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(54) **Weaving machine with improved feed for the woof.**

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Description

This invention concerns a weaving machine with improved feed for the woof. More particularly, it concerns a feed for the woof thread whereby a stoppage can be avoided through the operation of the feed if a break occurs in the woof thread before the shed or gap is reached.

It is known that the woof thread feed of a weaving machine consists primarily of a number of components, such as thread bobbins, thread extraction machinery and/or unwinding devices and other storage devices, whereby the woof thread follows a determined path from the yarn bobbin until it is offered up to a woof mechanism, by which the yarn is finally fed to the gap. The bobbins used for this purpose are mostly each provided with a reserve bobbin, whereby the end of the thread wound around them is connected to the end of the thread on the active bobbin, such that when the active bobbin is empty, the mechanism automatically switches to the reserve bobbin.

Feed systems are also known (US 4215 728) whereby a number of unwinding bobbins are used which work in turns to achieve a desired effect. This system is used in a woof system in which use is made of several yarns of different types or colours. The system is provided with an electronic thread travel monitoring device between supply bobbin and storing device. In the event of a break of a wift thread, the monitoring device causes the machine to step before the broken thread meters the weaving died.

It is also generally known that the interchanging of the woof yarns to be fed to the gap can be achieved by offering up the or supplying the different yarns alternately to a woof feed device, which can consist of, for example, claw, blower or similar.

A disadvantage of all these known woof yarn feed methods lies in the fact that a break in the thread always requires a stoppage whenever such a break occurs outside the gap, irrespective of whether the break occurs between a bobbin and the woof mechanism or the woof feed device, between a bobbin and an unwinding device, on the upper surface of an unwinding device, between the unwinding device and the woof mechanism or between the two coupled bobbins.

It is clear that such stoppages result in a marked reduction in the output rate of a weaving machine.

In order to provide a solution to the aforementioned disadvantage, the claim presents a feed for the woof thread of a weaving machine whereby a break in the thread before the gap does not result in a stoppage. According to the invention, this is achieved by the features of claim 1 having, in the advantage that the weaving machine can continue to operate without interruption.

The invention provides a separated feed whereby both sections are alternately operational and, in the event of a break in the thread, one of the sections is cut out, while the second section is engaged with doubled operating speed so that the entire weaving machine feed can be ensured by the second section.

With a view to giving a better demonstration of the caracteristics of the invention, a number of preferred embodiments are described below, as examples without any limitative nature, with references to the accompanying drawings, in which:

Figure 1 represents schematically a feed system for woof thread according to the invention, whereby the feed yarn path consists principally of bobbins and a woof mechanism.

Figure 2 represents an alternate of the embodiment according to Figure 1, whereby two sets of two bobbins each are used;

Figure 3 represents an alternate of Figure 1;

Figure 4 represents an alternate of Figure 2;

Figure 5 represents an improved feed system for woof thread according to the invention,

whereby two unwinding devices are involved in the feed system at the same time.

The simplest embodiment of the invention is represented in Figure 1, whereby the woof thread feed system consists primarily of the combination of two components 1 and 2, each of which is formed of a yarn bobbin; a woof mechanism 3; at least one detector 4, located along the yarn path of one of the woof thread 5 or 6, which are formed by the unwinding of bobbins 1 and 2; and a drive unit 7, to which detector 4 is connected, and from which a drive line 8 runs to woof mechanism 3. In addition, the gap 9 of the weaving machine is schematically represented by means of a dotted line.

Woof mechanism 3 is, in this case, a double-action mechanism which can feed either woof thread 5 or woof thread 6 to gap 9, depending on the signal on drive line 8. In a pneumatic loom, for instance, such woof mechanism 3 may consist of two blowers, each to feed one of woof threads 5 and 6 to gap 9. Depending on the signal transmitted to woof mechanism 3 by drive unit 7, either the first or the second of these is powered with compressed air.

According to another embodiment a single blower is used, in which a mechanism or device ensures that the desired woof thread, either 5 or 6, is automatically fed to the entry of the blower.

