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P. L. MORSE RHYTHM CALCULATOR

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RHYTHM CALCULATOR

Park L. Morse, Emporia, Kans.

Application November 18, 1946, Serial No. 710,574

2 Claims. (Cl. 235-86)

This invention relates to calculators, and more particularly to calculators for ascertaining the fertile and infertile periods of women during their menstrual cycles.

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The rhythm system of birth control is based 5 upon the following three factors:

1. Ovulation of a female occurs only within a period of twelve to sixteen days preceding the start of her next menstrual period, this period of ovulation being independent of the length of 10 provision of a relatively compact calculator based time of mentrual flow and the length of the menstrual cycle.

2. The ovum can be fertilized only within 24 hours following ovulation.

tozoa not older than 72 hours.

Accordingly, it follows that fertilization of the ovum can take place only as a result of coitus taking place sometime within an interval of eight days lying between the 11th and 19th days 20 preceding the start of the next subsequent menstruation. For ready reference, the interval during which ovum fertilization can occur will be referred to hereinafter as the "conception period." 25

Since there is a variation from month to month in the menstrual cycle of many normal women, it is impossible to predict accurately the first day of the next succeeding menstruation. It, therefore, becomes necessary to include with $_{30}$ the conception period of any particular female the maximum number of days which her menstrual period is known to vary. For example, if a female has a menstrual cycle varying from 28 to 30 days, the possible maximum $_{35}$ ing portion of the calculator. conception period would be 10 days rather than the 8 days of a female who has a regular menstrual cycle. The first possible day of her conception period would then occur 19 days preceding her next menstruation, calculated on the 40 basis of the shortest menstrual cycle; and the last possible day of her conception period would end on the 11th day preceding her next menstruation, calculated on the basis of her longest menstrual cycle. 45

The foregoing biological phenomenon has been set forth in my application for "Calculator," Ser. No. 662,440, filed April 16, 1946, which describes and claims a device for precisely determining the calendar interval constituting the possible conception period of any specified woman, making due allowance for variations in her menstrual cycle, the interval within this period when coitus is most likely to result in conception, and for indicating the possible commence- 55 disclosed in Fig. 12. 2

ment date of her next menses and the duration of the next menstrual cycle.

An object of the present invention resides in the provision of a calculator of the foregoing general nature which is much simpler for the average person to operate, and which offers greater assurance against its inadvertent misuse and the obtaining of erroneous indicated results.

A further object of the invention lies in the on the rhythm system, which, despite its compactness, embodies an annual calendar and one or more menstrual cycle scales with comparatively widely spaced daily intervals or indicia there-3. The ovum can be fertilized only by sperma- 15 on, lending itself to more accurate setting and reading.

The invention possesses other advantageous features, some of which, together with the foregoing, will be set forth at length in the follow-

ing description of several forms of the invention, which have been selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings, although several forms of the invention are shown,

it is to be understood that it is not limited to such forms, since the invention as set forth in the claims may be embodied in a plurality of other forms.

Referring to the drawings:

Fig. 1 is an isometric view of a completely assembled rhythm calculator embodying the invention.

Fig. 2 is a diagrammatic front elevation on an enlarged scale and in a single plane of the view-

- Fig. 3 is a cross-section taken generally along the line 3-3 of Fig. 1.
- Fig. 4 is a section taken generally along the line 4-4 of Fig. 3.
- Fig. 5 is a partial section taken along the line 5--5 on Fig. 4.

Fig. 6 is a front elevation in a single plane of part of the calendar tape.

- Figs. 7 and 8 are exploded views of parts of the calculator mechanism.
- Fig. 9 is a top plan view of a modified form of the invention.
- Fig. 10 is a front elevation of the calculator disclosed in Fig. 9.
- Fig. 11 is a partial section taken along the line 11—11 on Fig. 9.

Fig. 12 is a top plan view of another modified form of the invention.

Fig. 13 is a front elevation of the calculator

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Fig. 14 is a partial section taken along the line 14-14 on Fig. 12.

In the form of invention disclosed in Figs. 1 to 8, inclusive, the calculator includes a housing 10 having a circular base 11 and an upstanding cylindrical wall 12a, 12b provided with spaced openings 13, 14 through which a calendar tape 15 may pass between the interior and exterior of the housing.

