

EXERCISE APPARATUS

FIELD OF THE INVENTION

- 5 The invention relates generally to an exercise apparatus and more particularly to an apparatus constructed for use primarily in the conditioning and strengthening of the user's muscles. The apparatus is adapted for ease of storage and/or portability.

BACKGROUND

- 10 Regular exercise is important for building and maintaining strength and endurance, and also to maintain flexibility. While activities such as running, swimming and stretching are somewhat effective in achieving those ends, the use of an exercise apparatus is generally employed for a more comprehensive training program. Apparatus developed for this purpose typically provide the user with a force resistance against which muscular effort
15 must be applied. Resistance is often provided by a weight, or by an elastic element. Such devices permit the force to be applied to the user's body from one or many different directions in order to develop substantially multiple areas of the body.

- One particularly effective exercise regimen based on resistance is that known as the Pilates
20 Method. Developed in the 1920s by Joseph Pilates, the Pilates Method is an exercise system focused on improving flexibility and strength for the body without building muscle bulk. The Method emphasises the balanced development of the band of muscles that circle the body just below the belt line, including the abdominals, lower back, hips and buttocks.

- 25 Through a series of controlled exercises on various apparatus, it is possible to lengthen, strengthen and realign the body with precise and efficient movement.

- Apparatus used in the Pilates Method are generally large, complex and costly machines which occupy a substantial amount of space, and consequently are not suitable for home
30 use. These are usually found only in gymnasiums, studios and clinics. Devices specifically designed for home use, while somewhat smaller, usually must be permanently erected in a

room or location specifically set aside for exercising. Many homes do not have sufficient space for this purpose.

A particularly effective Pilates machine is known as the "Pilates reformer", which is a large device having a bed-like frame. The frame supports a flat platform (called the carriage), which rolls back and forth on wheels within the frame. The carriage is attached to one end of the reformer by a set of springs. The springs provide choices of differing levels of resistance as the carriage is pushed or pulled along the frame. The carriage includes shoulder blocks to prevent a user from sliding off the end of the reformer as they push or pull the carriage.

At the spring end of the reformer there is an adjustable footbar. The footbar can be used by the feet or hands as a user moves the carriage. The reformer also has long straps with handles that are attached to the top end of the frame which can be pulled with legs or arms to move the carriage. Varying body weight and resistance of the springs make the carriage more or less difficult to move. Reformers parts are adjustable for differing body sizes and for differing levels of skill.

As is immediately apparent, reformers of the prior art are large, cumbersome, heavy and difficult to transport. Attempts to produce reformers for home use have lead to devices that are difficult to fold and unfold, break easily, are not easy to transporting, have complex folding mechanisms, *et cetera*.

It is an aspect of the present invention to overcome or at least ameliorate a problem with the prior art; or to provide an alternative to prior art contrivances by providing a compact and portable exercise apparatus which can be easily erected for use and folded for storage. It is a further aspect of the present invention to provide an alternative to prior art contrivances.

The discussion of documents, acts, materials, devices, articles and the like is included in this specification solely for the purpose of providing a context for the present invention. It is not suggested or represented that any or all of these matters formed part of the prior art base

or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application

SUMMARY OF THE INVENTION

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After considering this description it will be apparent to one skilled in the art how the invention is implemented in various alternative embodiments and alternative applications. However, although various embodiments of the present invention will be described herein, it is understood that these embodiments are presented by way of example only, and not
10 limitation. As such, this detailed description of various alternative embodiments should not be construed to limit the scope or breadth of the present invention. Furthermore, statements of advantages or other aspects apply to specific exemplary embodiments, and not necessarily to all embodiments covered by the claims.

15 Unless the contrary intention is expressed, the features presented as preferred or alternative forms of the invention can be present in any of the inventions disclosed as alone or in any combination with each other.

Throughout the description and the claims of this specification the word "comprise" and
20 variations of the word, such as "comprising" and "comprises" is not intended to exclude other additives, components, integers or steps.

In a first aspect the present invention provides an exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a user engagement member, and an
25 arm, the user engagement member linked to the arm, the arm in turn linked to the main frame, wherein the linkage between the arm and the main frame is adapted or configured such that the user engagement member is capable of being moved from an operable position to a storable position.

