

MOBILE BATCHING PLANT

This invention relates to a mobile apparatus for the continuous, full scale production of concrete which is capable of being transported to the site where the concrete is required.

The construction of multi storey, high density housing development projects requires a very large and continuous supply of concrete. The traditional method of obtaining such supply of concrete is from a batching plant. A traditional batching plant requires a considerable amount of space to be erected and it can take up to six weeks to erect such a plant.

In addition to the space and time requirements the erection of a batching plant requires concrete for the foundation to enable the plant to be erected. Delays in obtaining this concrete can result in delays in erecting the batching plant and hence the commencement of the construction work.

Traditional batching plants due to their size are usually located at a site remote from the construction site and therefore concrete from the plant has to be transported to the construction site by mean of concrete mixing trucks.

There are many disadvantages with the traditional batching plant such as space required for its erection and time taken to erect. Concrete produced by such a batching plant is often over watered, to allow for the time taken in transportation, and is usually over mixed. There is a serious risk that concrete

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which has been transported by concrete mixing trucks may lose some of its strength in the time taken to transport it from the plant to the site and thus may not be suitable for use. Further a traditional batching plant site will often require a licence from the appropriate licensing authority.

The present invention relates to a mobile apparatus for the continuous, full scale production of concrete, which can be transported to the required site by road and assembled at the site very rapidly and at minimum cost and which allows the full scale production of concrete to commence on site in a fraction of the time it would take to erect a traditional batching plant.

Assembly of the apparatus does not require an extensive or substantial foundation and so the problem of finding sufficient quantities of concrete to erect a traditional batching plant are avoided. It is an advantage of the present invention that freshly mixed concrete is available to the contractor for immediate use. The contractor can thus plan its requirements more accurately and thus avoid wastage. The mobile batching plant also eliminates the need to obtain a licence for the site where it is located.

Mobile concrete mixing apparatus are known from the prior art. The prior art suffers from the disadvantage that it can only produce a small volume of concrete. This is due to the fact that the prior art has sought to carry the various components of concrete on board the mobile mixing apparatus.

The advantage of the present invention is that it provides an on site batching



plant, which is capable of producing a concrete on a scale needed in the construction of multi storey housing developments, within a matter of days of the apparatus arriving at the site.

According to the invention there is provided a container, which is mounted on a flat bed trailer with wheels, which enables the container to be coupled to a truck for transportation by road. Within the container is contained a concrete mixing device, a conveying means equipped with a weighing device, to transport aggregate to the mixing device and a water storage facility, which is also equipped with a metering device. The roof of the container has two or more openings to which there is attached an aggregate sorting and storage facility and a cement storage facility. The aggregate storage facility is in communication with the conveying means and the cement storage facility is in communication with the weighing device which is in communication with the concrete mixing device. The conveying means and the concrete mixing device are equipped with motors which can be connected to an external power source such as an on site generator. The container is also provided with a central control unit which is linked by appropriate means to and which can control and regulate the operation of the entire apparatus.

On delivery to the site the container is uncoupled from the truck unit and lifted by a crane off the ground on to a platform erected for the purpose. The platform is set in foundation sufficient to support the container. The container is then secured onto the platform by appropriate means. Mounted on to the top of the container at an opening on the roof is a cement storage facility. Mounted on



top of the container at the other opening is an aggregate sorting and storage facility.

Operation of the batching plant can commence once a suitable external conveying means has been provided which can transport aggregate from the site to the aggregate sorting and storage facility. This external conveying means may be fully enclosed to avoid atmospheric pollution.

In operation, aggregate from the construction site is transported to the aggregate sorting facility by means of the external conveying means. The sorting device, which incorporates a means to distribute aggregate of different sizes, fed from the site, distributes the aggregate to the appropriate storage facility. The aggregate sorting facility is linked to a suitable control mechanism, which may be mechanical or computer controlled, and which is linked to a central control unit to enable an operator to control its operation.

The aggregate storage facility is in communication with a feed mechanism which communicates with the conveying means located inside the container.

Aggregate of the desired size is fed through the feed mechanism to the conveying means for transportation to the mixing device. The feed mechanism of the aggregate storage facility incorporates a control device to control and regulate the supply of aggregate. The control mechanism may be mechanical or computer controlled, and is connected to a central control unit to enable an operator to control its operation.



Aggregate is fed from the storage facility through the feed mechanism to the conveying means. The conveying means may incorporate a form of enclosure to prevent pollution. The conveying means is equipped with a weighing device which is linked to the central control unit. Once the desired amount of aggregate has been fed to the conveying means further supply of aggregate from the aggregate storage facility can be stopped by the operator. Precise amounts of aggregate of the desired size or sizes are thus fed to the mixing device.

The cement storage facility which is in communication with a weighing device located within the container incorporates a means to feed cement into a weighing device which is in communication with the concrete mixing device. The feed mechanism incorporates a control device, which can be mechanical or computer controlled and which is connected to a central control unit to enable an operator to regulate its operation. Cement from the cement storage facility is fed to the weighing device. The weighing device is linked to the central control unit. Once the desired amount of cement has been fed from the cement storage facility to the weighing device further supply of cement can be stopped by the operator. Precise amounts of cement are thus fed to the mixer.

The water storage facility is connected to a water meter which incorporates a control means which is connected to the central control unit. Measured amounts of water from the water storage facility are fed to the mixing device via the water meter.

The mixing device incorporates a control mechanism which may be mechanical



or computer controlled.