A central bearing socket 16 projects upwardly 10 from the base of the housing, receiving the lower end of a rotatable shaft 17 to which a driving sprocket 18 is secured. The sprocket has twolongitudinally spaced rows of sprocket teeth 19engageable in spaced openings 20 of the endless, 15 flexible calendar tape 15 having 365 equal divisions thereon to represent the number of days in a normal calendar year. The tape openings 20 are spaced apart a distance equal to the pitch: of the sprocket teeth 19. This tape rides along 20 the exterior of the forward housing wall 12a between the openings 13, 14 through which it extends for passage around a roller 21 rotatably mounted on a vertical, stationary pin 22 suitably secured to the base 11 of the housing adjacent its rearward wall 12b, and around a plurality of circularly spaced rollers 23a, 23b arranged in inward and outward spiral fashion with respect to the central sprocket 18. The rollers 23a, 23b are rotatably mounted on vertical pins 24 suitably secured, as by riveting, to the base 25 of a roller rack 26 having a central opening 27 surrounding the bearing socket 16 and resting on the housing base 11, to which it is non-rotatably secured in the manner to be described.

It is apparent that the endless tape 15 proceeds. from the exterior of the forward wall 12a through one of the wall openings 13, around the housing roller 21 and the exterior of one set of rack rollers. 23*a*, progressing inwardly around these rollers in $_{40}$ spiral fashion until it passes over the central sprocket 18 whose teeth 19 fit within the spaced tape openings 20. The tape continues from the sprocket around the other set of rollers 23b, arranged in spiral fashion, and out through the other wall opening 14 onto the exterior of the forward cylindrical wall 12a, where the calendar dates may be viewed.

A cover plate 28 is secured to the housing. This plate has a central hole 29 to permit free passage of the sprocket shaft 17 and is also provided with a plurality of spaced countersunk. holes 30 through which suitable screws 31 may extend into threaded holes 32 in lugs 33 projecting inwardly of the housing wall 12a, to secure the cover 23 firmly to the housing 10. The cover plate has a depending arcuate rim 34 extending along the forward wall 12a and engaging the upper edge of the tape 15 to confine it against vertical movement in conjunction with an arcuate rim 35 extending upwardly from the base 11 and contacting the lower edge of the tape. The upper and lower rims 34, 35 define a curved. channel in which the tape 15 is confined along the exterior of the forward wall 12a.

The roller rack 26 is angularly adjustable with respect to the housing 10 to approximately tension the calendar tape 15. As disclosed in the drawings, the roller rack plate 25 has a plurality of arcuately arranged holes 36 adjacent its 70 periphery, and the housing base 11 has a plurality of arcuately spaced sockets or holes 37 aligned with corresponding hoels 38 in the cover plate 23. The holes 36, 37, 38 in the rack, base and cover

cover plate holes 37, 38 spaced a greater distance apart than the rack holes 36. In the specific example in the drawings, the rack holes 35 are spaced apart from center to center two diameters, while the holes 37, 38 in the base and cover plate are spaced apart from center to center three diameters.

An appropriate tool may be inserted through an arcuate slot 39 in the cover plate into engagement with the rack plate 25, and the latter turned clockwise until the appropriate tension is placed on the calendar tape 15. Thereafter, a lock pin 40 is inserted through one of the cover plate holes 38, an aligned rack hole 36, and into an aligned hole or socket 37 in the base plate, to prevent further angular displacement between the housing 10 and roller rack 26 and hold the tape 15 tensioned around the fixed axis roller 21, rack rollers 23a, 23b, forward wall 12a and sprocket 18. The holes are so spaced and disposed that the roller rack 26 can be moved arcuately any amount within the limits of the device and one of its holes 36 will align with a cover plate hole 38 and base socket 37, permitting insertion of the pin 40 through the aligned holes

25 to lock the rack in its position of tensioning adjustment.

