

Description

The present invention relates to restrictor for use in a system for fluid flow control utilising a restrictor valve which is adapted for insertion near one or more outlet orifices in a fluid supply network thereby enabling control of the discharge of the fluid at the outlet orifice or orifices.

In the past numerous problems have existed in water supply reticulation networks relating to unevenness and irregularity of water flow at outlets in the system. The problems have hitherto previously been evident in small, domestic water reticulation systems and also in larger systems where an array of outlets are disposed in series whereby one outlet in the array is proximate to the water source and subsequent outlets in the array are increasingly more distant from the water source. A pressure gradient is normally present along outlets in a series configuration.

This phenomenon of pressure irregularity is common where the array of outlets are vertically separated relative to the water source, such as where an elevated storage tank supplies water by gravity, or where the outlets are substantially horizontally separated from a source such as a mains pressure water storage tank.

The problems of uneven pressure have originated in a number of ways; (ignoring for the purposes of this description distribution pipeline sizes, frictional effects between the water and the pipe wall).

Firstly, when water emanates from a pressurised source whether under gravity or under mechanically generated pressure such as mains pressure and when that water must feed a multiplicity of outlets whether in series or in parallel for the same source pressure, the outlets at the extremity of the supply network, when all or some of the outlets are in operation, suffer a dramatic reduction in pressure as the water attempts to escape through the upstream outlets before reaching the downstream outlets. A variation in pressure at each outlet will occur over the length of the discharge line to which the outlets are connected.

The same phenomenon will occur whether the outlets are disposed substantially horizontally to the supply source or substantially vertically relative to the supply source.

A dramatic reduction can occur where mains pressure must reach substantial heights above the ground. This can occur in home units or multi storey dwellings when outlets are situated on each floor. The outlets on the lower floors tend to deprive the outlets on the upper floors of fluid, creating the uneven pressure distribution.

To a certain extent, especially in showers, the problem is ameliorated by the restricting effect of the conventional shower roses but it is not regulated to an acceptable level.

Where a water reticulation system has showers which have water mixing fittings there is usually a variation in the pressure between the cold water supply and hot water supply. This can occur if the cold water supply is mains pressure and the hot water supply is gravity fed for instance. It can also occur when losses occur in a mains pressure hot water system.

This results in a build up in the mixing riser of back pressure in the line of highest pressure.

When the flow is restricted at the shower head the higher pressure takes over making the combined mixed flow from the shower head difficult to properly control. When there is a drop in hot water pressure the cold water pressure may force the hot water valve cock jumper valve closed or cause a back surge of cold water through the hot water pipe. The reverse occurs if the hot water pressure is the greater.

A further problem that exists in water reticulation systems occurs when opening and closing of valve cocks in the reticulation system causes pressure fluctuations in other outlets in the system. In domestic reticulation systems this phenomenon is noticeable when a person showering may detect a reduction either in temperature or pressure or both, as a result of the activation of another valve cock in the same reticulation system elsewhere in the house.

GB 1 105 795 describes a complex pressure responsive throttling device for controlling the maximum flow rate of water from a multi-outlet system to take account of pressure differences between different parts of the system and at different loads on the system. The device consists of a restrictor at each outlet the flow passages of which are more or less blocked by a valve acted upon by the water pressure immediately upstream of the outlet.

According to the invention there is provided a restrictor for the restriction of flow at an outlet or outlets in a fluid supply line or network of lines, characterised by a substantially annular disc having at least one hole therethrough and a conical portion the top of which is connected to the disc such that the central axis of the conical portion and disc are in axial alignment.

The insertion of the restrictors in the network has the effect of causing even pressure distribution at each orifice and almost complete elimination of the pressure gradient which normally occurs when unrestricted outlets are in series from a supply source.

The orifice discharge pressures are, by the insertion of the restricting valve at each orifice in the network set so that they cannot exceed a predetermined maximum and when that maximum is achieved at one discharge orifice, other discharge orifices in series with the first mentioned orifice do not exceed the predetermined

maximum pressure irrespective of the proximity of an orifice in the network relative to the fluid source where the supply pressure is usually highest.

The restrictor is preferably inserted within control valve cocks in the reticulation network and in particular in valve seats in the control valve cocks.