Concrete mixed in the mixing device is discharged from the mixing device by means of a suitable outlet for distribution around the site.

Control devices from the aggregate sorting and storage facility, the internal conveying means, the cement storage facility and water storage facility are linked to a central control unit. The central control unit can be preprogrammed with the requirements for various different concrete mixes to automate the operation. An operator can select the concrete mix required to enable the appropriate amount of aggregate to be dispensed on to the conveying device, the appropriate amount of cement to be dispensed into the mixing device via the weighing device and appropriate volume of water to be dispensed into the mixing device.

In order that the invention may be more fully understood the invention will now be described by way of example with reference to the drawings.

Figure 1 is a schematic drawing showing a side elevation of the container mounted on the trailer with the aggregate sorting and storage facility and cement storage facility assembled.

Figure 2 is a schematic drawing of the cross sectional side elevation through the container with the aggregate sorting and storage facility and cement storage facility assembled.



Figure 1 provides an overview of the mobile batching plant once it has been assembled on site. The apparatus consists of a container (1), which is mounted on a flat bed trailer (2) and which is equipped with wheels (3). The container is mounted on a platform (4) which is set in foundation (5). Mounted at the top of the container is the cement storage facility (6) and aggregate sorting facility (7A) and aggregate storage facility (7B). The operation of the batching plant is commenced when an external conveying means (8) is assembled to transport aggregate from the site to the aggregate sorting facility. Located at one end of the container directly below the mixing device is the concrete discharge outlet (9). The container may be connected to a truck unit at one end of the trailer (50).

Figure 2 provides a cross sectional side elevation view of the container. Within the container is located the conveying means (10) which runs at an elevated angle from one end of the container to the other. The conveying means is surrounded by an enclosure (11). Located at the other end of the conveying means is a concrete mixing device (12), a water storage tank (13), and a cement weighing device (14) which is connected to the mixing device.

On delivery to the site the container (1) mounted on the trailer (2) is lifted by crane on to the platform (3) which has been erected on the site and secured into place. The cement storage facility (6) and aggregate sorting and storage facility (7A&B) are lifted by crane on to the container (1) and are secured into place. A concrete discharge outlet (9) is also attached to the container at a point below the mixing device. A suitable external conveying means (8) is then assembled on



site, which is preferentially fully enclosed to prevent atmospheric pollution, to transport aggregate from the site up to the aggregate sorting facility(7A)

In operation, aggregate from the site is transported along the external conveying means (8) to the aggregate sorting facility (7A). Depending on the size of the aggregate it is distributed to the appropriate storage facility (7B). Measured amounts of the appropriate size aggregate are then discharged from the storage facility (7B) onto the conveying device (10). The aggregate is then transported along the conveying device to the mixing device (12). Cement is discharged from the cement storage facility (6) into the cement weighing device (14) which is then discharged directly into the mixing device. Appropriate volume of water from the water storage facility (13) is also discharged into the mixing device. The concrete is then discharged from the mixing device via an outlet (9) attached to the bottom of the container for use.

On completion the aggregate sorting and storage facility, the cement storage facility and the concrete discharge outlet are detached from the container. The container is then lifted from the platform to the ground where it can be coupled to a truck unit and transported to another site.





CLAIMS

1. A mobile batching plant comprising a container, an aggregate sorting and storage facility and a cement storage facility, wherein the container is mounted on a flat bed trailer which is equipped with wheels at one end and which is capable of being connected at the other end to a truck unit for transportation by road, and wherein disposed within the container, along the longitudinal axis thereof, is a conveying means which is equipped with a weighing device, and further disposed within the container is a concrete mixing device situate at one end of the container, which is in communication with the conveying means, a cement weighing device, a water metering facility and a water storage facility and wherein the aggregate sorting and storage facility may be reversibly connected to the container through suitable openings in the roof of the container such that aggregate sorting and storage facility is in communication with the aforesaid conveying means and the cement storage facility is in communication with the concrete mixing device.
2. An apparatus as claimed in claim 1 wherein the conveying means is provided with a motor and a weighing device and wherein the conveying means is surrounded by an enclosure and which is disposed at an elevated angle which is in communication with the aggregate storage facility and is capable of receiving aggregate discharged from the said storage facility and wherein the upstream end of the conveying means is in communication with the concrete mixing device and capable of receiving





material discharged from the conveying means and wherein there is provided a mechanism to control and regulate the function of the conveying means.

3. An apparatus as claimed in claim 1 where there is disposed above the conveying means a feed control mechanism to control and regulate the supply of aggregate from the aggregate storage unit to the conveying means.
4. An apparatus as claimed in claim 1 wherein there is situated above the container a cement storage facility which is provided with a feed control mechanism to control and regulate the supply of cement and which is in communication with a cement weighing device.
5. An apparatus as claimed in claim 1 wherein there is disposed in the container is a cement weighing device which is in communication at one end with a cement storage facility and in communication at the other end with the concrete mixing device and which is disposed with a control mechanism to control and regulate the discharge of cement into the mixing device.
6. An apparatus as claimed in claim 1 wherein there is disposed within the container a water storage facility which is provided with water metering capability and which is in communication with the concrete mixing device and which is provided with a control mechanism to control and regulate





the volume of water discharged into the mixing device.