A minimum menstrual cycle band or ring 41. encompasses the housing wall 12a, 12b and cover 30 plate 28, and a maximum menstrual cycle disk 42 is disposed over the cover plate 28 and part of the ring 41. The disk has a central hole 43 to permit free rotatable passage of the sprocket shaft 17, to the upper end of which an operating 35 handle 44 is suitably secured as by means of a screw 45 threaded into the shaft. Free rotation of the shaft 17, sprocket 18 and handle 44 may be insured by interposing thrust washers 46 between the ends of the sprocket 18 and the cover. plate 28 and base socket 16, and between the

handle 44 and maximum menstrual cycle disk 42. The cover plate 28 has a plurality of arcuately arranged indicia 47 thereon representing the number of days of the menstrual cycle. As specifically disclosed in the drawings the days are numbered counterclockwise from 20 to 40, the indicia or lines being spaced from one another the same angular distance as the spacing of the. calendar days on the tape portion engaging the curved forward wall 12a. The minimum men-50 strual cycle band or ring 41 has a beveled tab 48 projected inwardly from the upper edge over the cover plate and provided with a reference arrow or mark 49 adapted to point to the menstrual cycle scale 47. This ring has an extended opening 50 along the forward housing wall 12a, defined by upper and lower sides 51, 52, with the. right portion of the opening containing a colored transparent window 53 along part of its length terminating at a fertility reference mark or 60. line 54 on the upper and lower sides of the opening 50. In the specific device in the drawing, the opening 50 extends along the calendar tape 15 for 40 days, to correspond with the provision for 40 days on the scale 47. The letter E may be placed on the window portion 55 immediately to the right of the fertility reference mark 54, which . occupies a space corresponding to one calendar. day on the tape. This letter E, when used in. conjunction with the calendar tape in the manner to be described, indicates the earliest date at which the next menses can commence. A viewing reference window 55 has its flange or foot 57 suitably secured to the housing base 11, and plate have the same diameter, with the base and 75, extends vertically across the extended opening. 50 with its upper end received in a peripheral cover plate notch 58. The window opening 56 occupies a space corresponding to one calendar day on the tape 15.

The reference arrow 49 is so disposed on the minimum cycle ring 41 with respect to the letter E as to point to the same number of days on the menstrual cycle scale 47 as the letter E is disposed over the tape 15 ahead of the reference window 56.

The upper side 51 of the ring opening 50 is provided with a band 59, which may be distinctively colored, extending in a clockwise direction from the fertility reference mark 54 a distance corresponding to 19 consecutive days on the 15 calendar tape 15, where the band terminates in another fertility reference mark or line 60, which cooperates with the calendar tape to indicate the first calendar day of the fertile or conception period. The lower side 52 of the ring opening 50 is also provided with a band 61, which may be distinctively colored, extending clockwise from the fertility reference line 54 for a distance of 16 days, where an ovulation reference mark or line 62 may be placed to indicate on the calendar tape 15 the first day of the ovulation period. It is to be noted that this ovulation colored band 61 extends clockwise a period of 16 days from the fertility reference line 54, or 3 days less than the fertility band 59 on the other side of the opening 50.

The maximum cycle disk 42 has its rearward portion 63 of substantially less radius than the radius of the cover plate 28 to expose the menstrual cycle scale 47. Its forward portion 64 has a greater radius than the cover plate, being provided with a depending skirt 65 disposed along the exterior of the minimum cycle band 41. The disk 42 and its skirt 65 hold the band 41 against vertical movement, with its lower edge in slidable engagement with the base [] of the housing [].

The disk 42 also has a reference arrow or mark 66 adapted for cooperative indication with the days of the menstrual cycle scale 47. The disk skirt 65 has an extended opening 67 whose right end has a transparent window 68, preferably of clear plastic or glass, disposed over the band window 53 and having a width corresponding to the spacing of one day on the calendar tape. The skirt sides \$9, 70 defining its opening 67 extend in a clockwise direction from the window 68, terminating in upper and lower ends 71, 72 which provide reference lines or marks. The upper reference mark 71 is spaced a distance corresponding to 11 calendar days from the trans-55 parent window 63, whereas the lower reference line 72 is spaced 12 days from the transparent window 68.

