

- [54] **MULTI-UNIT SPINNING MACHINE**
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- [22] Filed: **June 20, 1972**
- [21] Appl. No.: **264,450**

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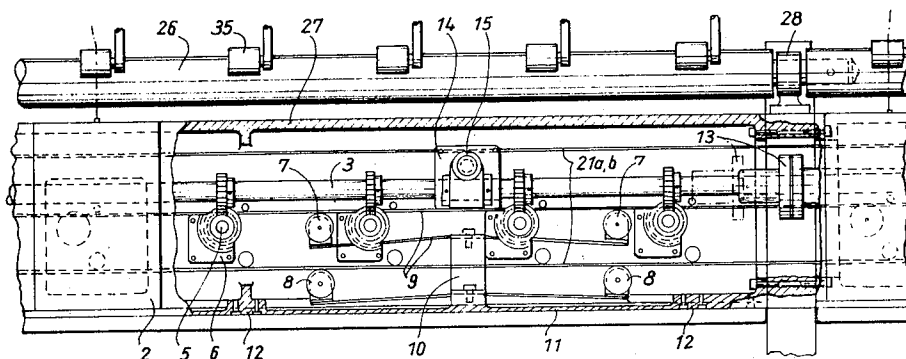
- [30] **Foreign Application Priority Data**
 June 21, 1971 Germany..... P 21 30 725.5
- [52] **U.S. Cl.**..... 57/1 R, 57/34 R, 57/56, 57/58.89, 57/92
- [51] **Int. Cl.**..... D01h 11/00, D01h 1/12, D01h 7/00
- [58] **Field of Search**..... 57/1, 34 R, 56, 58.89, 57/58.95, 92

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[57] ABSTRACT

A multi-unit spinning machine divided into groups of working units wherein the drive means for each of the units including the turbine belts, etc. are arranged in a common channel wherein air under pressure is supplied while the driven means such as the spinning turbine, etc. are located on the exterior of this channel and connected to a second channel to which vacuum is supplied.

