery line is provided in the stationary hub of the wheel in communication with only these designated ports.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawings:

Fig. 1 is a side elevational view of our novel fluid conductor and take-off assembly.

Fig. 2 is a transverse, sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse, sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary, sectional, plan view of our conductor, showing also the ported wheel, the wheel supporting hanger members, track and wheel being omitted.

Fig. 5 is a transverse sectional view illustrating a modified embodiment of our invention.

Fig. 6 is a side elevational view of the take-off wheel only, a portion thereof being broken away to show the novel arrangement of the radially extending passages in the take-off wheel.

Referring now more particularly to the accompanying drawings wherein we have shown the preferred embodiments of our invention, a letter C generally indicates our conductor which can be employed to supply any liquid or gaseous pressure medium as desired and includes an inverted, U-shaped, metallic conduit or casing **10**, the free edges of which are turned inwardly as at **11** and thence terminate in spaced-apart, upwardly angled portions as at **12**.

A resilient, deformable, extruded rubber liner **13** is fitted in the conduit **10** in any suitable manner, the liner having a longitudinally split lower wall including upwardly disposed, angled, converging portions **14**, which extend beyond the free edges of the conduit **10** and are provided with normally abutting, enlarged sections **15** (see Fig. 2 of the drawings). Integral partitioning ribs **16** join the outer wall of the liner **13** and the outer corners of the substantially rectangular-shaped portions **15** to define a main air conducting passage **17** and side pressure equalizing chambers **18**, the chambers **18** communicating with the passage **17** through ports **19** provided at longitudinally spaced intervals in the ribs **15**. When the liner **13** is extruded, the sections **15** may be separated by the extrusion die or may, of course, be formed as one-piece and thence are later split to form the separable sealing sections. It is to be observed that a split depending bead **20** is provided as shown to increase the area of the sealing surfaces, and longitudinal openings **21** are provided in the sections **15**. Plugs **22** are provided for the ends of the conduit **10** and an air intake line I leads from a source of compressed air or other pressure fluid supply through the conduit into the chamber **17** as shown.

Provided at longitudinally spaced intervals on the conduit **10** are reinforcing plates or brackets B which prevent the conduit from spreading under the pressure of the fluid carried thereby and which may be employed to support the conductor **10** in a building in any suitable manner. Mounted on the sides of the brackets **22** are tracks **23**, the angularly disposed legs **23a** of which are slightly inclined as clearly shown in Fig. 3 of the drawings. Hanger members **24** provided with rollers **25** on their upper ends, ride on the tracks **23**, and support a take-off wheel **26** as will now be further described.

As clearly shown in Fig. 3 of the drawings, the wheel **26**, which is preferably of metallic construction, is removably mounted on a hub **27** formed with reduced ends **28** to which the lower end of the hangers **24** are connected, and nuts **29** are threaded on the ends of the hub **27** as shown, an outlet hose **30** leading from one end of the hub **27**, all as shown in Figs. 1 and 3 of the drawings.

The wheel **26** is of sufficient diameter to extend into the conduit **10** and spread the sections **15** of the liner **13** as shown in Figs. 3 and 4 of the drawings, so that certain of the radially extending passages **31**, provided in the wheel **26**, are in communication with the supply chamber **17**. The hub **27** of the wheel **26** is ported as at **32** to permit the passage of air from only those passages **31** which are in communication with the chamber **17** to the bore **33** which leads out the one end of the hub to the outlet line **30**.

In operation, it will be seen (see Fig. 4) that a limited section of the peripheral outer rim of the wheel **26** extends into the casing **10** so that a limited number of passages **31** are open to the passage **17** in the conduit **10**,

the lips of the conduit yieldingly and tightly engaging the outer periphery of the wheel to form a leak-proof joint therewith, permitting air to freely flow through the continuous passages formed by these passages **31**, the port **32**, and the bore **33** to the outlet hose **30** without leaking to atmosphere. The pressure equalizing chambers **18** permit the remainder of the lining **13** to remain closed even under pressures of over 150 p. s. i. The ports **19** through the ribs **16** are virtually closed at the point where the lining is deformed by the wheel **26** as will be seen from an inspection of Fig. 3 of the drawings.