30 In the context of the present invention the term "user engagement member" is intended to include any substantially rigid member adapted or configured to be engaged by the user in the course of an exercise. The member may be for the purpose of stabilising the user's

position on the apparatus, or to provide a surface for pushing against in the course of a resistance-based exercise.

As used herein the term “operable position” is intended to include any position that the user engagement member can assume in which the user can undertake an exercise for which the apparatus is designed. Typically, this will include a position whereby the member allows a foot to engage and press against it when the user is on the carriage.

The term “storable position” is intended to include any position that the user engagement position can assume in which the apparatus has a smaller dimension as compared with that when the member is in the operable position. Typically, this will include a position whereby the member lies substantially flat against the frame or carriage of the apparatus.

Applicant has discovered that an exercise apparatus having a user engagement member (such as a footbar) that is alternatively configurable between an operable and a storable position in the manner described and claimed herein overcomes or ameliorates one or more problems of the prior art, or provides an alternative to existing devices.

The user engagement member is an important component of many types of exercise apparatus, and is generally required to possess significant strength given that user may apply formidable pressure. The member is also often required to assume a position that is above or below the general plane of the apparatus to facilitate certain exercises. These requirements are generally adverse to the design of an exercise apparatus that is robust and portable. Providing the user engagement member at or toward the terminus of an arm that is connected to the main frame is a solution that accommodates all requirements.

The member may be of any dimensions suited to the particular type of exercise apparatus under consideration. Generally, the member is substantially elongate and is of sufficient length to accommodate one or two feet of a user, or one or two hands (when placed side by side). The member may be fabricated from any suitable material including metals (such as tubular steel). However, for reasons of weight minimisation the member may be fabricated from a metal such as aluminium. The member may alternatively be fabricated from a non-

metal such as a high density plastic or carbon fibre. In some embodiments, the user engagement member is covered with a cushioning material suitable for enhancing user comfort.

- 5 Typically the arm is linked directly to the main frame of the apparatus, however it will be understood that other embodiments may provide that the arm is linked to the main frame via some other intermediate structure such as a spacer element. Similar considerations apply to the link between the arm and the user engagement member.
- 10 The linkage between the arm and the main frame may be of any type capable of allowing or facilitating the movement of the member between the operable position and the storable position. The linkage may be a hinged linkage or a pivotal linkage. In one embodiment of the apparatus the linkage between the arm and the main frame comprises a simple pin connecting the arm and the main frame, with the arm capable of pivoting about the pin,
- 15 with a single degree of freedom.

The linkage between the arm and the main frame may comprise means for limiting the distance by which the arm may travel. For example, it will generally be desirable that the user engagement member (when in the operable position) assumes a predetermined position. This position may be related to the size of the user and/or the exercise under consideration. Thus, the means for limiting the distance may be a stop that engages a fixed structure of the apparatus (such as the main frame) when the user engagement member is in the predetermined position. Alternatively the means may allow for one of a number of predetermined distances to be selected by the user, and may comprise a locking

20 mechanism. The locking mechanism may be a simple pin that is inserted through the arm and into an aperture bored into an immovable component of the apparatus, such as the main frame. Alternatively, the locking mechanism may rely on the frictional engagement of the arm with an immovable component such as the main frame.

- 30 The linkage between the arm and the user engagement member is typically of a type allowing for rotation of the member about its' own long axis. This allows for the user to maintain full engagement with the member through the full motion of an exercise. In a

fundamental embodiment, the linkage is a simple pin providing for a single degree of freedom.

In a preferred embodiment the apparatus comprises two arms, with each arm linked to a terminus of the user engagement member. This embodiment requires two linkages between the main frame and the arm; and also two further linkages between the arm and the user engagement member. This arrangement is particularly stable, allowing for support to the user engagement member at both termini.

- 10 The connection may be made by way of a simple pin, whereby the arm and main frame are rotatable in a single axis about the pin, and having a single degree of freedom.