8 Claims, 6 Drawing Figures



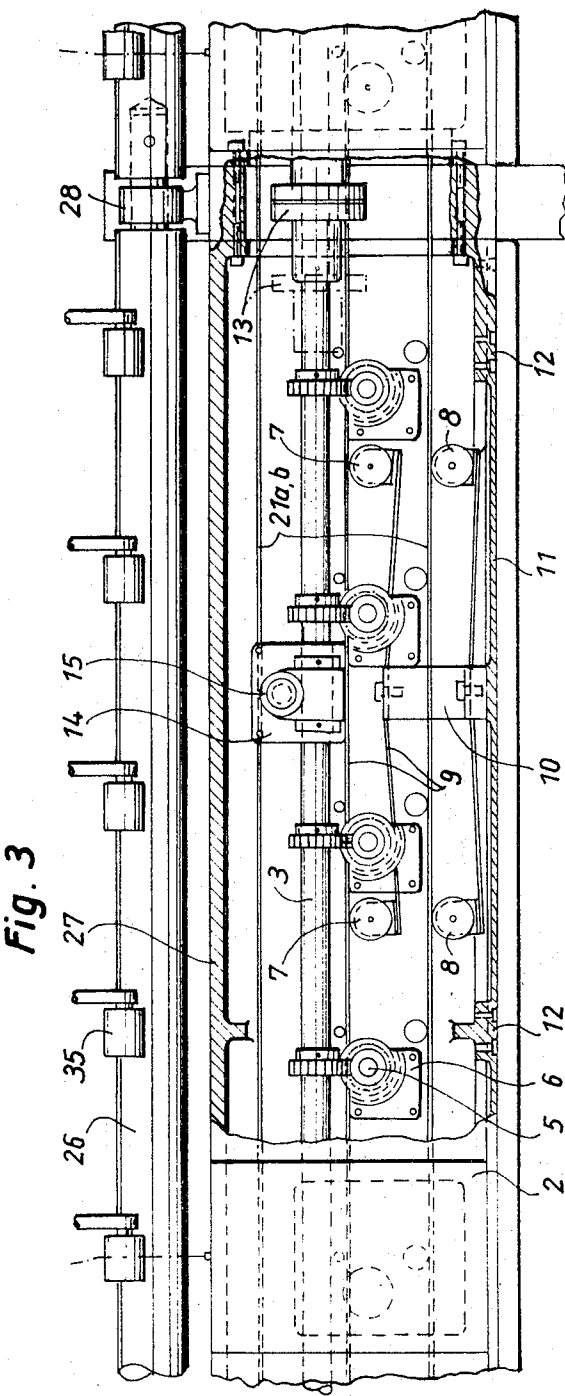
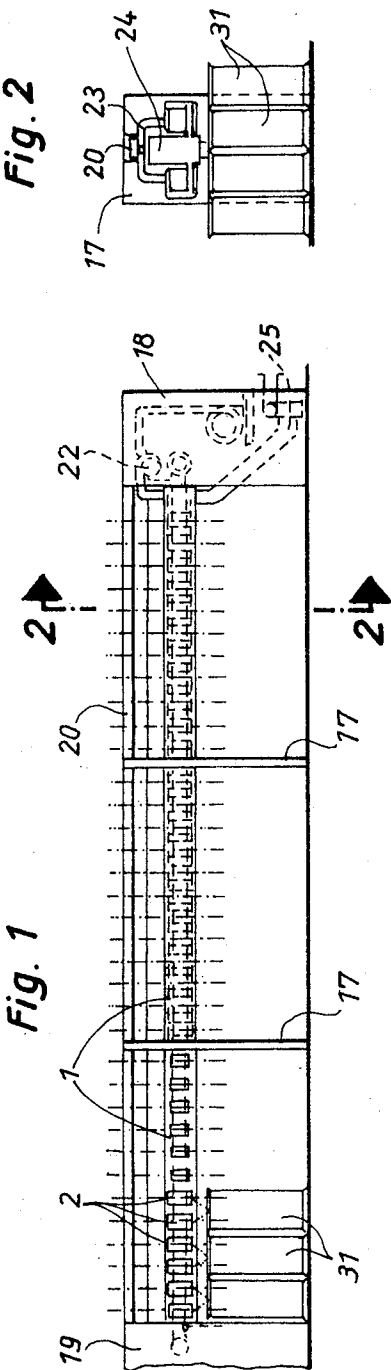