7. An apparatus as claimed in claim 1 wherein there is disposed within the container a concrete mixing device which is located at the upstream end of the conveying means which is provided with a motor and wherein the mixing device is in communication with the conveying means such as to be capable to receive discharge of material from the conveying means and is also in communication with the cement weighing device such as to be capable to receive discharge from the weighing device and even further in communication with the water storage facility such as to be capable to receive water therefrom and is further disposed with an external discharge unit to discharge mixed concrete from the mixing device.
8. An apparatus as claimed in claim 1 wherein there is situated above the container an aggregate sorting and storage facility which is capable of receiving aggregate from an external source and distributing the said aggregate to the aggregate storage facility such that aggregate of the different sizes are stored separately and wherein the aggregate storage facility is in communication with the conveying means through a feed control mechanism to control and regulate the supply of aggregate to the conveying means.
9. An apparatus as claimed in claims 1 to 8 wherein there is provided a central control unit which is capable of controlling and regulating the aggregate feed mechanism, the cement feed mechanism, the water metering mechanism, the weighing device and the mixing device.



ABSTRACT

MOBILE BATCHING PLANT

Mobile apparatus for the production of concrete comprising a container, mounted on a flat bed trailer with wheels which can be transported by road, a detachable aggregate sorting and storage facility and a detachable cement storage facility. The container contains a concrete mixing device, a conveying means, equipped with a weighing device and a water storage facility, equipped with a metering facility. On delivery to the site the container is lifted on to a platform, erected for the purpose, and the aggregate sorting and storage facility and cement storage facility secured to the roof of the container. Measured amounts of aggregate from the site are fed from the storage facility to the conveying means and transported to the mixing device. Measured amounts of cement from the storage facility and metered amounts of water are also fed into the mixing device. Concrete is discharged from the base of the mixing device.

FIGURE 2

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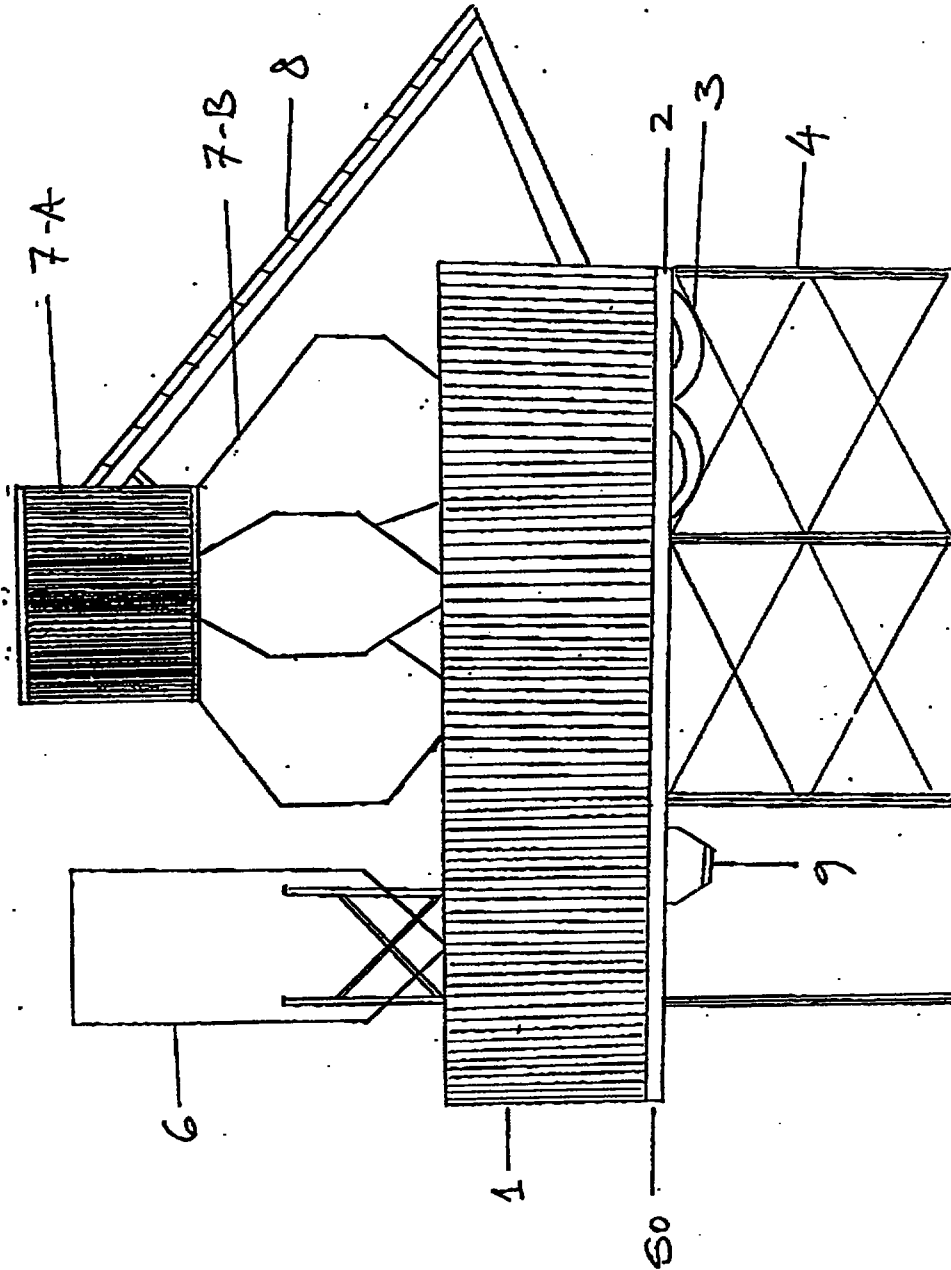