The apparatus may comprise means for retaining the user engagement member in the storable position, this facilitating storage and/or portability. The means for retaining may be disposed on, or involve, one or more of the arm, user engagement member, main frame, carriage or any linkage of the apparatus. For example an elasticised element may be provided, the element capable of engagement with the arm and the main frame.

In one embodiment of the apparatus, the arm is fitted with a wheel or a roller. Even where an exercise apparatus is in a folded arrangement (and therefore more easily storable), the transport of the apparatus to the place of storage may still a problem. For example, where an apparatus is used in a bedroom, the user may prefer to store it some distance away, such as in a garage. In some cases, the exercise apparatus may be loaned or hired from a clinic, gymnasium or studio. In that case, it will need to be transported to the user's car, and then from the car to the house.

In a preferred embodiment of the apparatus, the wheel or roller is disposed on or about the arm such that when the user engagement member is in the operable position the wheel or roller is incapable of engaging with the floor, but when in the storable position is capable of engaging with the floor to allow rolling of the apparatus. This arrangement provides significant further practical advantages in addition to those discussed *supra*. An exercise

apparatus having a wheel or roller disposed in this manner is easily manually transported while in the storable position, but is stable when in the operable position.

The wheel or roller may be disposed on or about the arm in any way to achieve the result described *supra*. In one embodiment, the wheel or roller is disposed on the arm at the terminus opposite that having the user engagement means. In this way, the position of the user engagement means dictates the position of the wheel or roller. In certain forms of the apparatus the arm is linked to the main frame with a simple pivot linkage (such as a pin), whereby the arm pivots about a linkage point with a single degree of freedom. In certain
10 embodiments, the arm comprises a bend and exhibits two main axes: the first axis described by a line running from the terminus having the user engagement means through the linkage point with the main frame, the second axis described by a line running from the terminus having the wheel or roller through the linkage point with the main frame.

15 In preferred forms of the apparatus these axes describe an obtuse angle. In some embodiments, the acute angle is from about 122 degrees to about 162 degrees, preferably from about 127 degrees to about 157 degrees, preferably from about 132 degrees to about 152 degrees, preferably from about 137 degrees to about 147 degrees. In a highly preferred form of the apparatus the acute angle is about 142 degrees.

20 Preferably the distance between the terminus of the arm having the user engagement means and the linkage point with the main frame is about 46 cm. Preferably the distance between the terminus of the arm having the wheel or roller and the linkage point with the main frame is about 11 cm.

25 Preferably the ratio of the distance between the terminus of the arm having the user engagement means and the linkage point with the main frame, and the distance between the terminus of the arm having the wheel or roller and the linkage point with the main frame is between about 3 and 5. Preferably the ratio is about 4.2.

30 The measurements and ratios included herein are relevant to an exercise apparatus having a main frame of length about 187cm, a carriage at about 12cm above the floor, and a user

engagement member (when in the operable position) at a height of 36cm above the carriage. It will be appreciated that the angles and measurements relevant to the arm (as disclosed in the above paragraph) may be altered by routine means in order to achieve the advantages disclosed herein for an apparatus of different overall size. For example, where
5 the carriage is at a greater height above the floor, the length between the pivot point and the terminus of the arm having the wheel or roller may be longer. Alternatively, the angle made by the first and second axes may be larger.

The skilled person, once availed with the present invention, is capable adjusting any
10 parameter to provide an arrangement with respect to the arm, pivot point and wheel/roller to achieve the desired result in a particular circumstance.

In another embodiment of the invention, the arm further comprises means for limiting movement of the carriage. It is desirable to limit the movement of the carriage past a
15 certain point on the carriage track to prevent damage to the main frame or any other structure of the apparatus. It is also desirable to do so for the purpose of restricting the range of movement achievable by the user in the course of exercise.

Preferably the means for limiting movement of the carriage comprises a stopping member
20 extending outwardly from the arm. The stopping member is adapted or configured such that when the user engagement member is in the operable position, the stopping member is positioned so as to be able to prevent movement of the carriage beyond a predetermined point. In this embodiment of the invention, it will be appreciated that the arm provides for three functions (moving the user engagement means from an operable to a storable state,
25 able to be wheeled, and used to stop the carriage).