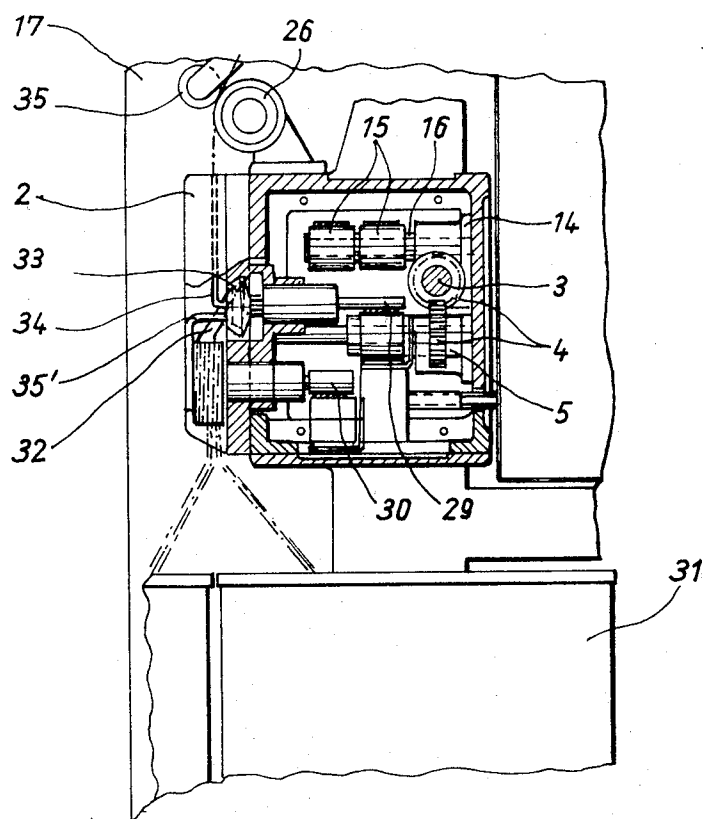
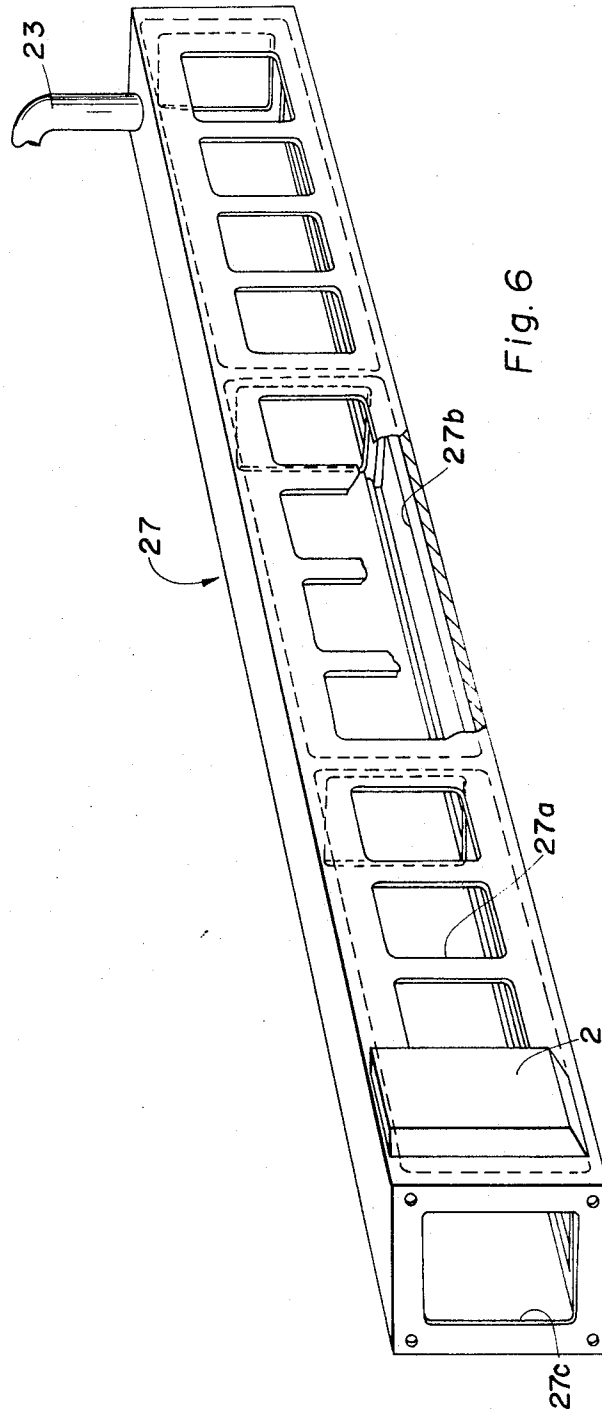
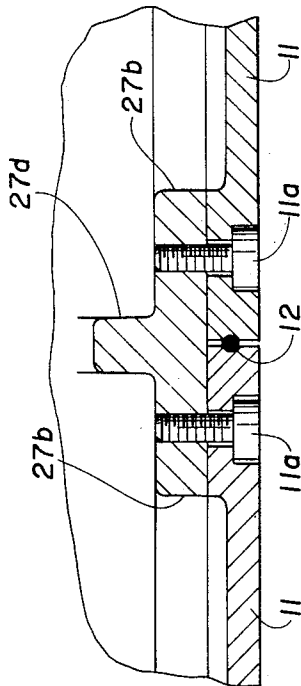


