Jan. 12, 1954 S. SWANSON 2,665,508

FARM GATE

Original Filed June 10, 1944 2 Sheets-Sheet 1

Fig. 1.

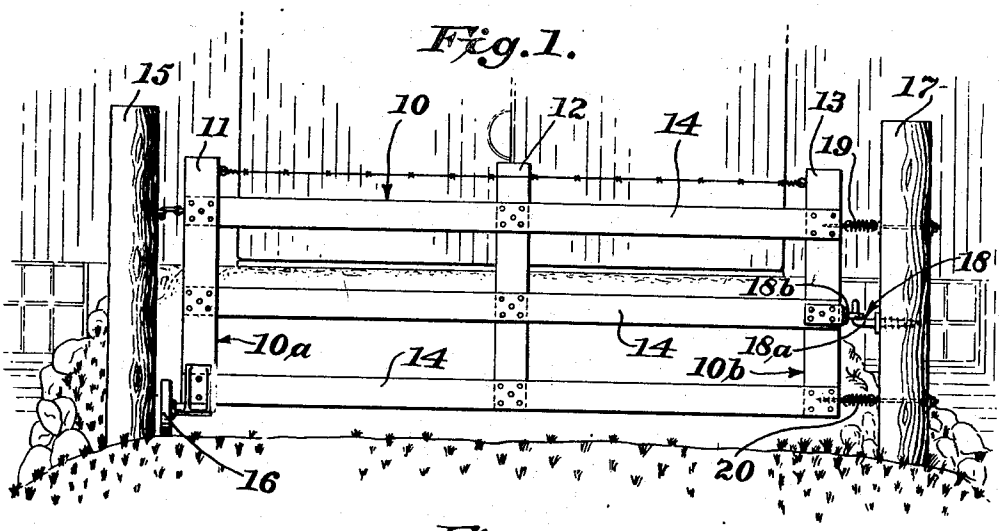


Fig. 2.

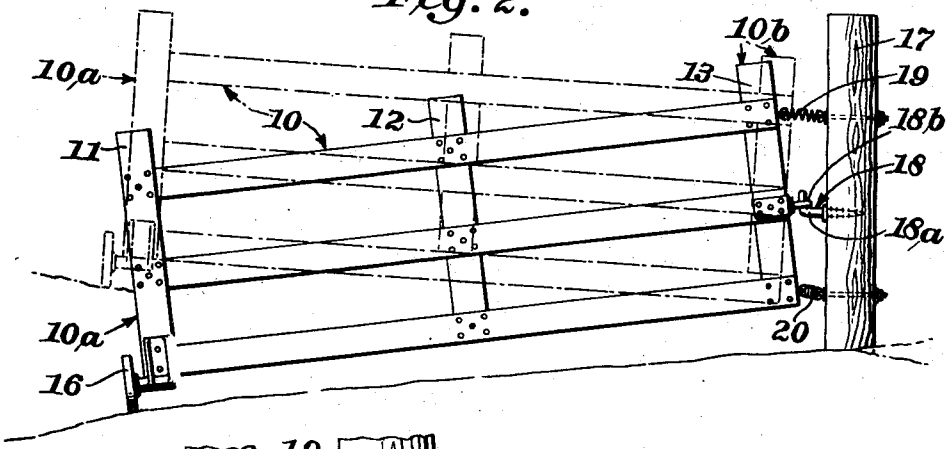


Fig. 3.