In claw weaving machines woof mechanism 3 consists principally of a thread presenter of a type already known, which, according to this embodiment, offers up one of the two woof threads, 5 or 6, to the claw, depending on the signal transmitted by drive unit 7.

The operation of the embodiment shown in Figure 1 is as follows.

During the normal weaving process gap 9 is provided with the required woof threads by alternately offering up woof threads 5 and 6 to gap 9 through al-

ternating action of woof mechanism 3. If one of the detectors 4 and 10 detects, on the one hand, a broken thread, or, on the other hand, the running out of one of the yarn bobbins, drive unit 7 makes sure that the full weaving cycle is performed from one only of components 1 and 2, such that the section where the fault or the end of a bobbin is detected is cut out.

In the embodiment according to Figure 2, the feed mechanism for the woof thread according to the claim consists primarily of two components, 11 and 12, which replace one another, a woof mechanism 3, a drive unit 7, at least one of the aforementioned detectors 4 or 10, located along the path of the woof threads 5 or 6. Here, each of components 11 and 12 consists of two bobbins, respectively 13 - 14 and 15 - 16. The ends 17 - 18 of each of the first bobbins, respectively 14 and 15, of components 11 and 12, are connected to the ends 19 - 20 of the thread on the related second bobbins, respectively 13 and 16.

The operation of this system is analogous to that of the embodiment shown in Figure 1, such that all the aforementioned alternates are also possible.

In the embodiment shown in Figure 3, an alternate form of Figure 1 is shown. The references used also agree.

The only difference lies in the detectors 21 and 22, provided on components 1 and 2, which consist of yarn bobbins. The operation of this embodiment of the feed system is almost exactly analogous to that of the embodiments described above. Detectors 21 and 22 offer the advantage of faster detection of the end of a bobbin than, with detectors 4 and 10, with the result that in this event, action is even faster, in other words, it is possible to switch woof mechanism 3 even more quickly.

In Figure 4, an embodiment of the invention is represented which consists primarily of a combination of the embodiments shown in Figures 1 to 3. In addition to the aforementioned detectors 21 and 22, which, in this case, are provided on the first bobbins 14 - 15 of each of components 11 and 12, there are also detectors on bobbins 13 and 16, respectively 23 and 24.

The operation is as follows.

Let us suppose for example that, during the normal weaving process woof thread 5 breaks, then detector 4 transmits a signal to drive unit 7, which then switches woof mechanism 3, via drive line 8, so that from that moment component 11 is cut out and component 12 ensures delivery of the woof thread to gap 9.

As regards complete unwinding of bobbins 13 and 14, it should be noted that, if both detectors 23 and 21 of bobbins 13 and 14 detect an empty bobbin, only the switch from component 11 to 12 is provided. Analogously, if both detectors 22 and 24 of bobbins 15 and 16 detect an empty bobbin, the system switches from 12 to 11.

Of course, all the other aforementioned drive, mechanisms and automatic controls are also applicable to the embodiment shown in Figure 4.

Finally, in Figure 5, an embodiment of the invention is represented schematically, in which, in addition to the aforementioned components 11 and 12, which, as stated, consist of two-bobbin sets, components 25 and 26 are also present. These components 25 and 26 here consist of unwinding devices which are installed in the yarn paths of, on the one hand, woof thread 5 and, on the other hand, woof thread 6. These components can also take another form, and are not necessarily limited to unwinding devices. These other forms are most frequently a runout device or a thread extraction device, which may or may not be combined with a thread storage appliance. The aforementioned detectors 4 and 10 are located along woof threads 5 and 6 in the section located between bobbins 14 - 15 and components or unwinding devices 25 - 26, in order to be able to ascertain a broken thread between unwinding devices 25 - 26 and woof mechanism 3, detectors, 27 and 28, are provided here as well. In addition, supplementary detectors 29 and 30 are provided on unwinding devices 25 and 26, which emit a signal as soon as the number of turns falls below a fixed minimum. In these embodiments, drive unit 7 also provides for cutting in and out of components or unwinding devices 25 and 26, by means of drive lines 31 and 32, along which their operation is controlled.

