

March 11, 1969

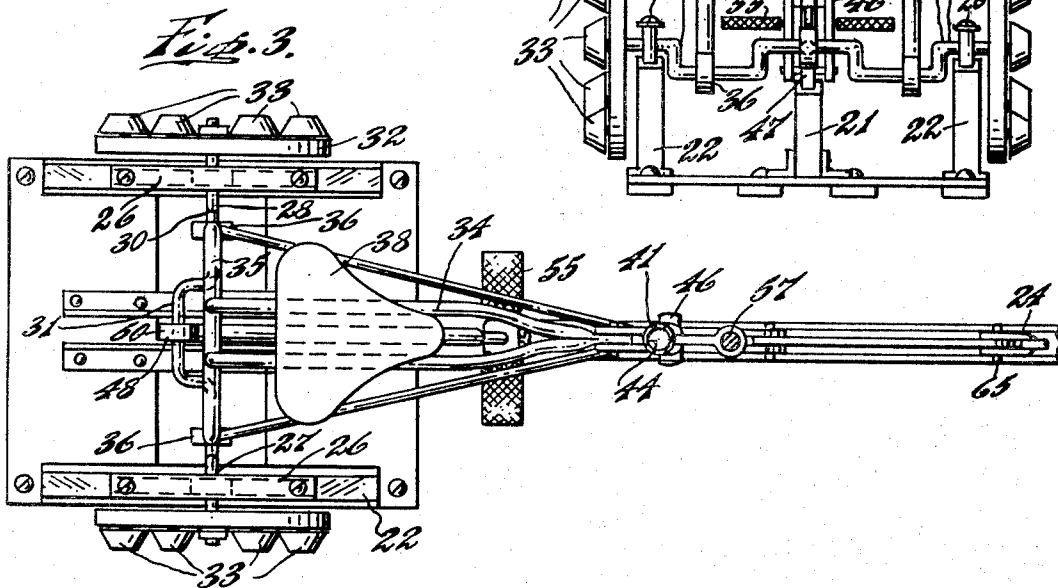
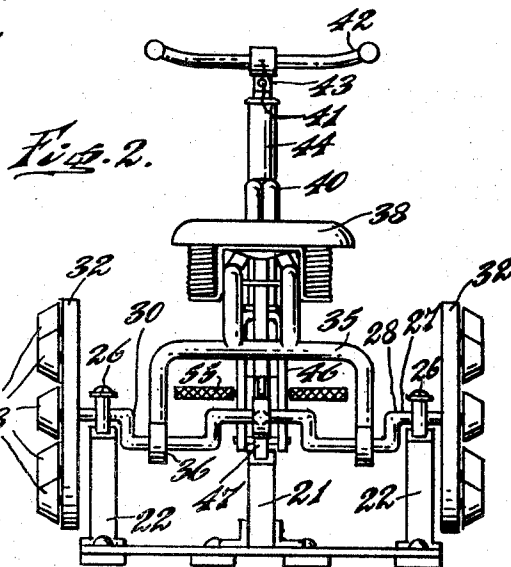
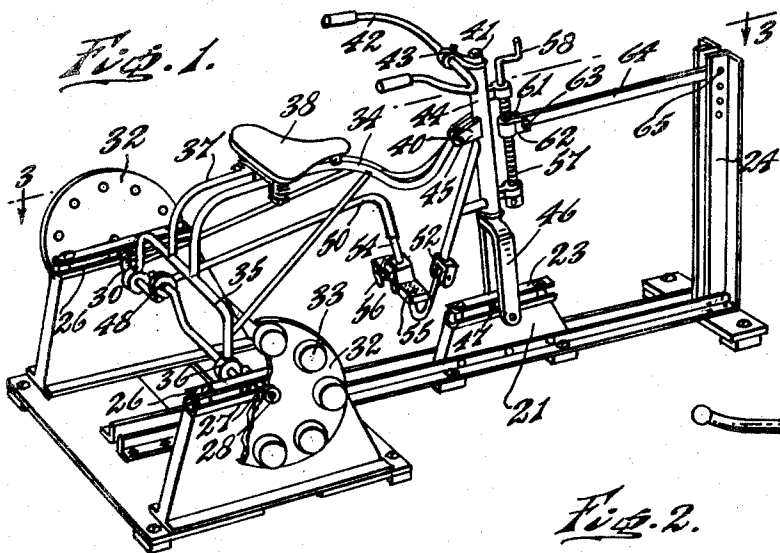
H. A. DEEKS