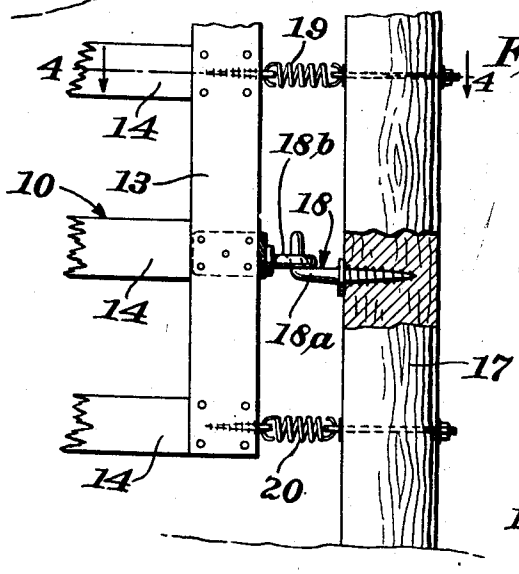
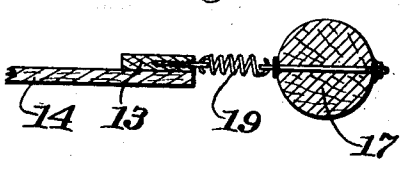


Fig. 4.



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Jan. 12, 1954 S. SWANSON 2,665,508

FARM GATE

Original Filed June 10, 1944 2 Sheets-Sheet 2

Fig. 5.

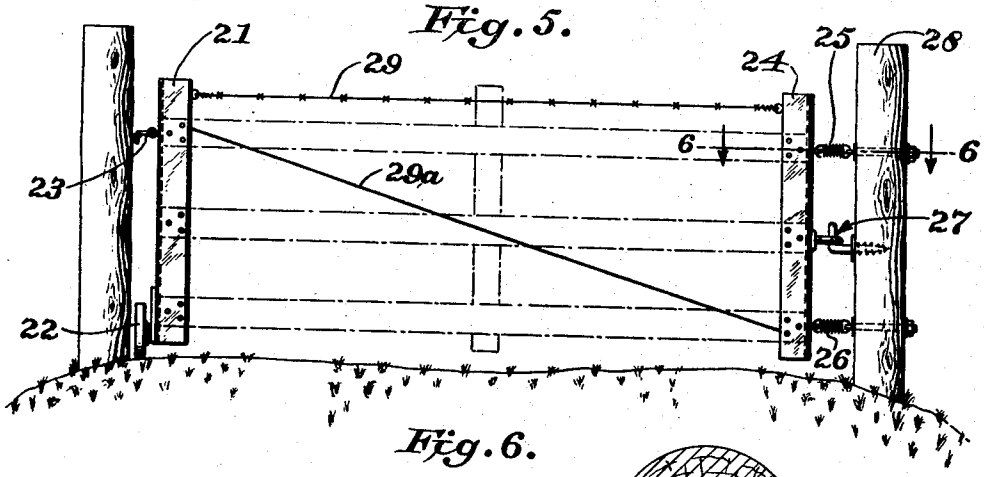


Fig. 6.

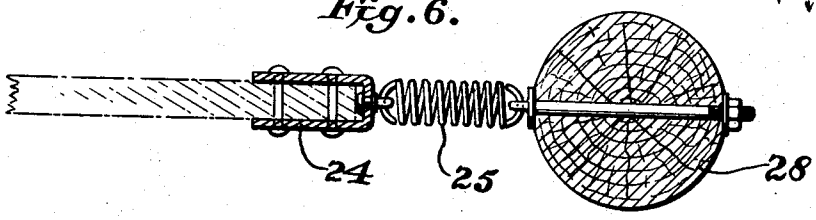


Fig. 7.