It is to be understood that a plurality of the take-off units, which we have described, may be employed on a given conductor line **10** and as various pressure fluid powered machines are moved to various locations, the take-off units are moved on the line **10** to supply them. Further, of course, it may be desirable in some instances to provide a T or other multiple connector fitting in place of the fitting **30***a* which is connected to the hub **27** to supply several machines from a single take-off unit.

In Figs. 5 and 6 we have shown a modified embodiment of my invention in which the construction of the take-off wheel is different from that of the wheel illustrated in Figs. 1–4. The longitudinally extending conduit **10′** as before includes portions **11′** and **12′** and the liner **13′** includes portions **14′**, **15′**, and **16′** to again form a main air conducting passage **17′** and side pressure equalizing chambers **18′**. Ports **19′** connect the chambers **17′** and **18′** and plugs (not shown), of course, are provided for the ends of the conduit and a pressure fluid supply line (not shown) similarly leads into the chamber **17′**.

Reinforcing plates B′ on the conduit **10′** support tracks **23′** which support the hangers **24′**, the latter members including rollers **25′** which ride on the tracks **23′**. The lower ends of the hangers **24′** are formed with bearing housings **34** in which are roller bearings **35** for rotatably supporting the reduced ends **36** of the hub shaft **37** of the take-off wheel **26′**. Nuts **38** secure the bearings **35** in position and as will be seen, the hub **37** rotates with the wheel **26′** and delivers the pressure medium through a bored passage **39** to a stationary fitting **40** which is connected to a supply hose (not shown). The wheel **26′**, of course, is of sufficient diameter to extend into the conduit **10′** and spread the sections **15′** of the liner **13′** so that certain of the radially extending passages **41** provided in the wheel **26′** are in communication with the supply chamber **17′**. The passages **41** are drilled in sufficient proximity one to the other that they intersect as shown at **41***a* and at spaced intervals a passage **41** extends beyond the point of intersection as at **41***b* into communication with an enlarged annular header chamber **42** provided in the wheel. From the chamber **42** ports **43** extend through the hub **37** into the bored passage **39**. As will be seen, check valve fittings **44** are provided in the outer end of each passage **41** and these fittings include ball chambers **45** with balls **46** therein adapted to close the valve ports **47**.

In operation, only a limited portion of the peripheral outer rim of the wheel **26′** extends into the casing **10′** so that only a limited number of passages **41** communicate with the supply passage **17′** in the casing. The pressure of the fluid in the passage **17′** forces the balls **46** in the fittings **44** in these passages off their seats to permit the passage of the fluid through the valve ports **47** into these passages, while the remaining passages **41** not in communication with the passage **17′** remain tightly sealed. Since all of the passages **41** intersect the pressure fluid proceeding in through the passages **41** which are in contact with the passage **17′**, forces the balls **46** in the check valves **44** in the other passages against their seats. Thus, there is no possibility of the pressure fluid leaking to atmosphere, the pressure fluid finding its way through the annular passage **41***a* formed by the intersection of the passages **41** to the portions **41***b* of certain passages **41**, thence to the chamber **42**, the ports **43**, and the passage **39** to the joint or fitting **40**. The one end of the hub shaft **37** extends into the fitting **40** and is rotatable therein so that the fitting may remain stationary when the wheel rotates as it is moved to a new location on the conduit **10′**.

It will thus be apparent that we have perfected a pressure fluid conductor and take-off unit assembly of novel and practical character which permits a pressure fluid powered machine to be moved to various locations in a factory or other building without losing contact with its supply source.

It is to be understood that the instant descriptive matter is intended as illustrative of the principles of the invention rather than limiting, and that various equivalent changes may be made in the various component elements of the device without departing from the spirit of the invention or the scope of the appended claims.

For example, when the term split or longitudinally split is employed in the claims the term does not necessarily mean a line which is split from one end thereof to the other, but may also mean a line which has one or more splits therein at any location or locations in its length. Further, the term fluid has reference to any liquid, gas, or material in a fluid state.

What we claim is:

1. In a fluid conductor and take-off unit assembly, a conductor line having a normally sealed, longitudinally split wall formed of a resilient material, and fluid take-off means movable along said line extending into said wall at any selected point in the length of the split portion thereof to spread said line and form an outlet opening at said point, said means covering the area around said opening to prevent the escape of fluid to the atmosphere.