3,432,164

EXERCISING MACHINE

Filed Feb. 14, 1967

Sheet 1 of 5



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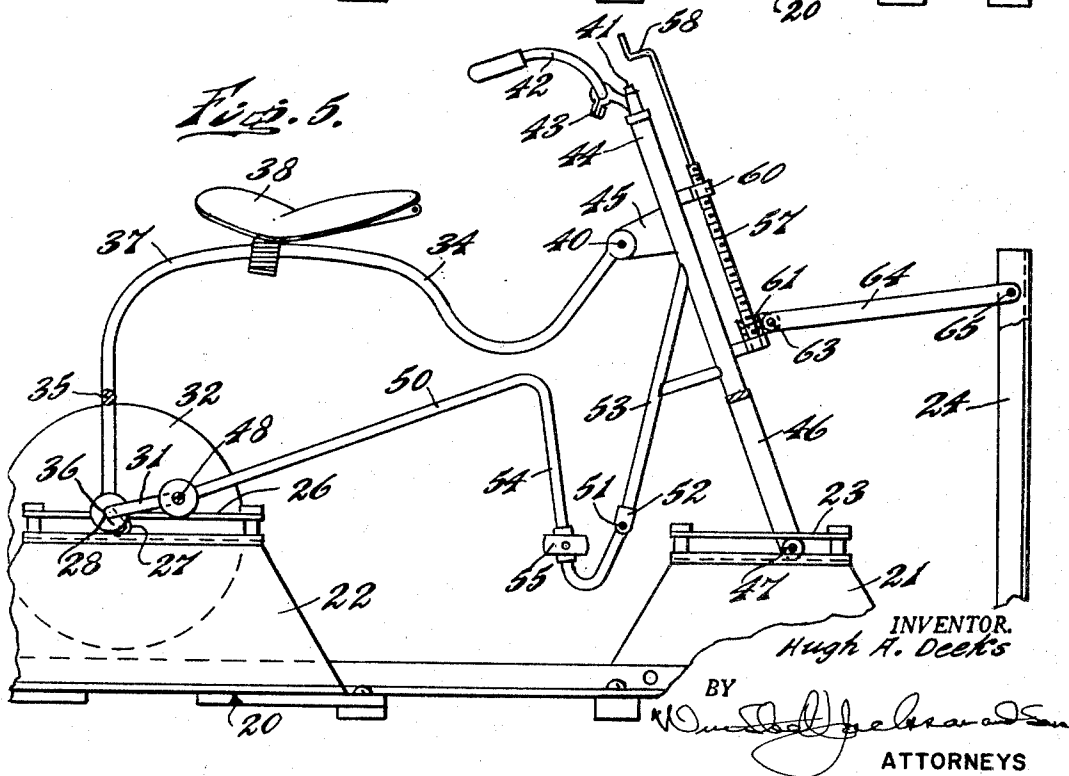
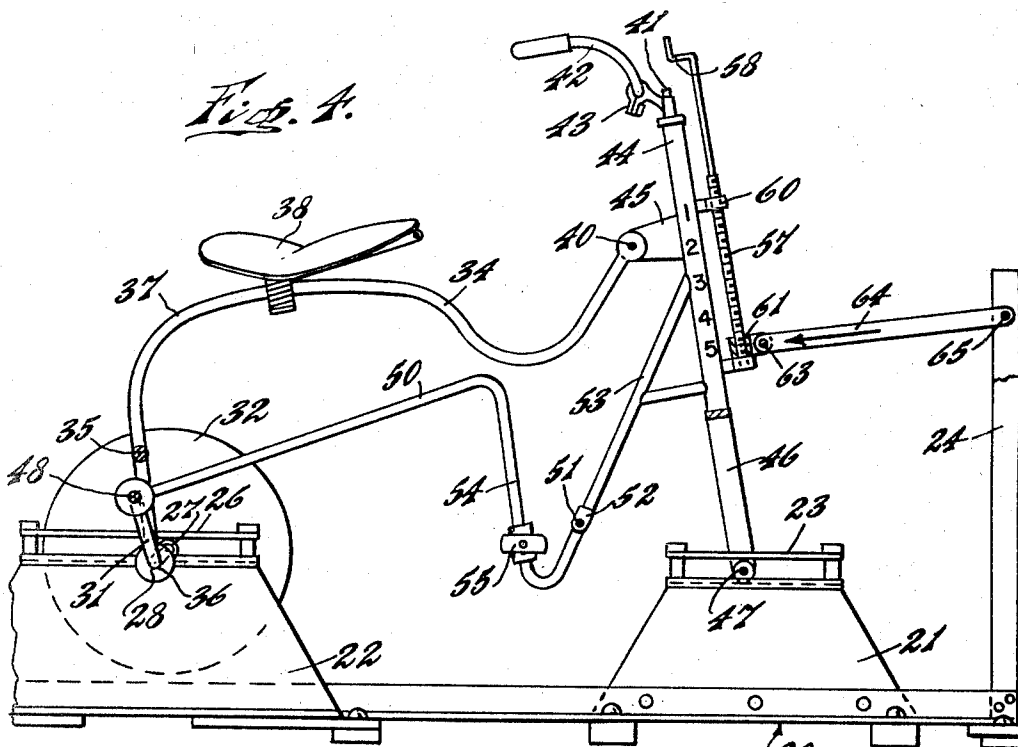
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Fig. 6.