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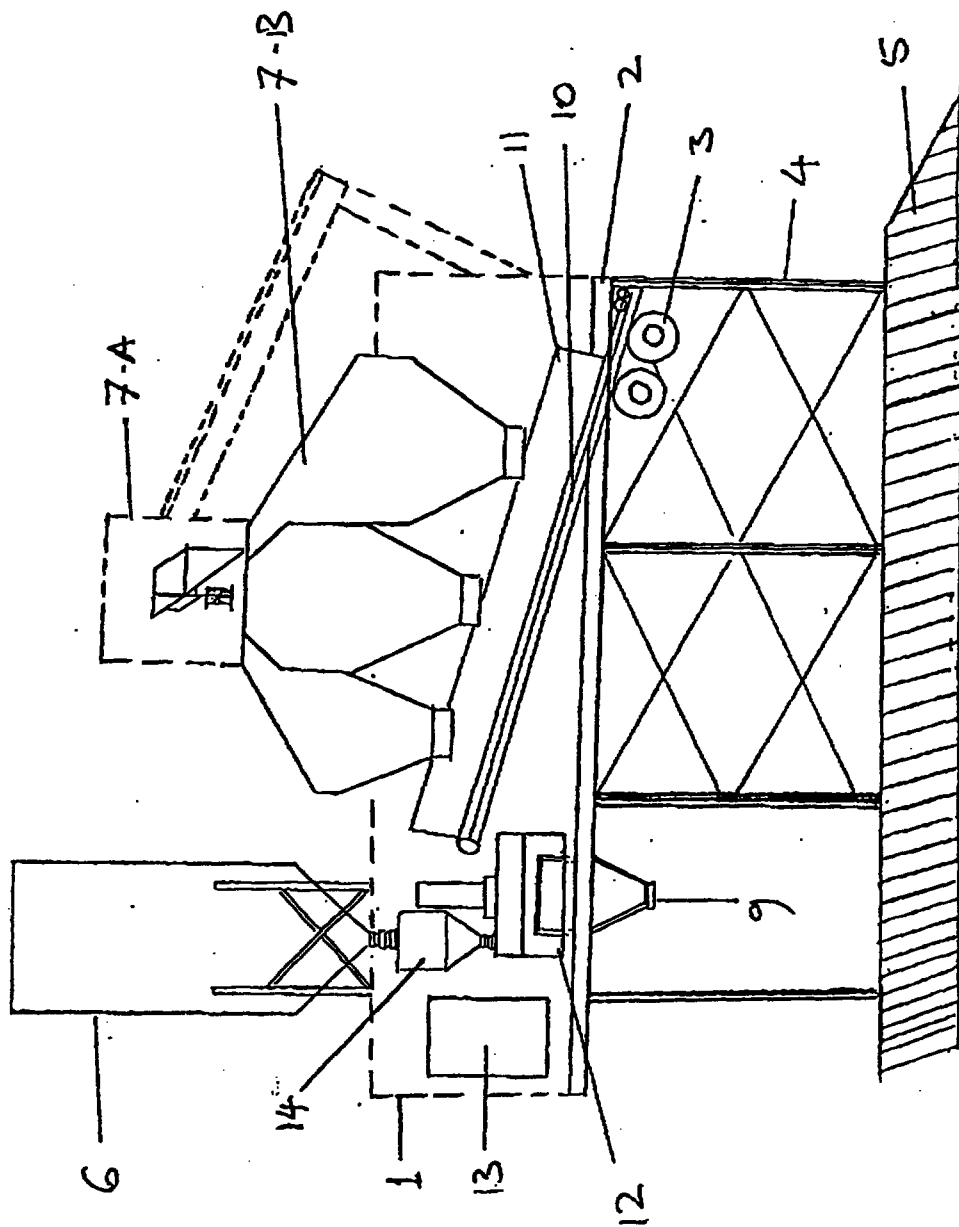


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MOBILE BATCHING PLANT

This invention relates to a mobile apparatus for the continuous, full scale production of concrete which is capable of being transported to the site where the concrete is required.

The construction of multi storey, high density housing development projects requires a very large and continuous supply of concrete. The traditional method of obtaining such supply of concrete is from a batching plant. A traditional batching plant requires a considerable amount of space to be erected and it can take up to six weeks to erect such a plant.

In addition to the space and time requirements the erection of a batching plant requires concrete for the foundation to enable the plant to be erected. Delays in obtaining this concrete can result in delays in erecting the batching plant and hence the commencement of the construction work.

Traditional batching plants due to their size are usually located at a site remote from the construction site and therefore concrete from the plant has to be transported to the construction site by mean of concrete mixing trucks.

There are many disadvantages with the traditional batching plant such as space required for its erection and time taken to erect. Concrete produced by such a batching plant is often over watered, to allow for the time taken in transportation, and is usually over mixed. There is a serious risk that concrete which has been transported by concrete mixing trucks may lose some of its strength in the time taken to transport it from the plant to the site and thus may

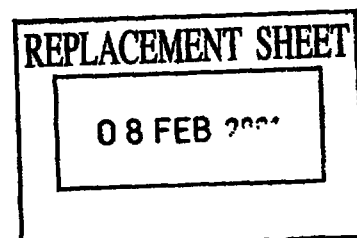
not be suitable for use. Further a traditional batching plant site will often require a licence from the appropriate licensing authority.