Fig. 4





MULTI-UNIT SPINNING MACHINE

BACKGROUND OF INVENTION

The present invention relates to textile spinning machines and, in particular, to an assembly of a plurality of spindleless spinning units into a unitary system.

Through Austrian Patent 272 161, there is known a spindleless spinning textile machine wherein the drive and driven units are connected to each other and arranged in rows so that their side walls touch each other. The shafts of each of the driven units are connected by engaging a common elongated drive unit extending through the side walls. The drive unit was sectionalized and provided with clutch means for each of the several units, so that the shaft extending through each unit may be independent so that each unit may be built as a unitary exchangeable part of the machine.

The object of this construction is to be able to put together a machine out of several, exchangeable working units, whereby testing of each unit before installation into the machine is possible. Further, should a defect occur in one unit, whose repair would need time, only this faulty unit, from the otherwise completely combined machine, need be disconnected so that it can be exchanged with a substitute unit. Furthermore, in the known textile machine the system units were so constructed that channels were formed through which air under pressure or vacuum was provided.

A disadvantage at this known construction lay in the fact that the drive shafts extended through several units and, therefore, it was not possible to prevent their getting dirty. Further, the tangential belts which drove the turbine, etc. also ran through the whole length of the machine but were arranged freely on the outside of each unit, and, therefore, created air currents which adversely effected the spinning procedure. Still further, their guide and drive elements were liable to get very dirty.

Starting from this point of the art, the object of the present invention is to provide a textile machine of the kind described, whereby the drive elements could be prevented from getting dirty.

It is another object of the present invention to provide a textile spinning machine wherein the driving and guidance of the tangential belts for the turbine, etc. was effected without the creation of adverse air current.

It is further object of the present invention to provide an improved and more simple spinning machine having greater efficiency and speed.

These objects, others, and numerous advantages will be seen from the following disclosure.

SUMMARY OF INVENTION

According to the present invention the spinning machine is divided into groups of working units wherein the drive means for each of the units including the turbine belts, etc. are arranged in a common channel wherein air under pressure is supplied while the driven means such as the spinning turbine, etc. are located on the exterior of this channel and connected to a second channel to which vacuum is supplied. The common channel for the drive means is sectionalized and each unit may be individually withdrawn and exchanged without influencing the operation of the other units in the associated system.

It is preferred that each group of units be separated from the other adjacent groups by vertical partitions

and that only clutch units be provided for the common drives corresponding to each system's breadth.

Full details of the present invention are set forth in the following description and in the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS.

In the drawings:

FIG. 1 is a schematic side view of a machine embodying the present invention;

FIG. 2 is a somewhat diagrammatic section along line 2—2 of FIG. 1;

FIG. 3 is an enlarged partially sectioned view of the machine of FIG. 1;

FIG. 4 is a sectional view along line 4—4 of FIG. 3;

FIG. 5 is a further enlarged sectional view of area A in FIG. 3; and

FIG. 6 is a perspective view of a housing casing of FIG. 3.

DESCRIPTION OF INVENTION

As seen in FIG. 1 and FIG. 2, series of spinning assembly systems 1, each comprising a plurality of individual spinning assembly units 2, are arranged in an elongated bank or frame, one adjacent the other. The systems are each separated by transverse vertical walls or bulkheads 17 which also serve as supporting members. At one end (in FIG. 1 the right end) of the frame, there is mounted a conventional drive means section 18 comprising motor, transmission and control means. At the other end of the frame, a conventional driven gear housing 19 and gear transmission means is located. In the system shown each of the spinning assembly units comprise spindleless spinning devices employing open end spinning turbines. The system includes associated mechanisms for feeding and withdrawing yarn fibers. As will be seen in greater detail later in connection with FIG. 4, the drive means and operating mechanisms for all of the individual spindle assembly units are housed within a common channel formed in hollow casings 27 of rectangular cross-section, extending from one wall 17 to the next. The spinning turbine 33 and feed 32 are connected to a second channel 24 located outside the casings 27 and between the two common channels formed by the casings as it becomes apparent from FIG. 2.

Located within the frame at the right end, in the drive means section 18 in addition to the conventional drive means (not shown), there are a compressed air blower 22 and a suction fan or pump 25. As will be seen, the air blower 22 is connected via suitable conduits 23 to the interior channels formed by the housing casings 27 for each of the spinning assembly systems 1. The compressed air supplied by the blower 22 produces a blanket of air pressure within the housing casings, thereby preventing the migration or transfer of fibers from the spinning chambers into the interior of the housing casings 27. The suction blower 25 is connected sectionally along conduit 24, flanked by the spinning assembly systems 1, to channel 35 leading to the turbines 33, and serving the purpose of providing the air vacuum necessary for the feeding and spinning of the fibers as well as for cleaning of the turbine and chamber.