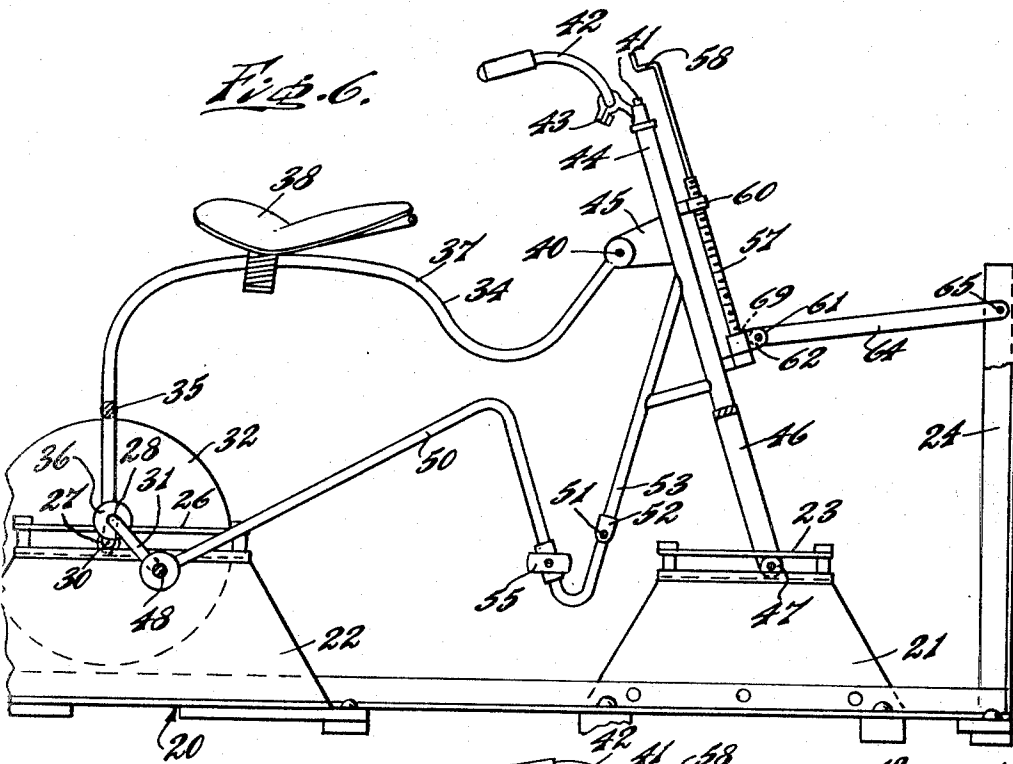


Fig. 7.