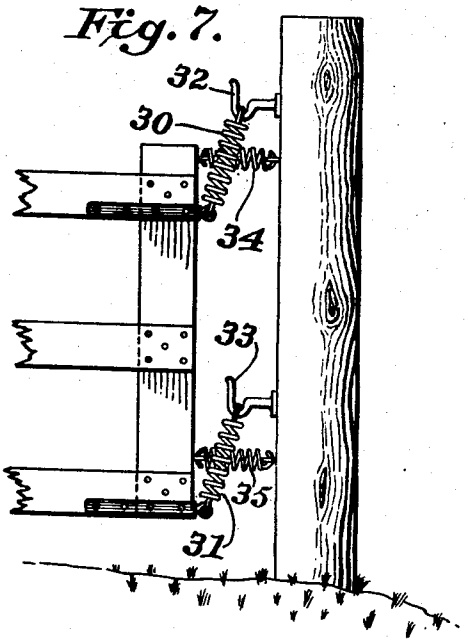
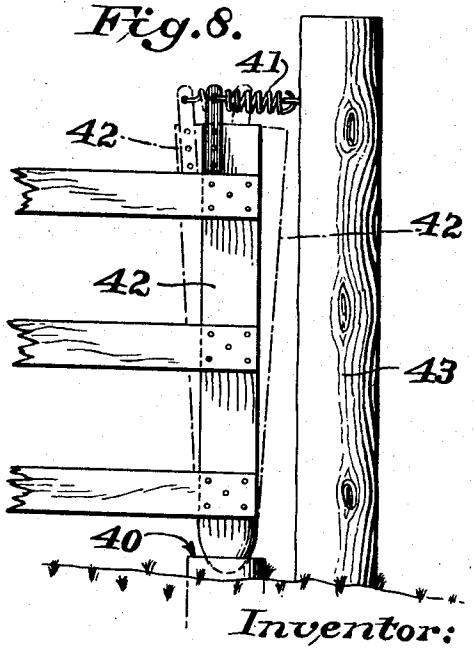


Fig. 8.



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UNITED STATES PATENT OFFICE

2,665,508

FARM GATE

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Original application June 10, 1944, Serial No. 539,717. Divided and this application August 5, 1947, Serial No. 766,284

7 Claims. (Cl. 39—96)

1

This invention relates to swinging gates and more particularly to an improved farm gate. The present application is a division of my copending application Serial No. 539,717 filed June 10, 1944, now U. S. Patent No. 2,426,380.

Several serious difficulties have been confronted in the construction and use of conventional farm gates. Such gates are usually made in the form of a long wooden frame hinged at one of its narrower ends to one gate post, its opposite or swinging end being adapted to close against another post. The frame, which is usually made of wood, must be of sufficient strength and size, and therefore the gate, particularly after it has been exposed to wet weather, is very heavy. Due to the length of the wooden frame and its weight, its swinging end cannot be maintained by suspension by the hinges, as is the case with a house door, and it sags to the ground. Therefore, for opening and closing the gate, one must lift and carry its swinging end. This requires considerable exertion, and when attempted by children, women, or aged persons, it is dangerous to health. Many cases of rupture, returned rupture, and similar accidents on farms have been traced to this cause. This difficulty is increased still further where the ground is uneven or rises, as in front of barn doors, and the gate has to be carried uphill.

Attempts have been made to provide the swinging end of the frame with a wheel rolling on the ground to support the weight of the swinging end. While this proved to be of considerable help on level ground or pavement, or in elaborate constructions where an arcuate supporting rail is provided for the wheel to roll on, in cases of common farm gates provision of such wheels was either ineffective where strong hinges did not permit the swinging end to follow the uneven ground, or it could roll only after the weight of the frame caused tearing out of the hinges or loosening of the frame joints. It can be easily appreciated that as the swinging gate frame hinged to a vertical gate post follows uneven ground, the vertical hinge-carrying edge of such gate frame tends to assume an inclined position; since the gate post remains vertical, either the hinges or the joints of the gate frame must give. Since the provision of strong hinges capable of preventing sagging of the gate is impractical, use of such hinge means as a loop of wire has often been resorted to. Such hinge means could not prevent the gate from sideward wabbling, under which conditions the effectiveness of the wheel is decreased to an impracticable degree.

2

One of the main objects of the present invention is to provide an improved farm gate which overcomes and eliminates the above difficulties, and in which the swinging end can be moved easily over uneven ground, or in other words, be made to follow a grade, without interference at the hinges.