The reference arrow or mark 66 on the maximum menstrual cycle disk 42 is so arranged thereon as to point to the number of days on the menstrual cycle scale 47 corresponding to the number of calendar days that the transparent window 68, marked L, is spaced from the reference window 55 secured to the housing. Thus, rotary movement of the disk 42 to place the maximum cycle arrow 66 adjacent a particular number of days on the menstrual scale 47 places the window L the same number of days distance around the tape 15 from the fixed reference win- 70 dow 56

Both the ring 41 and disk 42 are angularly adjustable with respect to each other and to the housing 10. The minimum cycle ring 41 may

respect to the housing by a suitable lock device, which, as disclosed in the drawings, includes a leaf spring 73 whose lower end is secured to the inner wall 12b of the housing by a suitable rivet 74. An intermediate lock pin or plunger 75 is secured to the spring and extends outwardly through an enlarged hole **76** in the rearward wall 12b for engagement with any one of a series of holes 17 provided in and extending along the

minimum cycle ring \$1. These holes 17 are 10 spaced from each other a distance corresponding to one day on the calendar tape 15 and menstrual cycle scale 47. The upper end of the leaf spring comprises a handle 76 extending through an enlarged slot 79 in the cover plate, which has a clockwise extending notch 80 adapted to hold the handle 78 of the leaf spring inwardly to maintain the lock pin 75 free of the band 41 and its holes 77. The opening 79 is large enough to permit the leaf spring 73 to be shifted trans-20 versely to move the pin 75 in and out of the band holes 17, and the spring 73 may swing on its lower pivot 74 sufficiently to place the handle 78 in or out of the notch 80.

The maximum cycle disk may also be locked in any selected position by a similar lock device. As disclosed in the drawings, such device includes a leaf spring 81 having a depending leg 82 suitably secured to the inner rear wall 12b of the hous-

ing, as by rivets 83. This leaf spring 31 projects 30 around the upper edge of the wall 12b and has an inwardly extending arm 34 carrying a vertical. upwardly projecting pin 85 adapted to extend through a hole 86 in the cover plate and into engagement with any one of a plurality of arcu-35 ately arranged holes or sockets 81 in the underside of the disk 42. A handle 88 projects upwardly from the end of the leaf spring 81 through an enlarged opening 89 in the cover plate 28 leading into a smaller notch 90 whose sides may 40 engage the shoulders 91 on the handle in order

- to hold the leaf spring 8! depressed when the handle 38 is moved clockwise and placed under the sides of the notch 90, to maintain the pin 85 out of engagement with the disk 42 and its socket 45
 - holes 87. However, when the handle 38 is pushed counterclockwise to place the shoulders 91 in the larger transverse opening 89, the leaf spring 81 re-elevates itself to position its lock pin 85 within one of the arcuate sockets 37. The arcuate
- 50 socket holes 87 are arranged on centered distances corresponding to the spacing of the calendar days on the tape 15 and menstrual cycle scale 47.

From the foregoing description it will be apparent that the minimum cycle band or ring 41 may be adjusted until its reference arrow 49 points to the selected number of days on the menstrual cycle scale 47, and that the maximum cycle disk 42 may also be turned until its reference arrow 66 points to the selected number of days on the menstrual cycle scale 47, whereupon both the band and disk may be locked in their selected positions.

It has been indicated above that the movement 65 of the minimum cycle band 41 to position its reference arrow 49 in alignment with the particular number of days on the menstrual cycle scale 47, representing the minimum number of days duration of the menstrual cycle, also places the E window 55 the same number of days along the calendar tape 15 from the fixed reference window 56. Similarly, the placing of the maximum cycle reference arrow 66 in alignment with a particular be held in a selected position of adjustment with 75 number of days on the menstrual scale 47 representing the duration of the maximum menstrual cycle, will place the L reference window 68 the same maximum number of days along the tape from the fixed reference window 56. Accordingly, by appropriately positioning the minimum cycle Fi. ring 41 and maximum cycle disk 42 along the menstrual scale 47, and by shifting the tape 15 to place the date at which the preceding menses began opposite the reference window 55, the minimum and maximum dates at which the next suc- 10. or a total of 10 days. ceeding menses will occur are indicated on the tape at the E and L windows, respectively.

It is also apparent that the beginning of the fertility and ovulation periods are also indicated, since the reference mark 60 at the end of the 15 upper colored band 59 is placed on the tape 15 adjacent the first day of fertility, and the lower reference mark 62 at the end of the lower colored band 61 on the tape adjacent the first day of ovulation. The proper positioning of the maxi- 20 the tape also embodies a short section 93 of a mum disk 42 and its depending skirt 65 causes the upper end 11 of the skirt adjoining the opening 67 to indicate the end of the fertility or conception period on the tape 15 and the end 72 of the lower side 70 of the skirt to indicate the end 25: of the ovulation period on the tape. There is a difference of one day between these two reference marks 71. 72.