If the system is operating with alternate feed from unwinding devices 25 and 26, then, in the event of detection of a fault, or equivalent, one of the unwinding devices will be cut out, while the remaining device is switched to double the number of revolutions.

It is clear that the system can operate with more than two feed systems per type of thread. In the case of three systems, for example, the systems can operate at a third of the capacity they would have if operating alone. If a thread break occurs, one of the feed systems drops out, and the others switch to half capacity. If a further thread breaks, one system operates at full capacity.

It is clear that the invention can have a large number of alternate embodiments, such as for example, combinations with more than three feed systems.

Thus in the aforementioned embodiments, the system can operate with all detectors shown, just as it can operate, with only one of them.

It is clear that the invention is not confined to operation with the detectors summarized here. More detectors can be used without stepping outside the context of the claim.

The feed system according to the invention can be embodied in multiple form if the system is to operate with more than one type or colour of woof yarn.

It is clear that this type of feed system can also be equipped with other duplicated components.

The present invention is in no way limited to the

embodiments described as examples and represented in the accompanying drawings. Such woof thread feed systems can, in fact, be constructed in a wide range of forms without stepping outside the context of the claim.

Claims

1. A weaving machine with a woof mechanism (3) and a feed system consisting of at least two components (1, 2; 11, 12; 25, 26) for feeding one woof thread (5, 6) each, with means for alternatively operating one of these components and with at least one detector (4, 10; 21, 22; 23 24; 27, 28; 29, 30) for checking the travel of the woof thread in the feed system, characterized in that the at least one detector is connected to a drive unit (7) which drive unit after receiving a thread breaks signal from the detector cuts out the respective component of the alternately operating components and cuts in at least one other component of the feed system such that the feed system continues to operate with its previous feeding capacity without the cut out component.

2. The weaving machine claimed in 1, whereby at least the components of each pair (1 - 2; 11 - 12; 25 - 26) are identical.

3. The weaving machine claimed in 1 or 2, whereby at least two components (1 - 2) consist of yarn bobbins.

4. The weaving machine claimed in 1 or 2, whereby at least one pair of components (11 - 12) consists of sets of two yarn bobbins (13 - 14; 15 - 16).

5. The weaving machine claimed in 1 or 2, whereby at least one pair of components (25 - 26) consists of unwinding devices.

6. The weaving machine claimed in 1 or 2, whereby at least one pair of components consists of runout devices or thread extraction equipment.

7. The weaving machine claimed in 1 or 2, whereby at least one pair of components consists of thread storage devices.

8. The weaving machine claimed in one of the preceding claims, whereby the aforementioned detector (4,10; 27, 28) is located along the woof thread (5, 6).

9. The weaving machine claimed in one of the preceding claims 1 to 7, whereby at least one detector (21; 22; 23; 24; 29; 30) is provided on at least one of the components (1 - 2;11 - 12; 25 - 26).

10. The weaving machine claimed in one of the preceding claims, whereby the drive unit (7) drives the woof mechanism (3).

11. The weaving machine claimed in claim 5 or 6, whereby the drive unit (7) controls the unwinding device or runout device.

Patentansprüche

1. Eine Webmaschine mit einer Schußfadeneintragvorrichtung (3) und einem Schußfadenzuführsystem, das aus wenigstens zwei Komponenten (1, 2; 11, 12; 25, 26) zum Zuführen von jeweils einem Schußfaden (5, 6) besteht, mit Mitteln zum alternativen Betätigen eines dieser Elemente und mit wenigstens einem Schußfadenwächter (4, 10; 21, 22; 23, 24; 27, 28; 29, 30) zum Überwachen des Weges des Schußfadens in dem Zuführsystem, dadurch gekennzeichnet, daß der wenigstens eine Detektor mit einer Antriebseinheit (7) verbunden ist, die nach Erhalt eines Fadenbruchsignals von dem Detektor die entsprechende Komponente der abwechselnd tätigen Komponenten abschaltet und wenigstens eine andere Komponente des Zuführsystems derart einschaltet, daß das Zuführsystem ohne die abgeschaltete Komponente fortfährt mit ihrer vorausgehenden Zuführkapazität zu arbeiten.