This construction of each of the spinning assembly systems 1 will be further seen from the enlarged view of FIG. 3. As will be seen, the basic element of each system is the housing casing 27 which is formed as a

hollow rectangular box having an interior channel as it is shown in more detail in FIG. 6. The casing 27 has openings 27a on the frontal face for removably receiving the spinning units themselves and openings 27b at its bottom to give access to the interior. The various operating or drive mechanisms are located within the interior channel of the casing 27. To make this possible, the input feed shaft 3 which normally extends the length of the entire machine is, in accordance with this invention, divided into sections corresponding to the length of each of the systems (i.e. between walls 17). A sliding coupling or one-way clutch 13 is provided between the ends of each section so that each unit may be individually disconnected. This clutch 13 is shown in FIG. 3 in solid lines connecting successive sections and further in dotted lines in a position where successive sections are disconnected. The input shaft 3 serves to drive a worm gear 4, the pinion of which is secured to the shaft 3 while the worm is secured to a transverse shaft 5 of a coupling journaled rotatably in a bearing block 6.

Through the channel formed in the interior of the box like housing casing 27, run the drive belts 21a and 21b. The belts 21a and 21b which run through openings 27c in the front walls of casings 27 and through mating openings in the bulkheads 17 are driven to tangentially engage the drive whorls 29 and 30 (indicated in dotted lines in FIG. 3) of the turbine 33 and the fiber feed means 32, etc. The belts 21a and 21b extend between the drive means section 18 and the transmission means section 19. To further guide and tension the belts 21a and 21b, rollers 7 and 8 are provided to press against the belts. The rollers 7 and 8 are mounted on leaf springs 9 secured within a stop boss 10 which is mounted on a mounting plate 11, removably secured to the casing, e.g. by suitable machine screws, to cover the bottom opening 27b in the wall of the housing 27. The edges of the mounting plate 11 are sealed by gaskets or similar sealing members 12, as it is shown in more detail in FIG. 5.

Each of the spinning units 2 is covered by a lid 35 and provided with a conduit 35' to the channel 24 providing the source of vacuum. Thus, the spinning units themselves are connected to a second sectionalized channel 24, which channel is separate from the channels formed by the interior of the casings 27. The spinning units are mounted sealingly in any convenient manner in openings 27a of casings 27 and secured thereto by removable screws or fasteners, suitable seal means (not shown) are provided around the edges of the lower side of the spinning units to further seal the housing casing 27.

Only after the various drive and guide elements have been inserted into the individual casings 27 mounted between the bulkheads 17 and sections 18 and 19, respectively, and after the individual sections of the input shaft 3 have been coupled by means of the clutches 13, the open end spinning turbines 33 are inserted into the appropriate frontal openings 27a in the housing casings 27, such that their driven elements extend into the casings, while their other parts are maintained outside the housing casings 27. In this manner the conventional cover or lid may be pivotally mounted over the spinning turbine to provide the usual observation and cleaning facilities for the individual units. After the placement of the spinning units in the casings 27, each of the respective drive whorls 29 for the turbine 33 en-

gage the tangential belt 21a and the drive whorls 30 for the fiber feed means engage the belt 21b. The Roll 26 extends over the entire length of the spinning machine and is preferably a hollow or tubular spindle as indicated in the drawings.

As is best seen from FIG. 6 each casing 27 is an elongated casing having a substantially quadratic cross section. Each casing 27 is provided on its front face with a number, e.g. 12, of openings 27a into which spinning units 2 are inserted in operation. More specifically the main portion of the spinning units 2 remains outside the channel formed by casings 27 while only some driven elements such as elements 29 and 30 extend into the channel as may be seen from FIG. 4.

Each casing 27 further is provided at its lower side with at least one opening 27b. Said openings 27b being closed during operation by plates 11 as becomes clear from FIG. 3 to 5. More specifically plates 11 are secured to the bottom of casing 27 by means of machine screws 11a, and sealed against each other and the casing, respectively by sealing elements such as sealing element 12. Preferably in the area between two adjacent openings 27b there are provided reinforcing ribs 27d inside the casings 27. Finally, each casing 27 at its end faces is provided with openings 27c for the drive means. Further, at least one of the casings 27 is connected to a pressure source by conduit 35. The fiber feed means is provided to pull the raw yarn from a large container 31, separate the yarn into discrete fibers and impel them through a channel 32 onto the spinning turbine 33. The return or upper run of the belts 21a and 21b pass over carry rollers 15 which are freely journaled on axles 16. The axles 16 are secured within the bearing blocks 14.