In the example shown in the drawings, it has been assumed that a woman has a minimum men- 30, along the normal scale within the range of the strual cycle of 25 days and a maximum menstrual cycle of 27 days, and that her last menses began on December 5. Accordingly, the lock devices 73, 81 are released and the minimum band 41 is turned until the minimum cycle arrow 49 points 35 for a period of 41 days, which is within the 40 to 25 days on the menstrual scale 47, and the maximum cycle disk 42 is turned until its reference arrow 56 points to 27 days on the scale 47. The lock devices 73, 81 are then repositioned to hold the band 41 and disk 42 positively in their 40 day of March and April on the leap year scale respective adjusted positions. The calendar tape being disposed immediately above the next suc-15 is then turned by means of the handle 44,whose motion is transmitted to the tape through the sprocket 18, until the December 5 indicia is aligned with the fixed reference window 56. This places the E window 55 over the December 30 mark on the calendar tape 15, and the L window 68 over the January 1 mark on the calendar tape, which represent the anticipated earliest and latest dates, respectively, at which the next men- 50 occurrences beginning on and after March 1 in a strual cycle can begin.

The reference line 60 on the upper side 51 of the band opening 50 is at the beginning of December 11, which indicates the first day of the fertility or conception period. Similarly, the reference line 71 on the upper side 69 of the skirt opening 67 is at the end of December 20, which indicates the end of the fertility period. Also, the lower band reference line 62 is at the beginning of December 14, which indicates the beginning of the ovulation period, and the reference. line 72 on the lower skirt side 70 is at the end of December 19, which indicates the end of the ovulation period.

The foregoing example attests to the accuracy of the calculator, since the beginning of the fertility period on December 11 is 19 days ahead of December 30, the anticipated earliest date on which the next menstrual cycle may occur. Sime ilarly, the end of the fertility period is the close 70 band 41 is fixed to the housing and is provided of December 20, or 11 days prior to January 1, which is the last day on which the next menstrual cycle might occur. The ovulation period will begin no earlier than December 14, or 3 days after the date on which the fertility period can com- 75 running in a clockwise direction from a 20-day.

mence, and the ovulation period ends with the close of December 19, or one day prior to the end of the fertility period on December 20:

It is to be noted that the maximum possible ovulation period is a period of 4 days plus the irregularity of 2 days between the maximum and minimum cycles, or a total of 6 days; and that the maximum possible fertility or conception period is 8 days plus the irregularity of 2 days,

The calendar band 15 is continuous, with the line 92 marking the end of December 31 coinciding with the beginning of January 1 of the next year (see Fig. 6), to permit rotation of the sprocket 18 in the same direction in feeding the calendar tape 15 continuously in the same direction around the forward wall 12a of the housing. Although only 365 equal daily divisions are provided on the tape for a normal 365 day year, leap year scale, to enable uninterrupted use of the calculator in February and March, and also April, of a leap year. As disclosed in Fig. 6, the leap year scale 93 is placed immediately above a portion of the normal scale and may be viewed through the extended opening 50 in the minimum cycle band 41.

The leap year scale commences on February 29 and runs for a sufficiently extended period calculator to cover events that may commence or terminate in January, February, March or April of the leap year. In the drawings, the leap year scale 93 runs from February 29 to April 9, day range of the specific device disclosed. February-29 is disposed immediately above March 1 on the normal scale, March 1 immediately above -March 2 on the normal scale, and so on, each ceeding day on the normal scale.

The calendar tape is used in a leap year in exactly the same manner as in a normal year, 45 with the exception that the leap year scale 93 is read in place of the normal scale portion therebelow on any occurrences which begin on February 29, or a date prior thereto and which will extend for a period including February 29. Any leap year may be indicated through use of the

normal scale. It is to be noted that the daily progression on the calendar tape 15 extending along the exterior 55 of the forward wall 12a is counterclockwise, or opposite to the clockwise direction in which the 19 and 16 days have been measured along the fertility and ovulation bands 59, 61 from the E window 55 or fertility reference marks 54; and also opposite to the 11 and 12 days' spacing of the reference marks 71, 72 from the L window 68. designating the ends of the fertility and ovulation periods.