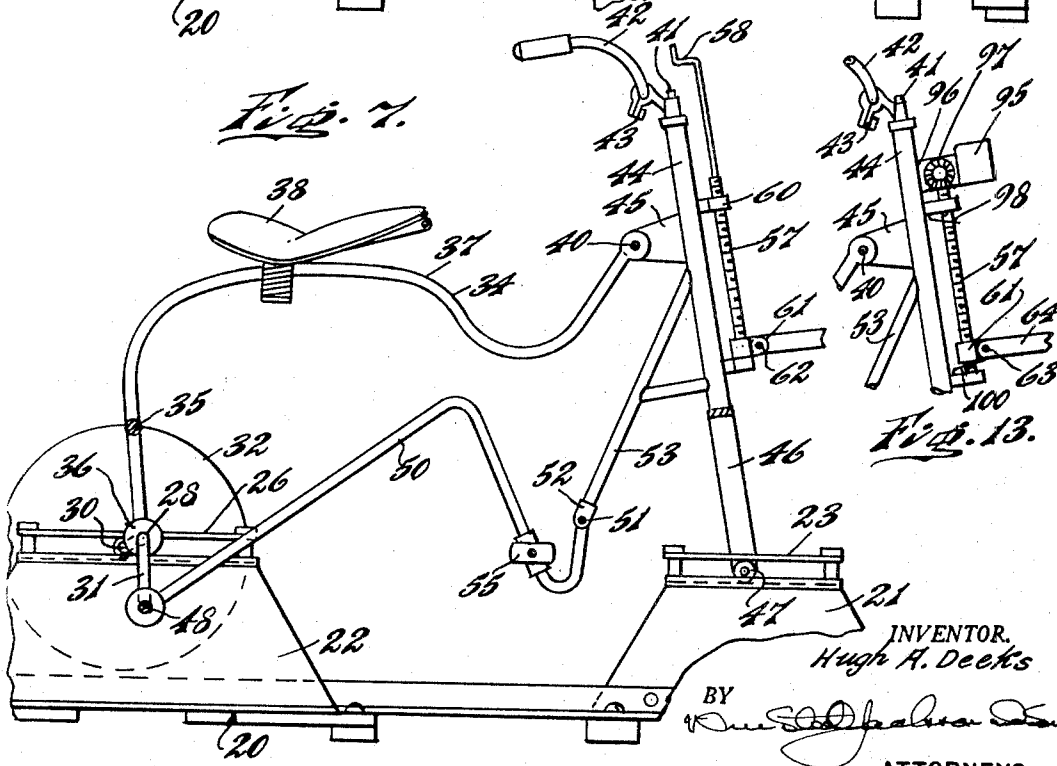


Fig. 13.

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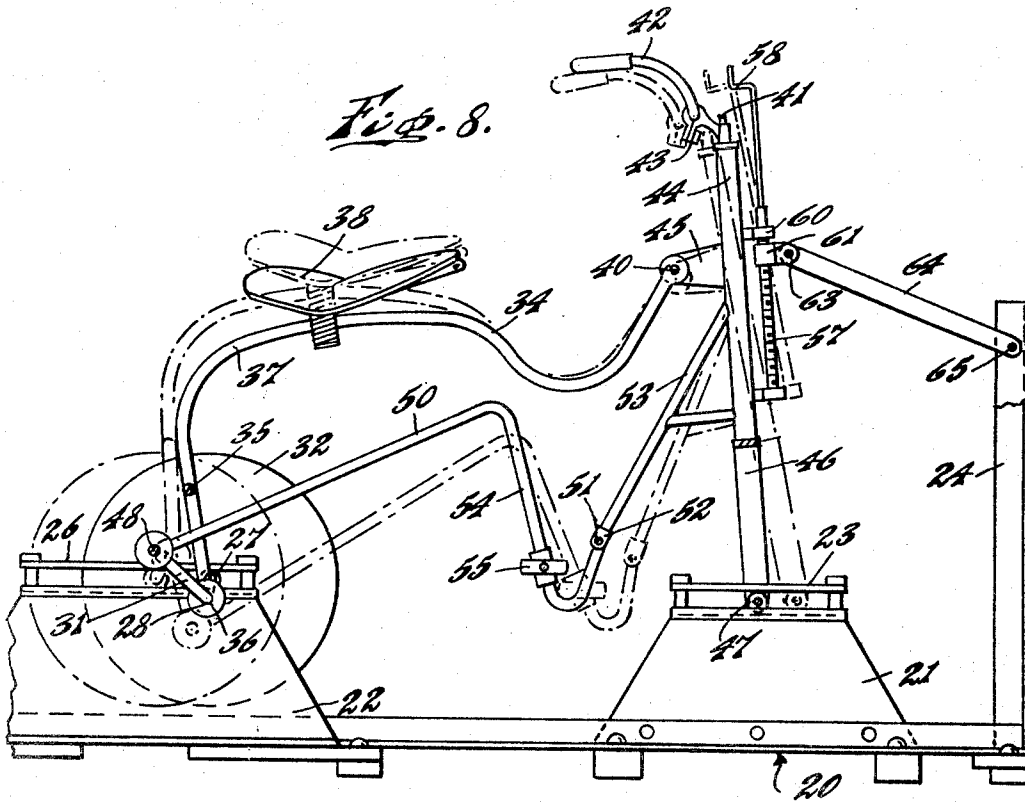
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Sheet 4 of 5