2. Webmaschine gemäß Anspruch 1, wobei mindestens zwei der Komponenten eines jeden Paares (1-2; 11-12; 25-26) identisch sind.

3. Webmaschine gemäß Anspruch 1 oder 2, wobei mindestens zwei der Komponenten (1-2) Garnspulen sind.

4. Webmaschine gemäß Anspruch 1 oder 2, wobei mindestens ein Komponentenpaar (11-12) aus Sätzen von zwei Garnspulen (13-14; 15-16) besteht.

5. Webmaschine gemäß Anspruch 1 oder 2, wobei mindestens ein Komponentenpaar (25-26) aus Abwickelvorrichtungen besteht.

6. Webmaschine gemäß Anspruch 1 oder 2, wobei mindestens ein Komponentenpaar aus Fadenliefervorrichtungen oder Fadenabzugsvorrichtungen besteht.

7. Webmaschine gemäß Anspruch 1 oder 2, wobei mindestens ein Komponentenpaar aus Fadenspeichervorrichtungen besteht.

8. Webmaschine gemäß einem der vorhergehenden Ansprüche, wobei der vorgenannte Schußfadenwächter (4, 10; 27, 28) entlang der Schußfaden (5, 6) angebracht ist.

9. Webmaschine gemäß einem der vorhergehenden Ansprüche 1 bis 7, wobei mindestens eine der Komponenten (1 - 2; 11 - 12; 25 - 26) mit mindestens einem Schußfadenwächter (21; 22; 23; 24; 29; 30) ausgerüstet ist.

10. Webmaschine gemäß einem der vorhergehenden Ansprüche, wobei die Antriebseinheit (7) den Eintragsmechanismus (3) antreibt.

11. Webmaschine gemäß Anspruch 5 oder 6, wobei die Antriebseinheit (7) die Abwickel- oder Fadenliefervorrichtung steuert.

Revendications

1. Une machine à tisser équipée d'un dispositif d'insertion (3) et d'un dispositif de fourniture constitué d'au moins deux éléments (1, 2; 11, 12; 25, 26) destinés à fournir chacun un fil de trame (5,6), équipée des moyens destinés à fonctionner un de ces éléments en alternance et équipée d'au moins un capteur (4, 10; 21, 22; 23, 24; 27, 28: 29, 30) destiné à contrôler l'avance du fil de trame dans le dispositif de fourniture, caracterisée par le fait qu'au moins un capteur est relié à l'unité de commande (7) lequel unité de commande, après recevoir un signal de rupture du capteur, désactive l'élément respective des éléments fonctionnant alternativement et active au moins un autre élément du dispositif de fourniture, de telle sorte que le dispositif de fourniture continue de fonctionner avec son capacité de fourniture sans l'élément désactivé.

2. Machine à tisser selon la revendication 1, caractérisée par le fait qu'au moins les éléments de chaque paire (1 - 2; 11 - 12;25 - 26) sont identiques.

3. Machine à tisser selon la revendication 1 ou 2, caractérisée par le fait qu'au moins deux éléments de fourniture (1 - 2) sont des bobines de fil.

4. Machine à tisser selon la revendication 1 ou 2, caractérisée par le fait qu'au moins une paire d'éléments de fourniture (1 - 2) estconstituée de jeux de deux bobines de fil (13 - 14; 15 - 16).

5. Machine à tisser selon la revendication 1 ou 2, caractérisée par le fait qu'au moins une paire d'éléments de fourniture (25 - 26) est constituée de dispositifs dérouleurs.