The present invention relates to a mobile apparatus for the continuous, full scale production of concrete, which can be transported to the required site by road and assembled at the site very rapidly and at minimum cost and which allows the full scale production of concrete to commence on site in a fraction of the time it would take to erect a traditional batching plant.

Assembly of the apparatus does not require an extensive or substantial foundation and so the problem of finding sufficient quantities of concrete to erect a traditional batching plant are avoided. It is an advantage of the present invention that freshly mixed concrete is available to the contractor for immediate use. The contractor can thus plan its requirements more accurately and thus avoid wastage. The mobile batching plant also eliminates the need to obtain a licence for the site where it is located.

Mobile concrete mixing apparatus are known from the prior art. The prior art suffers from the disadvantage that it can only produce a small volume of concrete. This is due to the fact that the prior art has sought to carry the various components of concrete on board the mobile mixing apparatus.

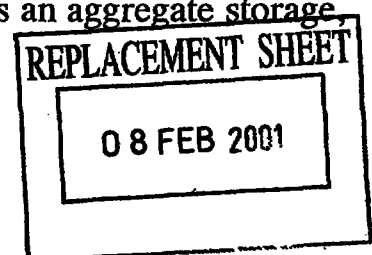
The advantage of the present invention is that it provides an on site batching plant, which is capable of producing a concrete on a scale needed in the construction of multi storey housing developments, within a matter of days of the apparatus arriving at the site.



According to the invention there is provided a mobile batching plant comprising a container, an aggregate storage, feed and sorting facility and a cement storage and feed facility, wherein the container is mounted on a flat bed trailer which is equipped with wheels at one end and which is capable of being connected at the other end to a truck unit for transportation by road, and wherein disposed within the container, along the longitudinal axis thereof, is a conveying means which is equipped with a weighing device, and further disposed within the container is a concrete mixing device situate at one end of the container, which is in communication with the conveying means, a cement weighing device, a water metering facility and a water storage facility and wherein the aggregate storage, sorting and feeding facility may be reversibly connected to the container through suitable openings in the roof of the container such that aggregate storage, sorting and feeding facility is in communication with the aforesaid conveying means and the cement storage facility is in communication with the concrete mixing device and wherein the mobile batching plant is provided with a central control unit which is capable of controlling and regulating by appropriate means the aggregate feed mechanism, the cement feed mechanism, the conveying means, the water metering mechanism, the weighing device and the concrete mixing device.

On delivery to the site the container is uncoupled from the truck unit and lifted by a crane off the ground on to a platform erected for the purpose. The platform is set in foundation sufficient to support the container. The container is then secured onto the platform by appropriate means. Mounted on to the top of the container at an opening on the roof is a cement storage facility.

Mounted on top of the container at the other opening is an aggregate storage, sorting and feeding facility.

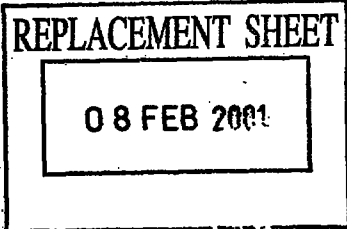


Operation of the batching plant can commence once a suitable external conveying means has been provided which can transport aggregate from the site to the aggregate storage, sorting and feeding facility. This external conveying means may be fully enclosed to avoid atmospheric pollution.

In operation, aggregate from the construction site is transported to the aggregate sorting facility by means of the external conveying means. The sorting device, which incorporates a means to distribute aggregate of different sizes, fed from the site, distributes the aggregate to the appropriate storage facility. The aggregate sorting facility is linked to a suitable control mechanism, which may be mechanical or computer controlled, and which is linked to a central control unit to enable an operator to control its operation.

The aggregate storage facility is in communication with a feed mechanism which communicates with the conveying means located inside the container. Aggregate of the desired size is fed through the feed mechanism to the conveying means for transportation to the mixing device. The feed mechanism of the aggregate storage facility incorporates a control device to control and regulate the supply of aggregate. The control mechanism may be mechanical or computer controlled, and is connected to a central control unit to enable an operator to control its operation.

Aggregate is fed from the storage facility through the feed mechanism to the conveying means. The conveying means may incorporate a form of enclosure to prevent pollution. The conveying means is equipped with a weighing device which is linked to the central control unit. Once the desired amount of



aggregate has been fed to the conveying means further supply of aggregate from the aggregate storage facility can be stopped by the operator. Precise amounts of aggregate of the desired size or sizes are thus fed to the mixing device.

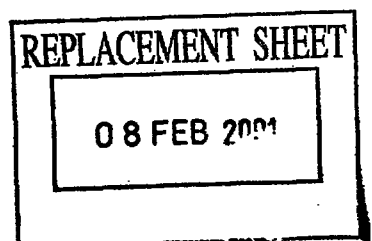
The cement storage facility which is in communication with a weighing device located within the container incorporates a means to feed cement into a weighing device which is in communication with the concrete mixing device.

The feed mechanism incorporates a control device, which can be mechanical or computer controlled and which is connected to a central control unit to enable an operator to regulate its operation. Cement from the cement storage facility is fed to the weighing device. The weighing device is linked to the central control unit. Once the desired amount of cement has been fed from the cement storage facility to the weighing device further supply of cement can be stopped by the operator. Precise amounts of cement are thus fed to the mixer.

The water storage facility is connected to a water meter which incorporates a control means which is connected to the central control unit. Measured amounts of water from the water storage facility are fed to the mixing device via the water meter.