A modified form of the invention is illustrated. 650 in Figs. 9 to 11, inclusive, in which either the minimum cycle band 41 or maximum cycle disk 42 may be held stationary and the other moved to accomplish the desired results on the calculator. As specifically shown, the minimum cycle along its upper side with a plurality of indicia 94 setting forth the minimum number of days of the menstrual cycle, which may range from 20 to 40 days within the capacity of the instrument,

period to a 40-day period. Each day on the scale 94 extends the same distance as a day on the calendar tape 15. The 20-day division is 20 days distant from the E window 55, as measured along the tape, and each succeeding division on the 5 scale 94 is a corresponding daily distance from the E window.

The maximum cycle disk 42 with its depending skirt 65 is precisely the same as in the other form of the invention. Although the same maximum 10 cycle scale may be provided on the cover plate 28, Fig. 9 discloses the reference arrow 66a on a beveled portion of the disk pointing to a scale 95 labeled "Irregularity" and numbered from 0 to 10 in a counterclockwise direction. The irregu- 15 larity is the difference between the maximum menstrual cycle and the minimum menstrual cycle, and in the example disclosed in the drawings, in which a maximum cycle of 27 days and the minimum cycle of 25 days is assumed, the 20 reference marker 66a points to an irregularity of 2 days. The arrow 66a and scale 95 are so disposed relative to each other as to align the L window 63 with the E window 55 when the arrow **66** α points to zero on the scale. 25

The fixed reference window 56 is omitted from this form of the invention and the mode of operation is somewhat different. Instead of moving the first day of the immediately preceding menstrual cycle opposite the window, as in the other 30 form, the calendar tape 15 is moved until such date is in vertical alignment with the number of days representing the minimum cycle on the fixed scale 94. The maximum cycle disk 42 has been adjusted to indicate an irregularity of 2 days, 35which places the reference marks 61, 62, 71, 72 appropriately along the calendar tape 15 at the beginning and end of the conception and ovulation periods, and the E and L windows 55, 69 at

In the example disclosed in the drawings, the same set of facts has been assumed, for illustrative purposes, as in the other embodiment. Thus, the calendar tape is moved until December 5 (the first day of menstruation of the period immediately preceding) is aligned with the 25th day indication on the fixed minimum cycle scale 94, the maximum cycle disk 42 having been shifted until its reference arrow 66a points to an irregu-50 larity period of 2 days on the irregularity scale 95. This places the reference marks 61, 71 bounding the fertility period at the beginning of the 11th day and ending on the 20th day, or a period of 10 full days, and the reference marks 62, 72 55 bounding the ovulation period at the beginning of December 14 and the end of December 19, or a total period of 6 days. Also, the E window 55 is disposed over December 30, which is the earliest date at which the next menstrual cycle may begin, $_{60}$ and the L window 68 is disposed over January 1, which is the latest date at which the next menstrual cycle may begin.

The irregularity indicator 66a and scale 95 need not be provided on the maximum cycle disk. Instead, as shown in Figs. 12 to 14, inclusive, the maximum cycle indication may be disposed along a beveled peripheral portion 96 of the disk 42 immediately above the indications 94 representing the minimum cycle. The maxi-70 mum cycle indications 97 in the example shown in the drawings run in a clockwise direction from 20 to 40 days, with the daily spaces each occupying the same angular distance as the per diem

ward wall 12a. This maximum cycle scale 97 is arranged so that the L window 68 coincides with the E window 55 when the irregularity is zero, that is, when the maximum and minimum cycles are equal. Such coincidence of the E and L windows occurs when the disk 42 is turned to place the maximum cycle scale indications 97 exactly coincident with the same indications on the minimum cycle scale 94 immediately therebelow. Any irregularity is reflected through movement of the maximum cycle disk 42 counterclockwise which positions the L window 68 counterclockwise to a later date of potential commencement of the next menses and correspondingly shifts the reference marks 71, 72, indicating the end of the fertility and ovulation periods, to a later date.