In preferred embodiments, the restrictor is of the type adapted for insertion in a control valve or valves in a fluid supply line or lines which together form a fluid supply network, between a fluid source and a fluid outlet, the restrictor being such that when a restrictor is inserted into each control valve, the fluid flow in the or each supply line downstream of the control valves and at the outlets the supply line are controlled such that a predetermined maximum discharge rate is maintained at each outlet, the maximum discharge pressure being below the available maximum fluid supply pressure when the control valve or valves are fully opened and of the restrictor valve.

The fluid supply network may comprise a main feeder line and a plurality of draw off lines from the main feeder line each terminating in an outlet orifice branching from the feeder line, which lines disposed in a series of parallel configuration, with each control valve being located upstream of the outlet orifices but downstream of the main feeder line.

It is an advantage of the present invention that substantial savings in water consumption and energy bills can be made when the restricting valve is installed at or near outlets in a reticulation system.

The invention will now be described in detail according to a preferred but non limiting embodiment wherein:

Fig. 1 shows the restricting device according to the preferred embodiment;

Fig. 2 shows a cross-sectional view of the restricting valve according to Fig. 1 inserted in a valve cock seat; Fig. 3 shows the restricting valve according to an alternative configuration adapted for threadable engagement with the valve seat of a valve cock;

Fig. 4 shows the restricting valve according to Fig. 2 inserted in a valve cock seat which is adapted for threadable insertion into a valve cock assembly; and

Fig. 5 shows graphically the test results from installation of a restricting valve in a single shower network.

Referring to Fig. 1 there is shown a restricting valve 1 according to a preferred embodiment and which is adapted for insertion into a valve cock or cocks located in a fluid flow reticulation network.

The restricting valve 1 comprises an annular disc 2 and a diametrically smaller truncated conical portion 3 which attaches to the disc 2. The annular disc 2 ideally has four holes 4 each of which are of the same diameter. Also, the holes 4 are ideally spaced equidistant from the central axis of the restricting valve. Fig. 1 shows the preferred restricting valve from a number of different views to enable a full perception of its shape and configuration.

Field tests have shown that the shape and configuration of the restricting valve as depicted in fig 1 is functionally efficient.

Fig. 2 shows the restricting valve of fig. 1 inserted in a valve cock seat 5. The annular disc 2 of the restrictor 1 engages an annular recess 6 at the base of the valve seat 5. When in use, the seat 5 is located in a conventional valve cock which is in turn located in a pipe network preferably in the proximity of a fluid outlet orifice.

The seat 5 is fitted by means of the thread 8 to a conventional tap or similar valve arrangement (not shown).

In use fluid from feed pipes passes axially along the passage 7 via holes 4 in restricting valve 1. The presence of the valve 1 inhibits the flow of the fluid such that irrespective of the supply pressure on the upstream side of the restricting valve the pressure on the downstream side of the restricting valve can be restricted so as not to exceed a predetermined maximum value. This effect is repeated at each outlet irrespective of the number of additional outlets which may be present in the reticulation network. The pressure at each outlet can be made the same according the type of restricting valve which is inserted near an outlet. It can also be varied by changing the configuration of the valve at different outlets according to requirements.

Figure 3 shows the restricting valve according to an alternative embodiment wherein the annular disc 2 is adapted with a thread 9 for threadable insertion into a valve seat 10 as shown in figure 4. In the embodiment of figure 4 the valve seat 10 is shown threadably adapted to a conventional valve cock 46.

In operation this restricting valve can be screwed into the threaded base of the valve seat 10. Fluid passes through the holes 11 in the annular disc 12 of the restricting valve and then passes between cone 13 and the inner wall of the valve seat 10 via passage 14. The holes 11 act to restrict fluid flow and cause a consequent decrease in pressure on the downstream side of the restricting valve.

At a given flow rate there is a decrease in pressure between the holes 11 and the portion of the fluid flow passage designated with numeral 15.

At position 15 the velocity of the fluid is reduced.

The restricting valve of the present invention has been successfully tested and used to restrict flow in several fittings in series and also to restrict flow and eliminate undesirable back pressure in conventional fluid mixer fittings.

Where the discharge rate of fluid through the valve cocks in a water system is in excess of the required flow rate, this causes a distinct pressure drop across the system especially during peak periods when several fittings are in and out of use.

Fig. 5 depicts graphically the test results from experimental insertion of a restricting valve in a shower mixer system comprising one outlet.