The mixing device incorporates a control mechanism which may be mechanical or computer controlled.

Concrete mixed in the mixing device is discharged from the mixing device by means of a suitable outlet for distribution around the site.



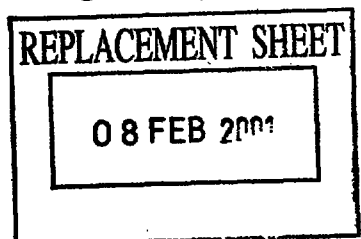
Control devices from the aggregate storage, sorting and feeding facility, the internal conveying means, the cement storage facility and water storage facility are linked to a central control unit. The central control unit can be preprogrammed with the requirements for various different concrete mixes to automate the operation. An operator can select the concrete mix required to enable the appropriate amount of aggregate to be dispensed on to the conveying device, the appropriate amount of cement to be dispensed into the mixing device via the weighing device and appropriate volume of water to be dispensed into the mixing device.

In order that the invention may be more fully understood the invention will now be described by way of example with reference to the drawings.

Figure 1 is a schematic drawing showing a side elevation of the container mounted on the trailer with the aggregate storage, sorting and feeding facility and cement storage facility assembled.

Figure 2 is a schematic drawing of the cross sectional side elevation through the container with the aggregate storage, sorting and feeding facility and cement storage facility assembled.

Figure 1 provides an overview of the mobile batching plant once it has been assembled on site. The apparatus consists of a container (1), which is mounted on a flat bed trailer (2) and which is equipped with wheels (3). The container is mounted on a platform (4) which is set in foundation (5). Mounted at the top of the container is the cement storage facility (6) and aggregate sorting facility



(7A) and aggregate storage facility (7B). The operation of the batching plant is commenced when an external conveying means (8) is assembled to transport aggregate from the site to the aggregate sorting facility. Located at one end of the container directly below the mixing device is the concrete discharge outlet (9). The container may be connected to a truck unit at one end of the trailer (50).

Figure 2 provides a cross sectional side elevation view of the container.

Within the container is located the conveying means (10) which runs at an elevated angle from one end of the container to the other. The conveying means is surrounded by an enclosure (11). Located at the other end of the conveying means is a concrete mixing device (12), a water storage tank (13), and a cement weighing device (14) which is connected to the mixing device.

On delivery to the site the container (1) mounted on the trailer (2) is lifted by crane on to the platform (3) which has been erected on the site and secured into place. The cement storage facility (6) and aggregate storage, sorting and feeding facility (7A&B) are lifted by crane on to the container (1) and are secured into place. A concrete discharge outlet (9) is also attached to the container at a point below the mixing device. A suitable external conveying means (8) is then assembled on site, which is preferentially fully enclosed to prevent atmospheric pollution, to transport aggregate from the site up to the aggregate sorting facility(7A)

In operation, aggregate from the site is transported along the external conveying means (8) to the aggregate sorting facility (7A). Depending on the

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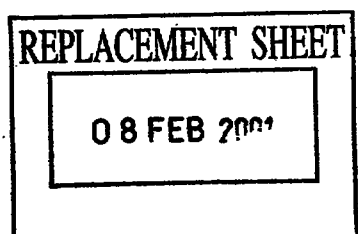
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size of the aggregate it is distributed to the appropriate storage facility (7B).

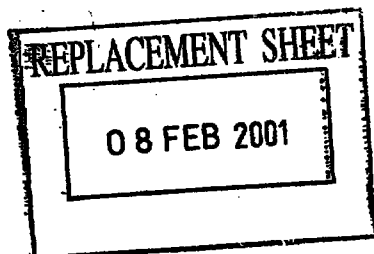
Measured amounts of the appropriate size aggregate are then discharged from the storage facility (7B) onto the conveying device (10). The aggregate is then transported along the conveying device to the mixing device (12). Cement is discharged from the cement storage facility (6) into the cement weighing device (14) which is then discharged directly into the mixing device.

Appropriate volume of water from the water storage facility (13) is also discharged into the mixing device. The concrete is then discharged from the mixing device via an outlet (9) attached to the bottom of the container for use.

On completion the aggregate storage, sorting and feeding facility, the cement storage facility and the concrete discharge outlet are detached from the container. The container is then lifted from the platform to the ground where it can be coupled to a truck unit and transported to another site.



CLAIMS



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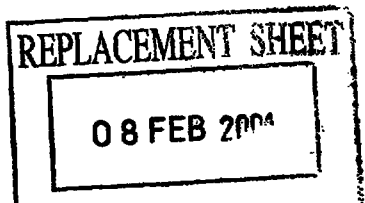


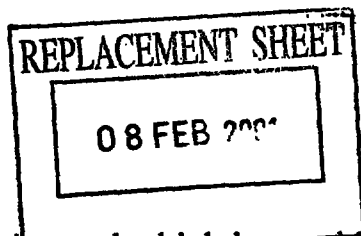
1. A mobile batching plant comprising a container, an aggregate storage, feed and sorting facility and a cement storage and feed facility, wherein the container is mounted on a flat bed trailer which is equipped with wheels at one end and which is capable of being connected at the other end to a truck unit for transportation by road, and wherein disposed within the container, along the longitudinal axis thereof, is a conveying means which is equipped with a weighing device, and further disposed within the container is a concrete mixing device situate at one end of the container, which is in communication with the conveying means, a cement weighing device, a water metering facility and a water storage facility and wherein the aggregate storage, sorting and feeding facility may be reversibly connected to the container through suitable openings in the roof of the container such that aggregate storage, sorting and feeding facility is in communication with the aforesaid conveying means and the cement storage facility is in communication with the concrete mixing device and wherein the mobile batching plant is provided with a central control unit which is capable of controlling and regulating by appropriate means the aggregate feed mechanism, the cement feed mechanism, the conveying means, the water metering mechanism, the weighing device and the concrete mixing device.
2. An apparatus as claimed in claim 1 wherein the conveying means is provided with a motor and a weighing device and wherein the conveying means is surrounded by an enclosure and which is disposed at an elevated angle which is in communication with the aggregate storage