2. In a fluid conductor and take-off unit assembly, a conductor line having a normally sealed, longitudinally split wall formed of a resilient material, a fluid take-off wheel including radially extending ports open to the periphery thereof extending into said wall at a point in the length of the split portion thereof to spread the respective sections of the wall and form an outlet opening at said point in communication with certain of said ports, said wheel being of sufficient width and diameter so that the peripheral surface in contact with the line seals the area surrounding said opening to prevent the escape of fluid to atmosphere, and means connected to the ports in communication with said opening to deliver the fluid therefrom.

3. The combination defined in claim 2 in which longitudinally disposed track means is provided on said line and said wheel is supported therefrom.

4. In a pressure fluid conductor and take-off unit assembly, a hollow conductor line including a normally sealed, longitudinally split wall formed of a resilient material, said conductor being longitudinally partitioned to define a central fluid supply chamber, and pressure equalizing chambers adjacent the sides thereof, means for admitting pressure fluid to said chambers, said wall being shaped so that the latter chambers are at least partially opposite the abutting surfaces of said wall so that the fluid pressure in the central chamber tending to spread the split portions is balanced by the fluid pressure in the equalizing chambers tending to retain them in tightly sealed condition, and fluid take-off means extending into said wall at any point in the length of the split portion thereof to spread the split portions of said wall and form an outlet opening at said point communicating with said supply chamber.

5. In a pressure fluid conductor and take-off unit assembly, a conductor line including a normally sealed, converging wall formed of a resilient material, longitudinally split at the convergence of the respective converging portions thereof, said conductor having partitions connecting the opposite walls of said conductor and the respective portions of said converging wall to define a central pressure fluid supply chamber, and pressure equalizing

chambers adjacent the sides thereof within said conductor, the latter chambers being disposed at least partially opposite the normally abutting split portions of said wall, said partitions having ports connecting said central chamber and the pressure equalizing chambers so that fluid pressure in the central chamber tending to spread the split portion is offset by the pressure in the equalizing chambers which tends to retain them in tightly sealed condition, and fluid take-off means extending into said line at a selected point in the length of the split portion thereof to spread said line and form an outlet opening at said point.

6. In a pressure fluid conductor and take-off unit assembly, a conduit substantially U-shaped in cross section, a lining formed of a resilient, deformable material for said conduit, said lining including a longitudinally split, normally sealed wall spanning the open side of said conduit, said lining being longitudinally partitioned to define a central fluid supply chamber, and pressure equalizing chambers adjacent the sides thereof, means for admitting pressure fluid to said fluid supply chamber and from said supply chamber to said pressure equalizing chambers, said wall being shaped so that the latter chambers are at least partially opposite the abutting surfaces of said split wall so that the fluid pressure in said supply chamber tending to spread the split portions is offset by the fluid pressure in the equalizing chambers tending to retain them in tightly sealed condition, and a fluid take-off wheel movable along said conduit, said wheel having a portion of its periphery extending into the open side of said conduit to spread the split portions of said lining and form an outlet opening communicating with said supply chamber, said wheel being formed with radially extending passages open to the periphery thereof to deliver pressure fluid from said opening, and means communicating with said passages to deliver air therefrom.

7. The combination defined in claim 6 in which said wheel is revolvably mounted on a stationary hub, said means communicating with said passages and including a passage in said hub in communication with only the radial passages in said wheel which are in communication with said opening, and a supply hose connected to the passage in said hub.

8. The combination defined in claim 7 in which tracks are provided on the side walls of said conduit, and spaced-apart, depending hanger members movable along said tracks to support the hub of said wheel, said hanger members having rollers guided on said tracks.

9. In a fluid conductor and take-off unit assembly, a conductor line including a normally sealed, longitudinally split under wall formed of a resilient, deformable material, longitudinally disposed track members including laterally extending, downwardly inclined legs supported on opposite sides of said conductor, inwardly inclined, depending hanger members supported by said tracks, said hanger members having rollers journaled thereon guiding on said tracks for movement therealong, a fluid take-off wheel revolvably supported under said conductor by said hanger members, a portion of the periphery of said wheel extending into said line at a point intermediate the length thereof to spread the line and form an outlet opening at said point, spaced-apart ports in said wheel open to the periphery thereof to communicate with the opening thus provided, said wheel being of sufficient width and diameter so that the peripheral surface in contact with the the line covers the area surrounding said opening to prevent the escape of said fluid to atmosphere, and means connected only to the ports in said wheel in communication with said opening to deliver fluid therefrom.