The spinning turbine 33 forms the fibers in known manner into a thread which is withdrawn through an outlet tube 34 by means of a roller 26 and counter-roller 26a pressed against it.

It will be seen from the foregoing that the present invention provides spinning apparatus which is free of objectionable disadvantages. The arrangement of all the drive means within the housings 27 permits higher efficiency and operating assurance to be obtained, since, on the one hand, the drive organs are prevented from becoming dirty or fouled with fibers, and, on the other hand, the enclosed housing guarantees that the spinning process will not be impaired through the creation of any air turbulence caused by the high speed of the drive belts 21a and 21b.

Further, the present invention provides a spinning machine which reduces considerably the pollution of the air in the factory. This is accomplished by providing a suction conduit 35', communicating with the interior of the spinning chamber, leading to the suction channel 24. Additionally, it is possible to operate the present apparatus, for example, as suggested by the aforementioned Austrian Patent (particularly FIG. 5) with only minimal suction and minimal delivery characteristics, since only air from the interior of the spinning chamber is sucked out and none of the surrounding or transient air is intermixed with it.

In order to obtain a solid unitary structure of the various units, stiffening elements, rods frame members 20 are used to interconnect the vertical walls 17 as seen in FIGS. 1 and 2. The coupling of electrical connections, control switches and other elements are conveniently made to common sources by coupling these connec-

tions at the connecting partitions 17. Thus, each system may be made independent of each other.

The application is a companion to and relates to apparatus shown and described in each of the following U.S. applications, all filed on even date hereof and reference is made to the specifications, claims and drawings of each and their disclosures incorporated herein, as if more fully set out herein:

Ser. No. 264,528 corres. to German Appln. P 21 30 739. 1, Wilhelm Braun, Mounting Apparatus for Spinning Assembly

Ser. No. 264,527 corres. to German Appln. P 21 30 690.1, Gerhard Bartling, Method and Apparatus for Joining Broken Ends

Ser. No. 264,529 corres. to German Appln. P 21 30 722.2, Rudolf Schon, Apparatus for the Spindleless Spinning of Textile Fibers

Ser. No. 264,530 Corres. to German Appln. P 21 30 738.0, Gerhard Bartling, Device for Open End Spinning

Ser. No. 264,531 corres. to German Appln. P 21 30 724.4, Rudolf Schon, Apparatus for Withdrawing Thread

The German Applications were all filed on June 21, 1971. The assignee is common to all.

Various other modifications and changes will readily lend themselves to those skilled in the present art. The present disclosure is intended, therefore, to be illustrative only and not limiting of the present invention.

What is claimed:

1. A textile spinning machine comprising a plurality of work units arranged over the length of said machine and common drive means for operating said units, said units being grouped into several systems lying between a drive means section and a gear means section, said systems including open face box like enclosures forming channels extending over the length of the machine and being connected to sources of pressure or suction generating means wherein said common drive means for all systems are located in at least one of said chan-

nels.

2. The textile spinning machine according to claim 1 wherein said work units comprise at least a turbine and shaft means for rotating said turbine and said common drive means including driving means located at one end of said machine, gear means located at the other end and at least one drive organ extending between said driving and gear means running the length of said machine for engaging said shaft means, said turbine shaft and said drive organ being arranged within said first channel connected to a pressure source and said turbine being connected to a second channel, which is connected to a suction source.

3. The apparatus according to claim 2 wherein said enclosure forming said first channel is formed with a plurality of frontal openings and said spinning units are removably mounted within respective ones of said openings.

4. The apparatus according to claim 2 wherein said enclosure is formed with another opening in which a mounting plate is secured, said mounting plate having formed thereon means for tensioning and guiding said drive organ.

5. The apparatus according to claim 4 wherein said drive organ is a driving belt.

6. The apparatus according to claim 2 wherein a further common drive organ is provided which is divided into sections corresponding to the length of each system, and is connected by clutch means to the drive organs of adjacent systems.

7. The apparatus according to claim 2 wherein each system is located between vertical partition walls serving as supports and as means for making each system independent.

8. The apparatus according to claim 7 including means wherein individual systems are provided with electrical operating and control means, said means being connected to a common source via couplings located within the partitions separating said systems.

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