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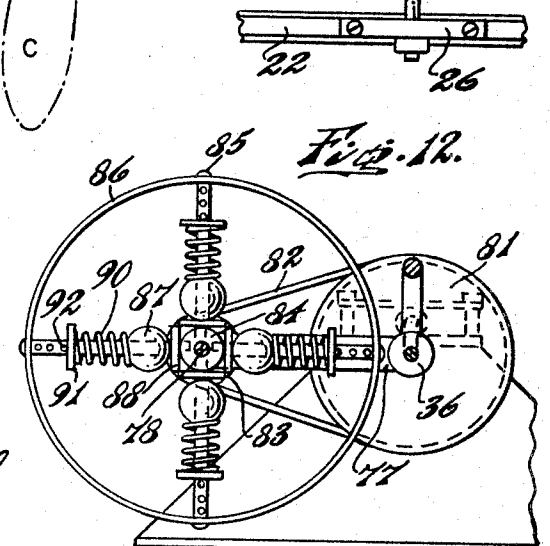
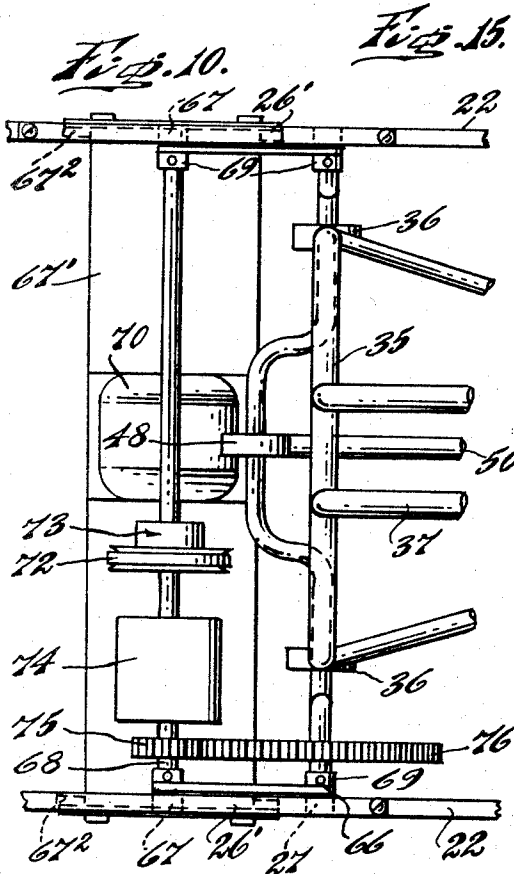
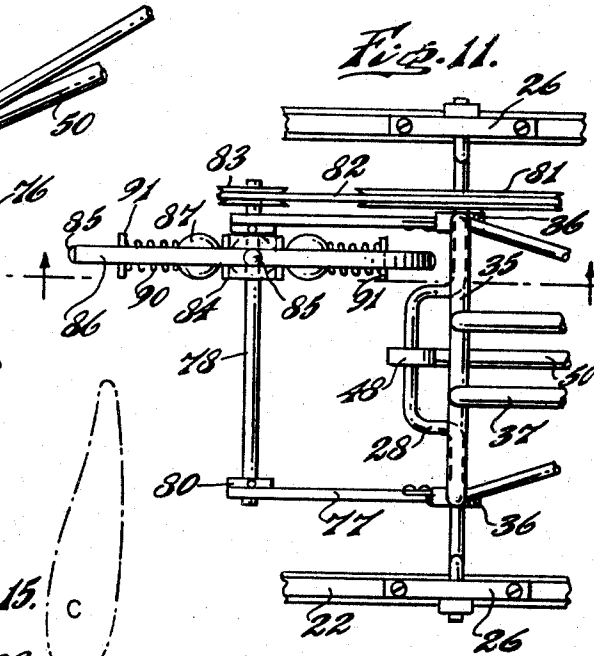
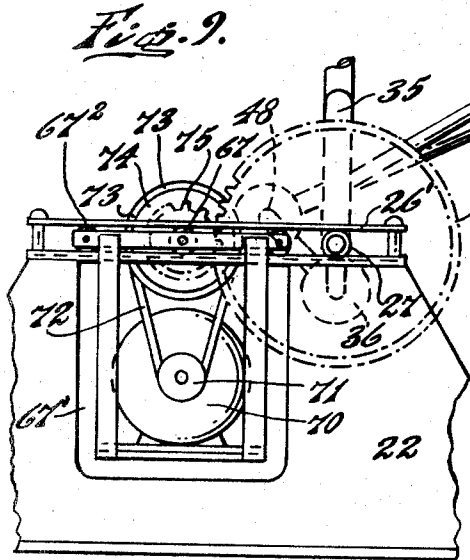
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*Fig. 14.*

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**EXERCISING MACHINE**

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Int. Cl. A63b 23/04, 21/00; A63g 17/00

9 Claims

**ABSTRACT OF THE DISCLOSURE**

The invention relates to an exercising machine which is capable of producing simulated effects of horseback riding, and can alternatively canter or gallop or can automatically change from one to the other.

The present invention relates to an exercising machine which produces exercise similar to horseback riding.

The purpose of the invention is to permit variations in the character of exercise after the manner of the change in gaits of a horse, including cantering and galloping.

A further purpose is to mount the crankshafts on sliding bearings, and to control forward progress by one crankshaft and up and down motion by another crankshaft.