facility and is capable of receiving aggregate discharged from the said storage facility and wherein the upstream end of the conveying means is in communication with the concrete mixing device and capable of receiving material discharged from the conveying means and wherein there is provided a mechanism to control and regulate the function of the conveying means.

3. An apparatus as claimed in claim 1 where there is disposed above the conveying means a feed control mechanism to control and regulate the supply of aggregate from the aggregate storage unit to the conveying means.
4. An apparatus as claimed in claim 1 wherein there is situated above the container a cement storage facility which is provided with a feed control mechanism to control and regulate the supply of cement and which is in communication with a cement weighing device.
5. An apparatus as claimed in claim 1 wherein there is disposed in the container is a cement weighing device which is in communication at one end with a cement storage facility and in communication at the other end with the concrete mixing device and which is disposed with a control mechanism to control and regulate the discharge of cement into the mixing device.
6. An apparatus as claimed in claim 1 wherein there is disposed within the container a water storage facility which is provided with water metering capability and which is in communication with the concrete mixing



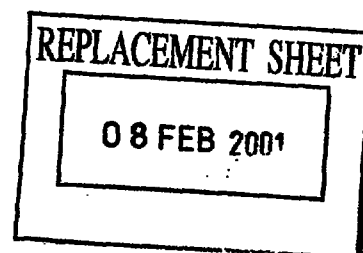


device and which is provided with a control mechanism to control and regulate the volume of water discharged into the mixing device.

7. An apparatus as claimed in claim 1 wherein there is disposed within the container a concrete mixing device which is located at the upstream end of the conveying means which is provided with a motor and wherein the mixing device is in communication with the conveying means such as to be capable to receive discharge of material from the conveying means and is also in communication with the cement weighing device such as to be capable to receive discharge from the weighing device and even further in communication with the water storage facility such as to be capable to receive water therefrom and is further disposed with an external discharge unit to discharge mixed concrete from the mixing device.
8. An apparatus as claimed in claim 1 wherein there is situated above the container an aggregate storage, sorting and feeding facility which is capable of receiving aggregate from an external source and distributing the said aggregate to the aggregate storage facility such that aggregate of the different sizes are stored separately and wherein the aggregate storage facility is in communication with the conveying means through a feed control mechanism to control and regulate the supply of aggregate to the conveying means.
9. An apparatus as claimed in claim 1 wherein the aggregate feed mechanism, the cement feed mechanism, internal conveying means, the water metering mechanism, the weighing device and the mixing device



are provided with control devices which are linked to a central control unit which is capable of controlling and regulating these devices.