6. Machine à tisser selon la revendication 1 ou 2, caractérisée par le fait qu'au moins une paire d'éléments de fourniture est constituée de dispositifs prédélivreur ou de délivrance de fil.

7. Machine à tisser selon la revendication 1 ou 2, caractérisée par le fait qu'au moins une paire d'éléments de fourniture est constituée de dispositifs d'accumulation de fil.

8. Machine à tisser selon l'une des revendications précédentes, caractérisée par le fait que le capteur (4, 10; 27, 28) mentionné ci-dessus est placé le long du fil de trame (5, 6).

9. Machine à tisser selon l'une des revendications 1 à 7 ci-dessus, caractérisée par le fait qu'au moins un capteur (21; 22; 23; 24; 29; 30) est prévu sur au moins un des éléments de fourniture (1 - 2; 11 - 12; 25 - 26).

10. Machine à tisser selon l'une des revendications précédentes, caractérisée par le fait que l'unité de commande (7) commande le dispositif d'insertion (3).

11. Machine à tisser selon la revendication 5 ou 6, caractérisée par le fait que l'unité de commande (7) commande le dispositif dérouleur ou le dispositif prédélivreur.

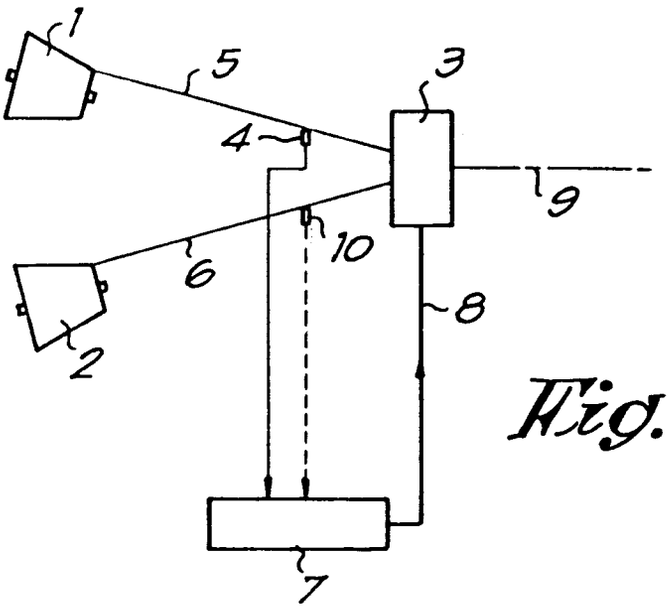

Fig. 1

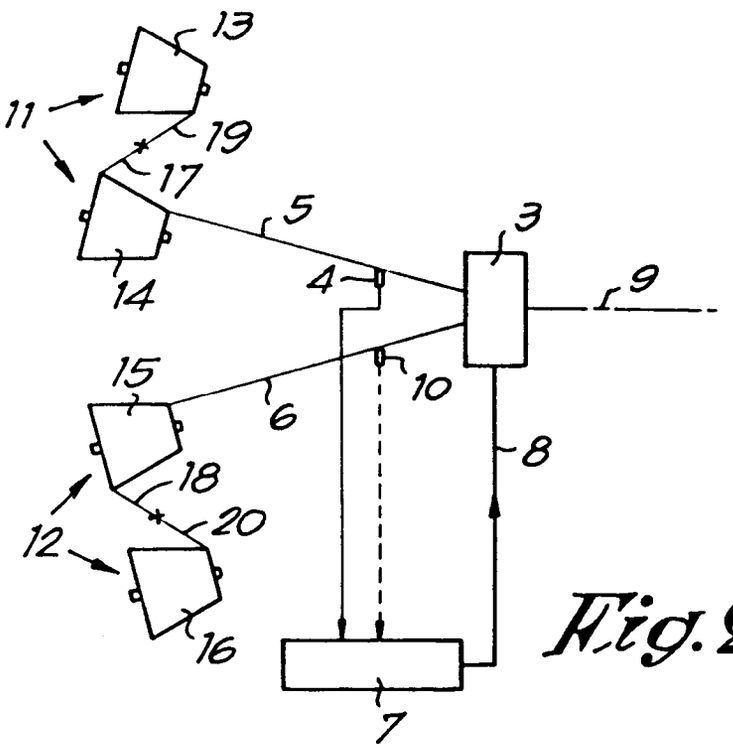

Fig. 2

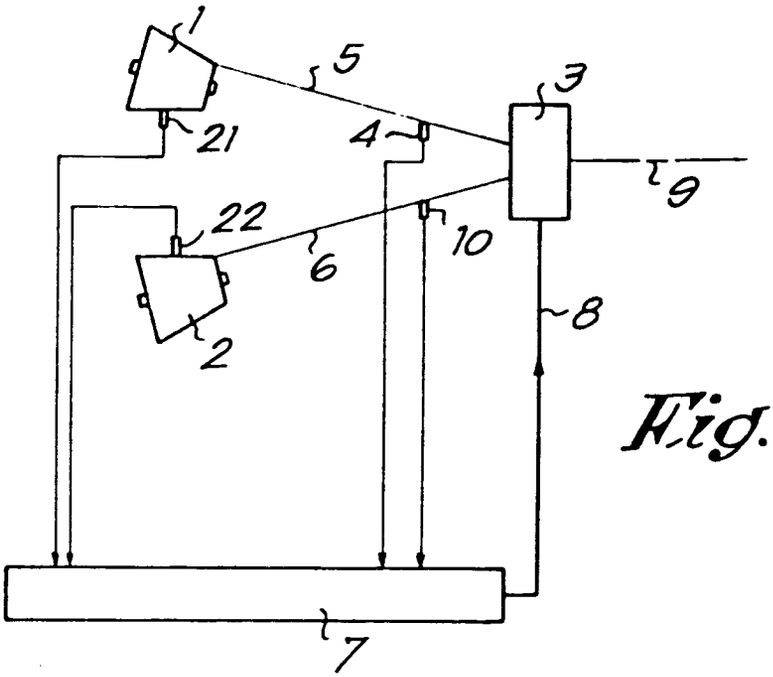
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Fig. 3

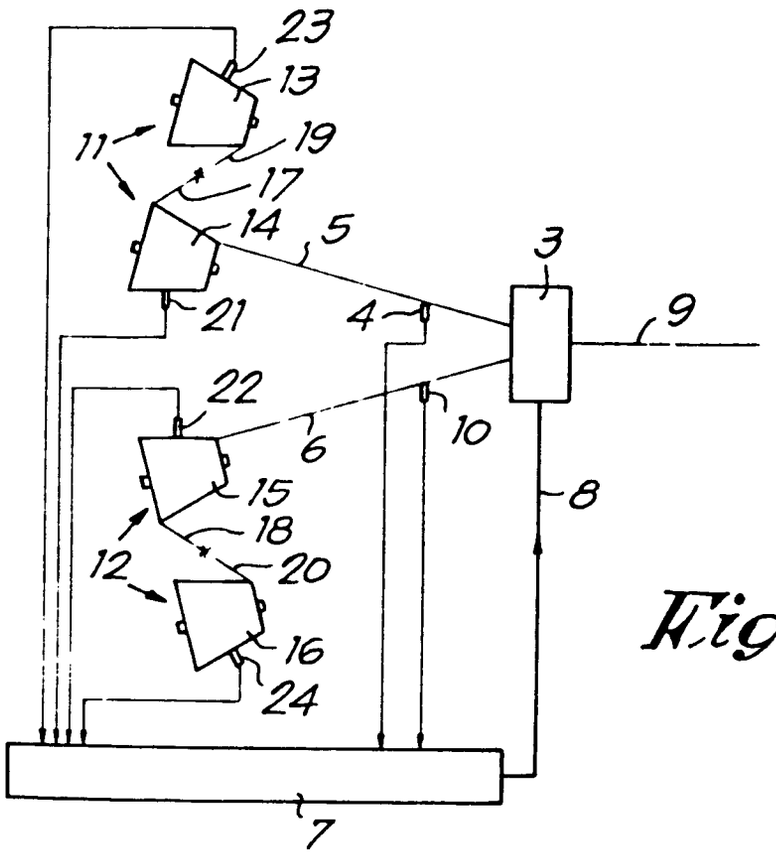
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Fig. 4