Another object of the invention is to provide an improved farm gate having means at its hinged end, which means are adapted to support the weight of said end and at the same time to permit it to deviate from the vertical position as the swinging end follows rising or falling ground.

A further object of the present invention is to provide an improved farm gate of the character specified in the preceding paragraph, which gate has means restricting undesirable side wabbling of the swinging end.

A still further object of the invention is to provide an improved farm gate in which the swinging end carries rolling means enabling it to be easily moved over even or uneven ground without the necessity of being lifted.

A still further object of the present invention is to provide an improved farm gate of the foregoing character in which the above operation of the gate is ensured by simple and inexpensive metal parts or hardware, which hardware may be supplied to users in the form of a simple set, enabling even an unskilled person to build a strong and smoothly operating farm gate merely by assembling pieces of boards of proper length to the hardware, and connecting the assembly to the gate posts.

A still further object of the present invention is to provide an improved hinge for farm gates.

It is an added object of the present invention to provide an improved farm gate which is simple and rugged in construction, dependable in operation, and is relatively simple and inexpensive to make.

Other objects and advantages of the present invention will be apparent from the following description and the appended drawings forming a part of the present specification, in which drawings similar numerals refer to similar parts throughout the several views.

Fig. 1 is an elevational view showing a gate embodying the present invention.

Fig. 2 is another elevational view illustrating operation of the gate shown in Fig. 1, in following a grade.

Fig. 3 is a view showing on a somewhat larger scale the hinge means of the gate shown in Figs. 1 and 2.

Fig. 4 is a fragmentary sectional view taken in the direction of the arrows on the section plane passing through the section line 4—4 of Fig. 3.

Fig. 5 is an elevational view similar to Fig. 1 and illustrating a modified construction of the gate embodying the present invention.

Fig. 6 is a fragmentary sectional view taken in the direction of the arrows on the section plane passing through the section line 6—6 of Fig. 5.

Figs. 7 and 8 illustrate gates embodying the present invention and having modified type of hinge means.

Before explaining in detail the present invention, it is to be understood that the invention is capable of other embodiments and modifications and that the terminology and phraseology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the requirements of the prior art.

In the drawings there are shown by way of example farm gates embodying the present invention. It will be understood that the present invention is not limited to farm gates, since it may be applied to any closure where requirements or operation conditions involve factors discussed herein.

Referring particularly to Figs. 1 to 4, inclusive, the gate illustrated therein comprises a generally rectangular frame designated by the numeral 10. The frame 10 is of an elongated shape and is composed of vertical members 11, 12 and 13, connected by means of horizontally disposed members or boards 14. A diagonal member (not shown) may also be provided if a particularly rigid construction is required. The vertical member 11 forms the swinging end 10*a* of the gate, movable away from and toward a post 15 for opening and closing the gate, respectively. A roller or wheel 16 is carried at the lower end of the member 11, being adapted to roll on the ground as the frame is being moved, thus greatly facilitating opening and closing thereof. The vertically extending member 13 forming the hinged end 10*b* of the gate frame 10 is connected or hinged with the aid of means described in detail below to a gate post 17. The gate is shown as interposed in a roadway leading up to the level of the second floor of a barn, which roadway therefore has a rather steep grade.

It will now be clear in view of the foregoing that as the swinging end 10*a* of the frame 10 is swung around, with the wheel 16 following the grade, it is being raised or lowered, as illustrated in Fig. 2. If rigid hinges such as door hinges were employed for connecting the hinged end 10*b* of the frame 10 to the gate post 17, such hinges holding the member 13 positively to the post 17 would not permit the swinging end 10*a* to change its elevation, or end 10*b* to change its angle with respect to the post 17, and an exertion of sufficient force on the gate frame to force it up or down the grade would either tear the hinges or loosen the joints between the vertical members and the horizontal members of the frame. The provision of some kind of loose hinges, such as a band of wire to hold the hinged end to the gate post, would cause the hinged end to wabbie sideward with the lower corner of the hinged end resting on the ground. This would prevent full closing of the gate at the hinged end, and, in general, would cause an inconvenient operation of the gate.