In the operative example disclosed in Figs. 12 to 14, inclusive, the same factors are shown as in the other forms of the invention. That is, the maximum cycle is 27 days, the minimum cycle 25 days, and the date at which the last preceding menses commenced is December 5. The maximum cycle disk 42 is adjusted until the number 27 on its scale 97 is immediately above and in a line with the number 25 on the minimum cycle scale 94, whereupon the disk 42 is locked in such adjusted position. The calendar tape 15 is then shifted until December 5 is in alignment with the number 25 on the minimum cycle scale 94. It is evident that the fertility or conception period then ranges from December 11 to December 20, inclusive, the ovulation period from December 14 to December 19, inclusive, the earliest commencement of the next menstrual period is December 30, and the latest date of commencement of such next menstrual period is January 1.

Since the minimum cycle band 41 is stationary the potential earliest and latest dates on which 40 able lock device need be provided for the maximum cycle disk only.

> By virtue of the present invention, the calculator may be adjusted and locked in adjusted position for any particular woman, depending upon her minimum and maximum menstrual cycles, which requires only movement and positioning of the calendar tape 15 to obtain accurate calendar information regarding her conception and ovulation periods, and the potential earliest and latest dates of commencement of the next menses. In the form of invention disclosed in Figs. 1 to 8, inclusive, the minimum cycle ring 41 and the maximum cycle disk 42 are appropriately moved, depending upon the duration of the minimum and maximum cycles, and are then locked in position. This setting remains fixed, requiring only turning of the handle 44 to move the tape 15 and locate the commencement date of the preceding menses opposite the reference window

56. In the last two forms of the invention, it is only necessary to move one of the menstrual cycle members, such as the maximum cycle disk 42, to a proper position, and then lock it in such position of adjustment. Thereafter, the tape 15 need only be positioned to place the date of com-65 mencement of the preceding menses in alignment with the duration time of the minimum menstrual cycle scale 94.

From the foregoing it is apparent that calculators have been devised, which are comparatively easy to operate, and which possess relatively large indicia, offering greater assurance against inadvertent mis-setting, which would be productive of erroneously indicated results. The spaces on the calendar tape 15 around the for- 75 large indicia are permitted in view of the relatively long calendar tape, which, when divided into 365 equal parts, still enables each part, or per diem division, to be of ample length along the tape.

I claim:

1. A rhythm calculator of the character derscribed comprising: a base plate; an upstanding hollow cylinder fastened at its lower end to said ...base plate, said cylinder being divided into first and second sectors by first and second periph- 10 ing date indicator. erally spaced slots formed parallel with the axis of said cylinder; an endless calendar tape extending over the outer surface of said first cylinder sector and into said cylinder; means within in a tortuous path; a continuous annual calendar inscribed on said tape over its entire length; a preceding menstrual period starting date indicator mounted on said base plate adjacent said first cylinder sector and overlying said tape; a cover plate fastened to the upper end of said cylinder, said cover plate being provided on its upper face with a menstrual cycle scale peripherally spaced from said starting date indicator and progressing in the same direction d, as said annual calendar; a minimum menstrual cycle ring circumscribing said cylinder for rotation thereon, said ring being provided with a peripheral slot overlying that portion of said annual calendar reeved about the said first cylinder sector; a next succeeding minimum menstrual period marker provided on said ring intermediate the ends of said peripheral slot: a conception sector indicated on the outer -face of said ring adjacent its said slot, said sector initiating at said minimum menstrual period marker and extending in a direction opposite to d, through a distance equal to nineteen days as measured on said annual calendar; an ovulation sector indicated on said ring adjacent its said slot, said ovulation sector extending from said minimum menstrual period marker in the same direction as said conception sector for a distance of sixteen days as measured on said annual calendar; a minimum menstrual cycle fiducial mark indicated on said ring in a position to traverse said menstrual cycle scale, the distance between said next succeeding minimum menstrual period marker and said minimum menstrual cycle fiducial mark measured in the direction d, being such that any given number on said menstrual cycle scale with which said minimum menstrual cycle fiducial mark is made to register upon the rotation of said minimum menstrual cycle ring, always represents the distance in days between said preceding menstrual period starting date indicator and said next succeeding menstrual period marker; a maximum menstrual cycle disk mounted on said cover plate for rotation thereon coaxially with said cylinder and provided with a skirt overhanging said minimum cycle ring, said skirt being provided with a maximum menstrual period marker overlying said annual calendar and being divided by a peripheral slot also overlying said calendar into first and second bands extending in a direction opposite to d, said first band being of a length equal to twelve and said second band being of a length equal to eleven days as measured on the adjacent portion of said calendar; a maximum menstrual cycle fiducial mark indicated on the face of said maximum menstrual cycle disk adjacent its periphery and arranged to traverse said menstrual cycle scale, the distance between said maximum