A further purpose is to pivotally interconnect a front frame providing handles and a rear frame providing a saddle and to rock the rear frame up and down while the front frame is moving forward and backward at its lower end.

A further purpose is to connect a motion limiting link to the front of the front frame selectively at a position above or below an interframe pivot between the forward and the rear frame.

A further purpose is to provide a flywheel or flywheels on the crankshaft, to make the balance of the flywheel or flywheels adjustable in the preferred form, and permissibly to add another flywheel with outwardly moving weights which are spring biased against moving outward so as to provide the user with additional exercise if desired.

A further purpose is to drive the crankshaft so as to provide exercise for people such as invalids who are not strong enough to propel the exercising machine.

A further purpose is to make the machine change its mode of motion between cantering and galloping, and vice versa, automatically.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which the invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

FIGURE 1 is a perspective of the preferred exercising machine of the invention, one of the flywheels being partially broken away.

FIGURE 2 is a rear elevation of the machine of FIGURE 1.

FIGURE 3 is a fragmentary top plan view of the machine of FIGURE 1, sectioned on the line 3-3 of FIGURE 1.

FIGURES 4, 5, 6 and 7 are fragmentary side elevations of the machine of the invention at different angular positions of the crankshaft, adjusted for galloping. The showing is partly in vertical section.

FIGURE 8 is a fragmentary side elevation of the machine of the invention adjusted for cantering, showing in dot-and-dash lines another position in the cycle of the operation.

FIGURE 9 is a fragmentary side elevation showing a power drive applied to the machine of the invention.

FIGURE 10 is a fragmentary top plan view of the drive mechanism of FIGURE 9.

FIGURE 11 is a fragmentary top plan view of a modified device of the invention employing a flywheel which increases its inertia with speed, to require additional effort by the rider.

FIGURE 12 is a fragmentary side elevation of the device of FIGURE 11.

FIGURE 13 is a fragmentary side elevation of a variation, automatically shifting from cantering to galloping and vice versa.

FIGURE 14 is a locus of the motion of the saddle during galloping.

FIGURE 15 is a locus of the motion of the saddle during cantering.

There are in the prior art a wide variety of exercising devices including those which simulate the exercise obtained by riding a horse.

The present invention relates to a static machine which more effectively exercises the human body, especially the respiratory area and the torso. The invention also makes it possible to regulate the character of exercise obtained. It is possible by the invention to obtain exercise similar to that obtained in cantering or exercise more closely approximating that of galloping.

A device of the invention in the preferred embodiment contemplates a rear frame and a forward frame which are pivotally interconnected by an interframe pivot near the top. The rear frame carries a saddle and the front frame carries handles. The rearward portion of the rear frame moves up and down and to some extent forward and backward in the preferred embodiment. The lower portion of the forward frame rocks in respect to the rear frame. The forward frame is pivotally connected to a support by a link and the pivotal connection can be moved up and down so that it can be either above or below the interframe pivot. Thus, the saddle is moving up and down, is changing its tilt with respect to the horizontal, and is to some extent moving forward and backward during the gallop in the preferred form. The handles are changing their angle of tilt.

In the preferred device also a link connected to a forward propulsion crankshaft at the rear and connected to a lower portion of the forward frame has stirrups and propels the machine by pressure of the feet thereon and pressure exerted by the arms from the handles, thus exercising the legs and arms and by forward and backward movement with respect to the saddle and to a great extent by up and down movement exercises the torso.

Thus the arms, legs and body all participate in the exercise.

The combination of relative movement of the saddle, of the stirrups and of the handles exercises the respiratory tract and the arms.

In the preferred embodiment, flywheels are provided on the crankshaft, and if desired flywheel means can be employed which will increase in inertia with speed and limit speed and provide greater exercise for a person of greater strength.

On the other hand, the device of the invention can be power driven for the benefit of an invalid.

Considering now the drawings in detail, the form of FIGURES 1 to 8 employs a support 20 which is made up of an interconnected forward support 21 and rearward support 22 which cannot change their relative positions. The forward support has a front bearing horizontal slide means 23 and more forward of it has a standard 24 which at the upper end carries a bracket for a fixed pivot for mounting a motion limiting link to be described.

The rear support **22** is divided into two portions each of which has at the top a rear bearing horizontal slide means **26**.

Journalled at **27** on the rear bearing horizontal slide means **26** is a double crankshaft **28** which has vertical lift crankshaft means or throws **30** near opposite ends and a forward propulsion means for throw **31** near the center.

Suitably on the ends of the crankshaft in the preferred embodiment of FIGURES 1 to 8, I provide flywheels **32** having near the rim weights **33** which can be removed or modified at certain locations so as to balance the crankshaft.