In some embodiments of the apparatus the stopping member is adapted or configured such that when the apparatus is in the storable position, the stopping member ceases to prevent movement of the carriage. Accordingly, the carriage may be moved into a position further
30 along the track allowing for a more compact apparatus overall. In addition, when the user engagement means is in the storable position (and the stopping member ceases to prevent movement of the carriage) a further advantage is provided in that the carriage is permitted

to move into a lockable position. The adoption of a lockable position minimises movement of the carriage while in the storable position, thereby facilitating transport of the apparatus. The arm may be fabricated from any suitable material, but is preferably aluminium. The arm may have cut outs to minimise weight.

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In a second aspect, the present invention provides an exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a shoulder retaining means, the shoulder retaining means linked to the carriage, wherein the linkage is adapted or configured such that the shoulder retaining means is capable of moving from an operable position to a storable position. Applicant provides a further manner in which the size of an exercise apparatus may be decreased for storage or portability. Shoulder retaining means are present on a number of exercise machines (either alone or in combination with user engagement means), with these features contributing to the overall external dimensions of the apparatus.

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As used herein, the term "shoulder retaining means" is intended to include any physical barrier that is capable of engaging a shoulder of a user lying on the carriage, the engagement preventing movement of the user across the surface of the carriage during exercise. Such means are essential for certain exercises given that a user may be exerting a force that leads to a movement across the carriage surface. For example, where the user may be exerting pressure on a footbar (against a resistance force provided by the apparatus) and there will be a natural tendency for the user to slide across the surface of the carriage, and toward the upper edge of the carriage. The disposition of a pad (or indeed two pads, one for each shoulder) extending from the carriage prevents this lateral movement and keeps the user substantially immobile on the carriage. Applicant proposes a linkage mechanism by which these retaining means may be moved from an operable position to a storable position.

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In one embodiment of the apparatus, the linkage comprises means for allowing the shoulder retaining means to be erected substantially vertically from a storable position, means for allowing rotation of the shoulder retaining means once erected, means for

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lowering the rotated shoulder retaining means into an operable position, and a peg extending from the carriage for securing the lowered shoulder retaining means in position.

In one embodiment of the linkage, the ability to erect the shoulder retaining means from the folded position is provided for by a hinge pin disposed toward the base of the means. The rotation and insertion is allowed by use of a sliding means, sliding and rotating within an internal fixed collar. Removal of the shoulder retaining means is prevented by the flared terminus of the sliding means.

Preferably, the shoulder retaining means comprises padding. In one embodiment the padding is flat on one side, to allow for a lower profile when in the storable position.

In a further aspect, the present invention provides an exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a user engagement member, and an arm, the user engagement member linked to the arm, the arm in turn linked to the main frame, a shoulder retaining means, the shoulder retaining means linked to the carriage, wherein the linkage between the arm and the main frame is adapted or configured such that the user engagement member is capable of being moved from an operable position to a storable position, and wherein the linkage between the shoulder retaining means is adapted or configured such that the shoulder retaining means is capable of moving from an operable position to a storable position.

While the inventive subject matter described herein will find utility in many types of exercise apparatus, it is preferably applied to a Pilates reformer apparatus. As discussed in the Background section herein, the Pilates reformer is an important facet of the Pilates method. The benefits of the Pilate reformer are well acknowledged, but an ongoing problem is the cumbersome nature of the apparatus. The present invention provides for a foldable and portable Pilates reformer which overcomes or ameliorates the significant shortcomings in terms of portability and size. The inventive reformer machine disclosed herein provides for the use of this important machine outside clinics, gymnasias and studios.

There are a number of types of Pilate reformers known in the art, with the present invention being applicable to many if not all. Reformers share a number of common features as discussed infra.

5 *Resistance means*

Reformer machines incorporate resistance means to increase the difficulty of an exercise. Springs are commonly used, but other resilient arrangements such as elastic materials are also capable of providing resistance from the machine. The springs typically hook onto the spring bar, and different springs can be unhooked to increase or decrease the resistance.