The graph shows the dramatic decrease in back pressure for an increase in flow rate.

As can be seen from the graph, the installation of the restricting valve of the present invention results in the almost complete elimination of back pressure in the mixing riser which would occur in the riser otherwise.

Another advantage of the restricting valve is that it enables a set maximum volume of mixed water to flow through the outlet. The amount of flow can be regulated when a flow is desired below the maximum volume.

Known restricting devices such as those which are placed at the outlet on a shower fitting, for instance, do not allow controlled adjustment of the flow especially when control valve cocks nearest the fluid supply are fully open.

The portion of the graph designated A indicates the effect of a restriction caused by a shower head.

The portion marked B indicates the dramatically decreased back pressure with the installation of a restricting valve in the valve cock body according to the present invention.

The valves have been tested on multiple series shower fittings with the result being that there is a decrease in back pressure in each mixer fitting.

Also, the pressure gradient across the series of showers is shown to be dramatically decreased.

When the valves are installed in hot water valve cocks the result is that a constant predetermined flow of hot water can be achieved thus resulting in considerable energy cost savings. This is balanced by a variable flow of cold water through the valve cocks.

Thus, in one application, the valve effectively places a governor on hot water usage, which tests have shown, results in these considerable energy cost savings.

Field tests have shown that when a series of restricting valves are installed in a water reticulation network water savings of at least 22% have been recorded and savings of at least 28% have been recorded for energy usage after variables have been taken into account such as temperature of the water and number of people using the system at any particular time.

In the fluid control system with restrictors installed near various outlets a fluid end energy saving is made as each outlet is restricted to a maximum pressure and flow rate which is below the delivery pressure in the lines which feed to the various orifices.

A relatively constant pressure and temperature is therefore maintained at each outlet when other taps are turned on. Furthermore, back pressure at the taps or valve cocks is eliminated due to the control of the volume of fluid at mixing sets.

It has been found that performance characteristics vary according to the particular shape and configuration of the restricting valves installed in a network.

The following results were achieved using three different restrictors each of different diameters.

40	5	<u>STATIC PRESSURE KPa</u>	<u>FLOW RATE</u>	<u>PRESSURE IN RESTRICTOR REGION</u>
	1	600	3 L/M	530
	2	600	4.25 L/M	420
45	3	600	6.5 L/M	180

50 Claims

1. A restrictor (1) for the restriction of flow at an outlet or outlets in a fluid supply line or network of lines, characterised by a substantially annular disc (2) having at least one hole (4) therethrough and a conical portion (3) the top of which is connected to the disc such that the central axis of the conical portion and disc are in axial alignment.

2. A restrictor (1) according to claim 1 in which the largest diameter of the conical portion (3) is smaller than the diameter of the annular disc (2), the conical portion being adapted to allow passage of fluid about its periphery.



Where the discharge rate of fluid through the valve cocks in a water system is in excess of the required flow rate, this causes a distinct pressure drop across the system especially during peak periods when several fittings are in and out of use.

Fig. 5 depicts graphically the test results from experimental insertion of a restricting valve in a shower mixer system comprising one outlet.

The graph shows the dramatic decrease in back pressure for an increase in flow rate.

As can be seen from the graph, the installation of the restricting valve of the present invention results in the almost complete elimination of back pressure in the mixing riser which would occur in the riser otherwise.

Another advantage of the restricting valve is that it enables a set maximum volume of mixed water to flow through the outlet. The amount of flow can be regulated when a flow is desired below the maximum volume.

Known restricting devices such as those which are placed at the outlet on a shower fitting, for instance, do not allow controlled adjustment of the flow especially when control valve cocks nearest the fluid supply are fully open.

The portion of the graph designated A indicates the effect of a restriction caused by a shower head.

The portion marked B indicates the dramatically decreased back pressure with the installation of a restricting valve in the valve cock body according to the present invention.

The valves have been tested on multiple series shower fittings with the result being that there is a decrease in back pressure in each mixer fitting.

Also, the pressure gradient across the series of showers is shown to be dramatically decreased.

When the valves are installed in hot water valve cocks the result is that a constant predetermined flow of hot water can be achieved thus resulting in considerable energy cost savings. This is balanced by a variable flow of cold water through the valve cocks.