A rear frame **34** has, at the lower rear portion, a yoke **35** which at the opposite ends carries crank bearings **36** which journal on the vertical lift crankshaft means or throws **30** and support the rear frame **34** against tilting laterally.

Above and forward of the yoke the rear frame **34** includes top bars **37** fixedly connected to the yoke and having suitably adjustably mounted thereon a saddle **38**, which can be a motorcycle saddle.

At the forward end, the top bars of the rear frame form an interframe pivot **40**.

A forward frame **41** carries at the top handles **42** which may conveniently be typical bicycle handle bars adjustable as to angle at a clamp **43** and adjustable as to height by telescoping at **44** as well known in bicycle handle bars.

Below the handles, the forward frame carries the interframe pivot brackets **45** which pivotally connect to the interframe pivot **40** at the forward end of the rear frame.

At the lower end the forward frame **41** carries a fork **46** which as at its lower end a bearing **47** which slides in the front bearing horizontal slide means **23**.

The forward propulsion crank **31** journals a forward propulsion crank bearing **48** which is connected to the rearward end of a forward propulsion link **50** which at the forward end pivotally interconnects at **51** with a fork end **52** at the lower rear portion of a bracket **53** extending rearwardly from the forward frame **41**. The forward propulsion link **50** is generally of Z-shape and has a diagonally upwardly extending stretch **54** on which are mounted stirrups or pedals **55** by an adjustment clamp **56** making it possible to raise and lower the stirrups.

At the upper forward end of the forward frame **41** there is a vertical adjustment screw **57** turned by a crank **58** in top and bottom bearings **60**. Threaded on the screw **57** is a nut **61** which is prevented from rotating and interconnected by a pivot bracket **62** which pivotally interconnects at **63** with the rearward end of motion limiting link **64**, the forward end of which fixedly pivots at **65** near the top of the standard **24**.

The table shows in relation to the figures the motions of the rear horizontal slide bearing, the vertical lift crank, the forward propulsion crank and the forward horizontal slide bearing for galloping in FIGURES 4 to 7. It will be understood that similar motions occur in cantering when the adjustment nut for the motion limiting crank is relatively up as in FIGURE 8. The difference is that the motions differ in extent in the two gaits. FIGURE 14 shows the path or locus of a point on the saddle for galloping, being generally circular, and FIGURE 15 shows the path or locus of a point on the saddle for cantering, being generally an ellipse. It will be understood, as later explained, that the gaits can change automatically if desired.

In galloping any part of the body goes through a motion in a generally circular path. There is a churning action which is effective on the digestive tract and the liver.

In cantering, on the other hand, the body of the user undergoes a motion in an elliptical path. This is particularly effective for exercising the respiratory system.

Describing now the action of the user in operating the device according to the various steps in the cycle shown in FIGURES 4 to 7, assuming the user has mounted the

machine in FIGURE 4, is sitting on the saddle, with his feet on the stirrups or pedals, and with his hands on the handles, to get from the position shown in FIGURE 4 to the position shown in FIGURE 5, he pulls with his shoulders, elbows and hands, exerting pressure on the handles, and he presses on the stirrups with his hips, knees, ankles and feet. The body weight is not at this point a great factor.

Assuming now the user is in the position of FIGURE 5, he pushes with the shoulders, arms and hands on the handles and relaxes pressure by the hips, knees, ankles and feet on the stirrups. This takes him to the position of FIGURE 6, the weight of the body on the saddle being a factor in carrying the machine forward.

Now with the machine in the position of FIGURE 6, pressure by the shoulders, arms and hands against the handles tends to carry the machine from the position of FIGURE 6 to the position of FIGURE 7. The body weight is not a substantial factor.

With the user now in the position of FIGURE 7, both leg and arm members relax and the weight of the body carries the machine from the position of FIGURE 7 to the position of FIGURE 4 for starting the next cycle.

FIGURE 8 shows the motion for cantering.

It will be evident that where desired the mere physical action of the machine can be supplemented to build up the morale of the user, and make the device pleasant to ride. Motion pictures can to advantage be projected showing scenes of the great outdoors and especially of horseback riding, which add to the pleasure of the user, and music can be played which is reminiscent of the outdoors, of the prairie or of riding. The user may be encouraged also to add to his exercise and pleasure by singing songs which are brought to mind by the wording on the motion pictures or by the music.

In some cases it is preferable to drive the machine by a power drive. This is especially desirable for invalids who would not have the energy to propel the machine.