- 10 Many levels of resistance are achieved through varying combinations of the springs. There may also be a gear system that allows one to change the distance of the spring bar from the end of the carriage. This is sometimes used to adjust for a user's height.

The Carriage

- 15 The carriage is the part of the machine that the user is disposed on. The carriage is moved by pushing against the footbar, or by pulling the straps or ropes at the opposite end of the reformer. The carriage glides back and forth along the inside of the frame, responding to the effort exerted and the amount of resistance set up by the springs. Reformer exercises can be performed lying down, sitting, kneeling or standing on the carriage.

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Head Rest and Shoulder Pads

Many Pilates reformer exercises are done lying down with the head on the headrest. As discussed *supra*, the shoulder pads keep the user stable on the reformer as the carriage is pulled or pushed. Often the shoulders are against the pads, but there are also exercises that

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use the shoulder pads as props for the feet, knees or hands.

Straps and Ropes

The straps are connected to pulleys at the top end of the reformer. The straps have handles at the end that may be grasped such that the user can pull or push the carriage. The straps

30 may be threaded through the handles in order to work the feet in the straps. Again, the basic principle is that the user will be pushing or pulling themselves on the carriage against the resistance provided by their own body weight and the springs.

In a further aspect the present invention provides a method for instructing in a Pilates exercise, the method comprising the step of providing an apparatus as described herein, and providing the instruction. The instruction may be by way of personal instruction,
5 written material, audio material or video material.

DETAILED DESCRIPTION WITH REFERENCE TO PREFERRED EMBODIMENTS

The present invention will now be further described by reference to the following non-
10 limiting embodiments, and where:

Figure 1 Panel A is a side elevation of a Pilates reformer shown in an operable configuration. Panel B is a side elevation of a Pilates reformer shown in a storable configuration. Panel C is a plan view of a Pilates reformer shown in an operable
15 configuration.

Figures 2 and 3 show mounting hardware for a shoulder pad of a Pilates reformer.

Turning now specifically Figure 1, there is shown a Pilates reformer according to the present
20 invention. There is shown the main frame **2**, supporting the carriage tracks (not shown) upon which the carriage **6** glides. The arm **8** is linked to the main frame **2** by a pivot hinge **10**. The user engagement means **12** (in this case, a footbar) is attached to the terminus of the arm **8**. A wheel **14** is disposed at the opposite terminus of the arm **8**. A stop **16** extends from the arm **8**. A shoulder pad is shown in the operable position **18**, adjacent to the
25 headrest **20**. The main frame **2** has a hinge **22** allowing the reformer frame to be folded.

As will be noted from Panel A showing the footbar **12** in the operable position, the wheel **14** is elevated above the floor such that the apparatus sits on the main frame **2** and is therefore immovable. The stop **16** is positioned so as to limit the travel of the carriage **6** along the
30 carriage track.

Panel B shows the footbar **12** in the storable position, and demonstrates the significant decrease in outer dimension of the apparatus afforded. Also shown is the movement of the wheel **14** into a position allowing for it to engage with the floor. Upon raising the apparatus onto the wheel **14**, the apparatus can be freely transported. This Panel also demonstrates the first shoulder pad **24** folded down onto the carriage to provide a lower profile, with the headrest **26** having been slid inwardly to decrease the overall length of the folded apparatus.

Figure 2 shows the mounting of a shoulder pad assembly of the present invention, as applicable to a Pilates reformer. A spigot **2** having a hinge pin **4** is attached to a mounting plate **6**, the plate for attachment to the carriage (not shown). The hinge pin **4** links the tube slider **8** to the spigot **2**. The tube slider **8** slides and rotates with internal fixed collar **10**. The mounting tube (to which the padding attaches) **12** is unable to be removed due to the presence of the flare **14** on the tube slider **8**.

Figure 3 shows the same components as for Figure 2, in an exploded view at Panel A. Panel B shows the same components as for Panel A but rotated through 90 degrees, and having the mounting tube **12**, tube slider **8** and collar **10** assembled. Panel B shows the further features of the padding **16** and the cut away **18** in spigot **2** allowing the mounting tube **18** to fold downwardly.