Thus, in one application, the valve effectively places a governor on hot water usage, which tests have shown, results in these considerable energy cost savings.

Field tests have shown that when a series of restricting valves are installed in a water reticulation network water savings of at least 22% have been recorded and savings of at least 28% have been recorded for energy usage after variables have been taken into account such as temperature of the water and number of people using the system at any particular time.

In the fluid control system with restrictors installed near various outlets a fluid end energy saving is made as each outlet is restricted to a maximum pressure and flow rate which is below the delivery pressure in the lines which feed to the various orifices.

A relatively constant pressure and temperature is therefore maintained at each outlet when other taps are turned on. Furthermore, back pressure at the taps or valve cocks is eliminated due to the control of the volume of fluid at mixing sets.

It has been found that performance characteristics vary according to the particular shape and configuration of the restricting valves installed in a network.

The following results were achieved using three different restrictors each of different diameters.

	<u>STATIC PRESSURE KPa</u>	<u>FLOW RATE</u>	<u>PRESSURE IN RESTRICTOR REGION</u>
1	600	3L/M	530
2	600	4.25L/M	420
3	600	6.5 L/M	180

Claims

1. A restrictor (1) for the restriction of flow at an outlet or outlets in a fluid supply line or network of lines, characterised by a substantially annular disc (2) having at least one hole (4) therethrough and a conical portion (3) the top of which is connected to the disc such that the central axis of the conical portion and disc are in axial alignment.

2. A restrictor (1) according to claim 1 in which the largest diameter of the conical portion (3) is smaller than the diameter of the annular disc (2), the conical portion being adapted to allow passage of fluid about its periphery.



3. A restrictor (1) according to claim 1 or 2 of the type adapted for insertion in a control valve or valves in a fluid supply line or lines which together form a fluid supply network, between a fluid source and a fluid outlet, the restrictor being such that when a restrictor is inserted into each control valve, the fluid flow in the or each supply line downstream of the control valves and at the outlets of the or each supply line are controlled such that a predetermined maximum discharge rate is maintained at each outlet, the maximum discharge pressure being below the available maximum fluid supply pressure when the control valve or valves are fully opened.
4. A restrictor (1) according to any preceding claim in which the annular disc (2) has at least four holes (4) therethrough for the passage of a fluid configured so as to regulate fluid flow to the predetermined maximum discharge rate.
5. A restrictor (1) according to claim 4 in which the central axis of the conical portion (3) and the central axis of the disc (2) are in alignment when the top of the conical portion is connected to the disc.
6. A restrictor (1) according to claim 5 in which the largest diameter of the conical portion (3) is smaller than the diameter of the annular disc (2), the conical portion being adapted to allow passage of fluid about its periphery and between its periphery and an inner wall of the control valve.
7. A restrictor (1) according to claim 6 in which the conical portion (3) is so adapted with a conical recess.
8. A restrictor (1) according to claim 7 in which each control valve has at least a movable spindle there within which urges a sealing means into sealing engagement with a sealing seat when the control valve is closed and in which the restrictor (1) locates in or on the sealing seat of the control valve.
9. A restrictor (1) according to claim 8 in which the annular disc (2) is adapted with chamfered circumferential edges to enable fitting with a passage in the sealing seat.
10. A restrictor (1) according to claim 8 or 9 in which the valve is threadably inserted into the sealing seat.
11. A restrictor (1) according to claim 8, 9 or 10 in which the valve is slidably inserted into a passage in the sealing seat.
12. A restrictor (1) according to any preceding claim in which the fluid supply network comprises
- a main feeder line
- a plurality of draw off lines from the main feeder line each terminating in an outlet orifice branching from the feeder line, which lines disposed in a series of parallel configuration, with each control valve being located upstream of the outlet orifices but downstream of the main feeder line.
13. A restrictor (1) according to claim 10 in which there is at least a second main feeder line also having draw off lines, the second or further main feeder lines being substantially in parallel with the first feeder line.