In FIGURES 9 and 10, I illustrate a more extended rear bearing horizontal slide means **26'** on the supports, slidably mounting the crankshaft bearing **27**. The slide means **26'** also has in spaced sliding relation bearings **67** for a pulley shaft **68**. The two shafts **27** and **68** are held in spaced relation by links **66** through which the shafts pass, the links being held against axial motion by collars **69** on the shafts. An electric motor **70** below the pulley shaft and suspended in a cage **67'** from bearings **67<sup>2</sup>** in the sliding bearing has a driving pulley **71** which turns a belt **72** which interconnects with a combined pulley and overriding clutch **73** on the sliding pulley shaft **68**. The relation of the pulley sizes is to accomplish speed reduction. Suitably provided on the pulley shaft is an inertia wheel **74**. The pulley shaft is intergeared with the crankshaft by gears **75** and **76** for speed reduction. The operation of the machine may otherwise be the same as that described.

Where the machine is propelled by the user, there may be an advantage in providing an inertia device which will increase its inertia with speed so as to increase the effort. In FIGURES 11 and 12, I provide on the rear of the yoke **35** suitably mounted on the housings of the lift bearings **36** rearwardly extending brackets **77** which journal an inertia shaft or flywheel shaft **78** in bearings **80**. The inertia shaft **78** is driven by the user of the device at considerably higher speed than the crankshaft by pulley **81** on vertical lift crank **27** which interconnects by belt **82** with a smaller pulley **83** on inertia shaft **78**. The flywheel or inertia wheel includes a hub **84** from which radiate spokes **85** which connect with a rim **86**. Slidable on the spokes are inertial balls **87** which are urged to an inward position against stops **88** on the hub by helical compression springs **90** acting from spring abutments **91** surrounding the spokes and held in adjustable positions by cotter pins **92**. By moving the cotter pins to different holes the spring pressure can be changed.

In operation, therefore, this device will permit balls to move out radially as speed of rotation increases and the increased inertia will act as an obstacle against further increase in speed.

It will be evident that for children and young people interested in obtaining new sensations, the mechanism of the invention makes it possible to experience bucking by intermittently applying pressure to the stirrups, so that the action will resemble bronco busting, thus producing entertainment.

FIGURE 13 shows a variation in which the screw 57 is turned by an electric motor 95 mounted from a bracket 96 on the front frame and driving the screw 57 through speed reduction gearing 97. The nut 61 at opposite ends encounters limit switches 98 and 100 which reverse the motor so that the nut is constantly raising and lowering on the screw and the mode of operation of the device varies between cantering and galloping so as to give a high degree of variation in the effect.

In view of my invention and disclosure, variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

TABLE

Figure No.	Rear horizontal slide bearing	Vertical lift crank	Forward propulsion crank	Forward horizontal slide bearing
4	Forward	Down	Above center	Moving forward.
5	Moving rearward	Moving up	Forward	Forward.
6	Rear	Up	Moving rearward	Moving rearward.
7	Moving forward	Moving down	do	Rear.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an exercising machine, a support, rear bearing horizontal slide means on the support, front bearing horizontal slide means on the support, a double crankshaft having bearing means sliding in the rear bearing horizontal slide means, having vertical lift crankshaft means and forward propulsion crankshaft means, a rear frame having a crank bearing at the rear journalling the vertical lift crankshaft means and having a forward interframe pivot, a saddle on the rear frame, a forward frame having at the bottom a bearing sliding in the front bearing horizontal slide means and having at the rear an interframe pivot pivotally connecting with the interframe pivot on the rear frame, handles on the forward frame, a forward propulsion link having at the rear a crank bearing journalling on the forward propulsion crankshaft means and having at the front a pivotal connection with the forward frame below the interframe pivot, stirrups on the forward propulsion link, and a motion limit-

ing link pivotally connected at a forward end to the support and at the rearward end to the forward part of the forward frame.

2. An exercising machine of claim 1, having two coaxial spaced rear bearing horizontal slide means, the crankshaft having bearing means sliding in both rear bearing horizontal slide means, having two vertical lift crankshaft means, and having two crank bearings journalling the vertical lift crankshaft means on the rear frame.

3. An exercising machine of claim 2, in which the motion limiting link is pivotally connected to the front frame above the interframe pivot.

4. An exercising machine of claim 2, in which the motion limiting link is pivotally connected to the frame below the interframe pivot.

5. An exercising machine of claim 2, having adjustable means to raise and lower the pivotal connection between the front frame and the motion limiting link between positions above and below the interframe pivot.

6. An exercising machine of claim 5, in combination with means for automatically moving the adjustment means to raise and lower the pivotal connection between the front frame and the motion transmitting link and thereby change the character of cycle of the machine.

7. An exercising machine of claim 2, in combination with flywheel means on the crankshaft.

8. An exercising machine of claim 7, in which the flywheel means comprises outwardly movable weights and spring means biasing the weights inward.

9. An exercising machine of claim 1, in combination with means for driving the crankshaft.

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