CLAIMS

1. An exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a user engagement member, and an arm, the user engagement member linked to
5 the arm, the arm in turn linked to the main frame, wherein the linkage between the arm and the main frame is adapted or configured such that the user engagement member is capable of being moved from an operable position to a storable position.
2. An exercise apparatus according to claim 1 wherein the linkage is a hinged linkage or a
10 pivotal linkage.
3. An exercise apparatus according to claim 1 or claim 2 wherein the linkage comprises a simple pin connecting the arm and the main frame, with the arm capable of pivoting about the pin, with a single degree of freedom.
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4. An exercise apparatus according to any of claims 1 to 3 comprising two arms, with each arm linked to a terminus of the user engagement member.
5. An exercise apparatus according to any one of claims 1 to 4 wherein the arm is fitted
20 with a wheel or a roller.
6. An exercise apparatus according to claim 5 wherein the wheel or roller is disposed on or about the arm such that when the user engagement member is in the operable position the wheel or roller is incapable of engaging with the floor, but when in the storable position is
25 capable of engaging with the floor to allow rolling of the apparatus.
7. An exercise apparatus according claim 5 or claim 6 wherein the wheel or roller is disposed on the arm at the terminus opposite that having the user engagement means.
8. An exercise apparatus according to any one of claims 1 to 7 wherein the arm comprises a
30 bend and exhibits two main axes: the first axis described by a line running from the terminus having the user engagement means through the linkage point with the main

frame, the second axis described by a line running from the terminus having the wheel or roller through the linkage point with the main frame.

5 9. An exercise apparatus according to claim 8 wherein the first and second axes describe an acute angle.

10 10. An exercise apparatus according to claims 9 wherein the acute angle is from about 18 degrees to about 58 degrees, preferably from about 23 degrees to about 53 degrees, preferably from about 28 degrees to about 48 degrees, preferably from about 33 degrees to about 43 degrees, preferably about 38 degrees.

15 11. An exercise apparatus according to any one of claims 1 to 10 wherein the ratio of the distance between the terminus of the arm having the user engagement means and the linkage point with the main frame, and the distance between the terminus of the arm having the wheel or roller and the linkage point with the main frame is about 11 cm.

12. An exercise apparatus according to any one of claims 1 to 11 comprising means for limiting movement of the carriage.

20 13. An exercise apparatus according to claim 12 wherein the means for limiting movement of the carriage comprises a stopping member extending outwardly from the arm.

25 14. An exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a shoulder retaining means, the shoulder retaining means linked to the carriage, wherein the linkage is adapted or configured such that the shoulder retaining means is capable of moving from an operable position to a storable position.

30 15. An exercise apparatus according to claim 14 wherein the linkage comprises means for allowing the shoulder retaining means to be erected substantially vertically from a storable position, means for allowing rotation of the shoulder retaining means once erected, means for lowering the rotated shoulder retaining means into an operable position, and a peg extending from the carriage for securing the lowered shoulder retaining means in position.

16. An exercise apparatus according to claim 15 wherein the ability to erect the shoulder retaining means from the folded position is provided for by a hinge pin disposed toward the base of the means, the rotation and insertion is allowed by use of a sliding means, sliding and rotating within an internal fixed collar.

17. An exercise apparatus comprising a main frame, a carriage movable relative to the main frame, a user engagement member, and an arm, the user engagement member linked to the arm, the arm in turn linked to the main frame, a shoulder retaining means, the shoulder retaining means linked to the carriage, wherein the linkage between the arm and the main frame is adapted or configured such that the user engagement member is capable of being moved from an operable position to a storable position, and wherein the linkage between the shoulder retaining means is adapted or configured such that the shoulder retaining means is capable of moving from an operable position to a storable position.

18. An exercise apparatus according to any one of claims 1 to 17 wherein the apparatus is a Pilates reformer, or substantially similar apparatus.

19. An exercise apparatus according to any one of claims 1 to 18 substantially as hereinbefore described by reference to the figures.

20. A method for instructing in a Pilates exercise, the method comprising the step of providing an apparatus according to any one of claims 1 to 19, and providing the instruction.