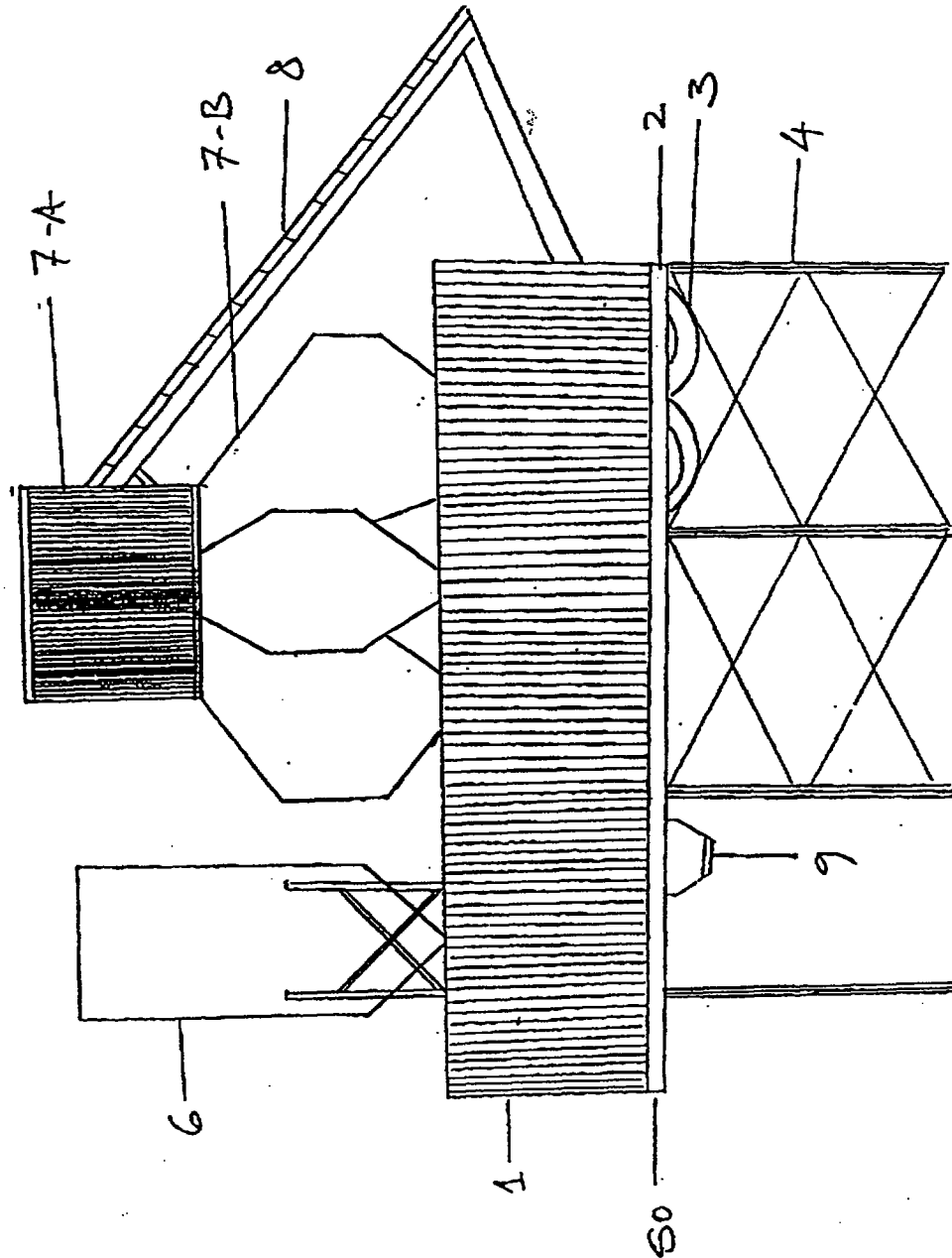
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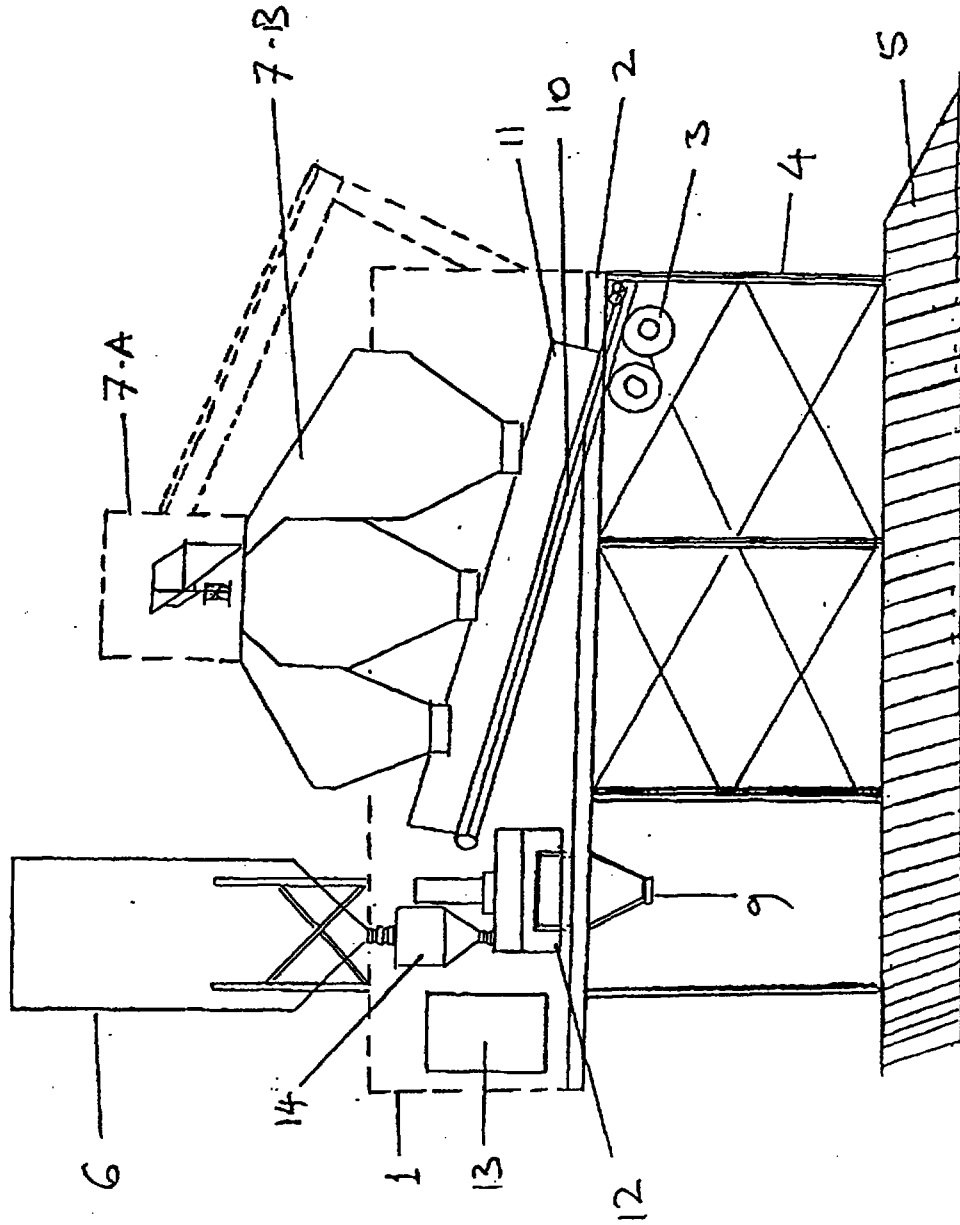
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