Patentansprüche

1. Drosseleinrichtung (1) zur Beschränkung des Durchflusses an einem Auslaß oder an Auslässen einer Fluidzufuhrleitung oder einem Netzwerk von Leitungen, gekennzeichnet durch eine im wesentlichen ringförmige Scheibe (2) mit wenigstens einer Durchgangsbohrung (4) und einem konischen Abschnitt (3), dessen Oberseite so mit der Scheibe verbunden ist, daß die Mittelachsen des konischen Abschnitts und der Scheibe axial aufeinander ausgerichtet sind.
2. Drosseleinrichtung (1) nach Anspruch 1, dadurch gekennzeichnet, daß der größte Durchmesser des konischen Abschnitts (3) kleiner ist als der Durchmesser der ringförmigen Scheibe (2), so daß der konische Abschnitt den Durchfluß des Fluids im seinen Rand zuläßt.
3. Drosseleinrichtung (1) nach Anspruch 1 oder 2 zum Einsetzen in ein Steuerventil oder Steuerventile in einer Fluidzufuhrleitung oder Leitungen, die gemeinsam ein Fluidzufuhrnetzwerk bilden, zwischen eine Fluidquelle und einem Fluidauslaß, dadurch gekennzeichnet, daß die Drosseleinrichtung derart ausgebildet ist, daß beim Einsetzen einer Drosseleinrichtung in jedes Steuerventil der Fluidstrom in dem oder jeder Zufuhrleitung stromabwärts der Steuerventile und an den Auslässen der oder jeder Zufuhrleitung so gesteuert ist, daß eine vorbestimmte maximale Auslaßmenge an jedem Auslaß beibehalten wird, wobei der maximale Auslaßdruck unter dem verfügbaren maximalen Fluidzufuhrdruck liegt, wenn das Steuerventil oder die Ventile vollständig geöffnet sind.
4. Drosseleinrichtung (1) nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die ringförmige Scheibe (2) mindestens vier Durchgangsbohrungen (4) für den Durchlaß eines Fluids aufweist, die so angeordnet sind, daß der Fluidstrom auf die vorbestimmte maximale Auslaßmenge eingestellt wird.
5. Drosseleinrichtung (1) nach Anspruch 4, dadurch gekennzeichnet, daß die Mittelachse des konischen Abschnitts (3) und die Mittelachse der Scheibe (2) aufeinander ausgerichtet sind, wenn die Oberseite des konischen Abschnitts mit der Scheibe verbunden ist.
6. Drosseleinrichtung (1) nach Anspruch 5, dadurch gekennzeichnet, daß der größte Durchmesser des konischen Abschnitts (3) kleiner ist als der Durchmesser der ringförmigen Scheibe (2), so daß der konische Ab-



schnitt den Durchlaß des Fluids um seinen Rand und zwischen seinem Rand und einer Innenwand des Steuerventils zuläßt.

7. Drosseleinrichtung (1) nach Anspruch 6, dadurch gekennzeichnet, daß der konische Abschnitt (3) mit einer konischen Aussparung versehen ist.

8. Drosseleinrichtung (1) nach Anspruch 7, dadurch gekennzeichnet, daß jedes Steuerventil wenigstens eine bewegbare Spindel in sich aufweist, die eine Abdichtungseinrichtung in Dichtungseingriff mit einem Dichtungssitz zwingt, wenn das Steuerventil geschlossen ist, und daß sich die Drosseleinrichtung (1) in oder auf dem Dichtungssitz des Steuerventils befindet.

9. Drosseleinrichtung (1) nach Anspruch 8, dadurch gekennzeichnet, daß die ringförmige Scheibe (2) mit abgeschrägten Umfangsrändern versehen ist, damit sie zu einem Durchlaß des Dichtungssitzes paßt.

10. Drosseleinrichtung (2) nach Anspruch 8 oder 9, dadurch gekennzeichnet, daß das Ventil in den Dichtungssitz eingeschraubt ist.

11. Drosseleinrichtung (1) nach Anspruch 8, 9 oder 10, dadurch gekennzeichnet, daß das Ventil verschieblich in einen Durchlaß des Dichtungssitzes eingesetzt ist.

12. Drosseleinrichtung (1) nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Fluidzufuhrnetzwerk eine Hauptbeschickungsleitung und

mehrere Abzugleitungen von der Hauptbeschickungsleitung aufweist, die jeweils in einem äußeren Auslaß enden, der von der Beschickungslinie abzweigt, wobei die Leitungen in Reihe in einer parallelen Anordnung angeordnet sind, und jedes Steuerventil sich stromaufwärts der Auslaßöffnungen, jedoch stromabwärts der Hauptbeschickungsleitung befindet.