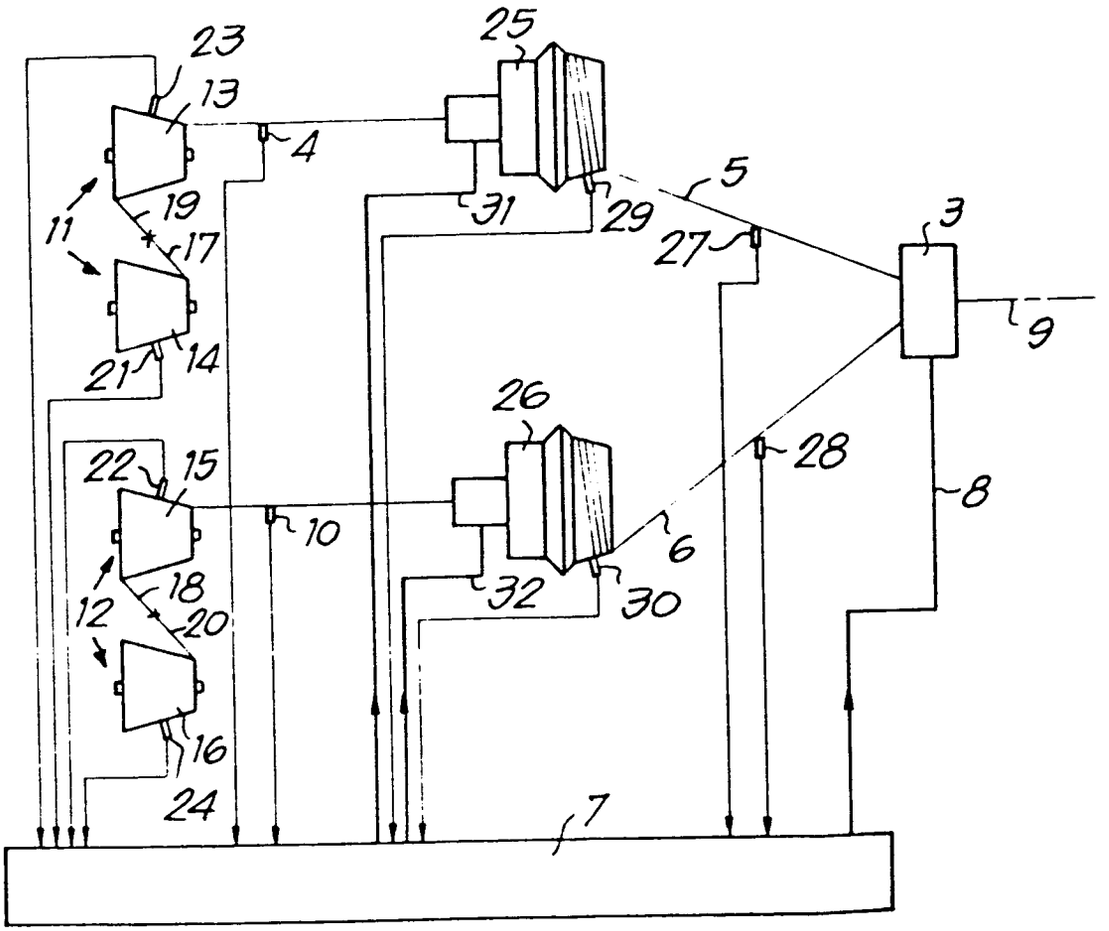
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Fig. 5