menstrual cycle fiducial mark being such that any number on said menstrual cycle scale with which said fiducial mark is made to register always represents the distance in days between said preced-

5 ing menstrual period starting date indicator and maximum menstrual period marker; and means for moving said calendar tape so that any selected day thereon can be brought into registration with said preceding menstrual period start-

2. A rhythm calculator of the character described comprising: a base plate; an upstanding hollow cylinder fastened at its lower end to said base plate, said cylinder being divided into first said cylinder for constraining said tape to move 15 and second sectors by first and second peripherally spaced slots formed parallel with the axis of said cylinder; an upstanding idler roller journaled on said base plate; a roller rack mounted in said cylinder for rotation on the axis thereof; a 20 plurality of upstanding idler rollers mounted on said rack in spiral arrangement; a sprocket wheel journaled in said cylinder coaxially therewith; a perforated endless calendar tape reeved in spiral arrangement around said idler rollers, said 25 sprocket wheel, through the slots in said cylinder and around the outer surface of said first cylinder sector; take-up means within said cylinder for adjusting the tension of said tape; a continuous annual calendar indicated on said tape by 30 equally spaced marks; a preceding menstrual period starting date indicator mounted on said base plate adjacent its said first sector and overlying said tape, a cover plate fastened to the upper end of said cylinder; said cover plate being provided 35 on its upper face with a menstrual cycle scale peripherally spaced from said starting date indicator and progressing in the same direction d as said annual calendar; a minimum menstrual cycle ring circumscribing said cylinder for rotation thereon, said ring being provided with a .40 peripheral slot overlying that portion of said annual calendar reeved about the said first sector of said cylinder; a next succeeding minimum menstrual period marker provided on said ring inter-45 mediate the ends of said peripheral slot; a conception sector indicated on the outer face of said ring adjacent its said slot, said sector initiating at said minimum menstrual period marker and extending in a direction opposite to said direction d, through an angle equal to that subtended by 50nineteen days on said annual calendar; an ovulation sector indicated on said ring adjacent its said slot, said ovulation sector extending in the same direction as said conception sector for a distance of sixteen days as measured on the ad-55 jacent portion of said annual calendar; a minimum menstrual cycle fiducial mark indicated on said ring and arranged to traverse said menstrual cycle scale, the distance between said next succeeding minimum menstrual period marker and 60 said menstrual cycle fiducial mark measured in the direction d, being such that any given number on said menstrual cycle scale with which said minimum menstrual cycle fiducial mark is made 65 to register by the rotation of said minimum menstrual cycle ring, always represents the distance in days between said preceding menstrual period starting date indicator and said next succeeding menstrual period marker; a maximum menstrual cycle disk mounted on said cover plate 70 for rotation thereon coaxially with said cylinder and provided with a skirt overhanging said minimum cycle ring, said skirt being provided with a maximum menstrual period marker overlying menstrual period marker and said maximum 75 said annual calendar and being divided by a pe181,836

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ripheral slot also overlying said calendar, into first and second bands extending in a direction opposite to d, said first band being of a length equal to twelve days and said second band being of a length equal to eleven days as measured on 5the adjacent portions of said calendar; a maximum menstrual cycle fiducial mark indicated on the face of said maximum menstrual cycle disk adjacent its periphery and arranged to traverse said menstrual cycle scale, the distance between 10 said maximum menstrual period marker and said maximum menstrual cycle fiducial mark being such that any number on said menstrual cycle scale with which said fiducial mark is made to register always represents the distance in days 15 between said preceding menstrual period starting date indicator and maximum menstrual period marker; and means for rotating said sprocket wheel so that any selected day of said annual calendar can be brought into registration with 20 said preceding menstrual period starting date indicator.

PARK L. MORSE.

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