13. Drosseleinrichtung (1) nach Anspruch 10, dadurch gekennzeichnet, daß wenigstens eine zweite Hauptbeschickungsleitung angeordnet ist, die ebenfalls Abzugleitungen hat, wobei die zweite oder weitere Hauptbeschickungsleitungen im wesentlichen parallel zu der ersten Beschickungsleitung verlaufen.

Revendications

1. Etranglement (1) destiné à étrangler un courant à une sortie ou à plusieurs sorties d'une conduite ou d'un réseau de conduites d'alimentation en fluide, caractérisé par un disque (2) sensiblement annulaire percé d'au moins un trou (4), et par une portion conique (3) dont la pointe est fixée au disque de telle manière que l'axe central de la portion conique et celui du disque soient en alignement axial.

2. Etranglement (1) selon la revendication 1, dans lequel le diamètre maximum de la portion conique (3) est plus petit que le diamètre du disque annulaire (2), la portion conique étant adaptée pour permettre un passage du fluide autour de sa périphérie.

3. Etranglement (1) selon la revendication 1 ou 2, du type adapté pour être monté dans un robinet ou des robinets de réglage intercalé(s) dans une conduite ou des conduites d'alimentation en fluide qui forment ensemble un réseau d'alimentation en fluide, entre une source de fluide et une sortie de fluide, l'étranglement étant tel que, lorsqu'un étranglement est monté dans chaque robinet de réglage, le débit de fluide circulant dans la ou chaque conduite d'alimentation, en aval des robinets de réglage et aux sorties de la ou chaque conduite d'alimentation soit réglé de manière à maintenir un débit de sortie maximum prédéterminé à chaque sortie, la pression de sortie maximum étant inférieure à la pression maximum disponible d'alimentation en fluide lorsque le ou les robinets de réglage est ou sont entièrement ouvert(s).

4. Etranglement (1) selon une quelconque des revendications précédentes, dans lequel le disque annulaire (2) est percé d'au moins quatre trous (4) pour le passage d'un fluide, configurés de manière à régler le débit de fluide sur le débit de sortie maximum prédéterminé.

5. Etranglement (1) selon la revendication 4, dans lequel l'axe central de la portion conique (3) et l'axe central du disque (2) sont en alignement lorsque la pointe de la portion conique est fixée au disque.

6. Etranglement (1) selon la revendication 5, dans lequel le diamètre maximum de la portion conique (3) est plus petit que le diamètre du disque annulaire (2), la portion conique étant adaptée pour permettre le passage du fluide autour de sa périphérie et entre sa périphérie et une paroi intérieure du robinet de réglage.

7. Etranglement (1) selon la revendication 6, dans lequel la portion conique (3) est adaptée de cette façon avec un évidement conique.

8. Etranglement (1) selon la revendication 7, dans lequel chaque robinet de réglage possède intérieurement au moins une tige mobile qui tend à mettre un moyen obturateur en contact de joint étanche avec un siège d'obturateur lorsque le robinet de réglage est fermé, et dans lequel l'étranglement (1) se trouve dans ou sur le siège d'obturateur du robinet de réglage.

9. Etranglement selon la revendication 8, dans lequel le disque annulaire (2) est adapté, par des bords circumférentiels chanfreinés, pour pouvoir se monter dans un passage ménagé dans le siège d'obturateur.



10. Etranglement (1) selon la revendication 8 ou 9, dans lequel le robinet est vissé dans le siège d'obturateur.

11. Etranglement (1) selon la revendication 8, 9 ou 10, dans lequel le robinet est monté coulissant dans un passage ménagé dans le siège d'obturateur.

5 12. Etranglement (1) selon une quelconque des revendications précédentes, dans lequel le réseau d'alimentation en fluide comprend :

une conduite collectrice principale,

une pluralité de conduites de piquage partant de la conduite collectrice principale, dont chacune se termine par un orifice de sortie partant de la conduite collectrice, lesquelles conduites sont disposées en une série dans une configuration parallèle, chaque robinet de réglage étant placé en amont des orifices de sortie mais en aval de la conduite collectrice principale.

13. Etranglement (1) selon la revendication 10, dans lequel il y a au moins une seconde conduite collectrice principale présentant des conduites de piquage, la seconde ou les autres conduites collectrice principales étant sensiblement parallèles à la première conduite collectrice principale.