10. The combination defined in claim 9 in which said means includes a stationary hub for said wheel, said hub having a vertically disposed passage leading out of said hub in the plane of said ports, a bore in communication therewith opening out of one end of the hub, and a take-off line in communication with said bore secured to said end of the hub.

11. In a pressure fluid conductor and take-off unit assembly, a conduit substantially U-shaped in cross section open along the lower face thereof, a lining formed of a resilient, deformable material for said conduit, said lining including a normally closed lower wall spanning the lower face of said conduit formed of converging wall portions enlarged and vertically split along their line of convergence, longitudinally disposed, integral partitions within said lining connecting the respective split portions of said wall with the opposite wall of said lining to define a pressure fluid supply chamber above said split portions and pressure equalizing chambers adjacent said supply chamber on the sides thereof, means for admitting pressure fluid to the supply chamber and from the supply chamber to said pressure equalizing chambers, the latter chambers being disposed at least partially opposite the split, normally abutting portions of said wall so that the fluid pressure in said supply chamber tending to spread said abutting portions is balanced by the fluid pressure in the equalizing chambers tending to hold the portions in tightly sealed abutting relation, laterally extending tracks supported on opposite sides of said conduit, spaced depending hanger members including rollers riding on said tracks and movable therealong, a stationary hub supported by said hanger members under said conduit, a fluid take-off wheel revolvably journaled on said hub with a portion of the periphery thereof extending into said conduit to spread the abutting portions of said lining to form a restricted outlet opening for said supply chamber, said wheel having radially extending ports through said wheel in the plane thereof open to the periphery thereof, said hub having a passage open only to the ports in communication with said outlet opening, and a delivery hose communicating with the passage in said hub.

12. In a fluid conductor and take-off assembly, a normally sealed, longitudinally split conductor line formed of a resilient, deformable material, a revolvable fluid take-off wheel including radially extending, interconnected ports open to the periphery thereof extending into said line at a point interjacent the ends thereof to spread the line and form an outlet opening at said point in communication with certain of said ports, said wheel being of sufficient width and diameter so that the peripheral surface in contact with the line seals the area surrounding said opening to prevent the escape of fluid to atmosphere, valve means in the outer portions of said ports normally closing said ports but opened by the pressure fluid in said line to permit passage of fluid into the ports in communication with said outlet opening, and means for receiving the fluid from said ports and delivering it from said wheel.

13. The combination defined in claim 12 in which said line is longitudinally partitioned to define a central fluid supply chamber and pressure equalizing chambers adjacent the sides thereof, said wheel extending into communication with said central chamber.

14. The combination defined in claim 12 in which a hub for said wheel projects laterally therefrom and is fixed thereto, a passage in said hub is in communication with said ports, and one end of said hub is rotatable in a fitting communicating with the passage in said hub.

15. The combination defined in claim 12 in which said ports are intersecting and an annular header chamber is provided in said wheel, certain of said passages extending into communication with said header chamber, said means for receiving the fluid from the ports including also a hub for the wheel with a passage therein in communication with said header chamber.

16. The combination defined in claim 2 in which tracks are provided on said conductor line and a laterally projecting hub is provided for said wheel, hanger members including rollers riding on said tracks rotatably supporting said hub.

17. In a pressure fluid conductor and take-off unit as-

sembly, a conductor line having a wall with at least a portion thereof formed of a resilient material, the said portion thereof being split, and fluid take-off means movable on said line extending into said portion of the wall at any selected point in the length of the split portion thereof to spread the respective sections of said portion of the wall and form an outlet opening at said point, said resilient wall closing tightly against the portion of said take-off means which extends into said wall to prevent the escape of pressure fluid to atmosphere.

18. In a fluid conductor and take-off unit assembly, a conductor line, a fluid take-off wheel including radially extending ports open to the periphery thereof rotatably movable along said line with its peripheral surface in engagement with the line, means for passing fluid in said

conductor into at least one port which opens to the surface of said wheel which is in engagement with the line at points along the line without permitting the escape of any fluid to atmosphere, and means in communication with only the ports in the engaged peripheral surface to deliver the fluid therefrom.

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