In accordance with the present invention there are provided improved means whereby the hinged

end is supported or suspended on the gate post such as post 17, said means permitting swinging of the gate around the post 17 with the swinging end 10*a* going up or down in following the grade without the frame wabbling sideward. Expressing the above in geometric terms, the functions of the improved hinged means are: (1) to support the weight of the hinged end on the post 17, (2) to provide a vertical axis for rotation of the gate frame in swinging the gate open and closed, and (3) to provide a horizontal axis for limited rotation in the swinging vertical plane as the frame is swung around with its end 10*a* following a grade, and (4) to urge yieldingly said frame to maintain its position in said swinging vertical plane, that is, to restrain it from sideward wabbling.

The hinge performing the above function and herein illustrated by way of example comprises a joint 18 including a hook 18*a* secured to the post 17 in any suitable manner, and an eye member 18*b* loosely fitting on the hook 18*a* and secured in any suitable manner to the gate member 13. By virtue of such a construction the weight of the hinged end 10*a* of the frame is supported through the eye 18*b* on the hook 18*a*, which hook thus also provides a hinge point or an axis for rotating the frame around a vertical axis in swinging said frame 10 around the post 17. Due to the loose fit of the loop or eye 18*b* on the hook 18*a* the frame 10 can also be rotated within the necessary limits around a horizontal axis in order to permit raising and lowering of the swinging end 10*a* of the frame 10 as shown in Fig. 2. There is thus provided a joint 18 which, in effect, operates within necessary limits as a universal joint. Any other construction of the joint to effect similar operation may be used.

Means are provided to restrain the frame 10 from sideward wabbling, said means being adapted to yield to the change of the angle between the end 10*b* and the post 17 resulting from raising or lowering of the end 10*a*. In the embodiment of the invention shown in Figs. 1–4 said means are exemplified by tension springs 19 and 20 having ends connected to the end 10*b* and the post 17 respectively. In the position of the gate frame shown in Fig. 1, the springs 19 and 20 are pre-tensioned and therefore both of said springs operate to exert a strong pull on the ends of the member 13 holding the same to the post 17 and thus maintaining it in a substantially vertical position. The joint 18 resists movement of the member 13 and consequently of the entire frame 10 toward the post 17 as would otherwise be caused by the tensioned springs 19 and 20. The springs 19 and 20 are so selected that they easily yield to the forces caused by operation of the swinging end of the gate and do not interfere therewith.

By virtue of such a construction the frame 10 may be easily opened and closed without sideward wabbling and with the wheel 16 rolling on the ground, the advantages of which operation are discussed above.

In the embodiment of the invention illustrated in Figs. 5 and 6, the construction and the operation of the gate is substantially the same, the main difference being in the method of fabrication or assembly of the hardware for efficient commercial distribution. In this construction the channel member 21 is pre-assembled with a wheel 22 and a hook 23, while a similar channel member 24 is pre-assembled with the springs 25 and 26 and the joint 27. A piece of barbed wire

29 and a wire bracer 29a may also be provided. Such hardware may be conveniently packed in one carton as a set, for distribution. For constructing the gate in the field the purchaser would need only to provide boards of suitable length and interpose them between the channel members 21 and 24 as illustrated in the drawing. Thereupon the springs 25 and 26 and the joint 27 are secured to the post 28 as illustrated, which provides a finished gate. If wire pieces 29 and 29a are supplied, they may be strung up as illustrated.

The hinge means illustrated in Fig. 7 comprise vertically disposed springs 30 and 31 supporting the frame on the hooks 32 and 33, respectively, and horizontally disposed springs 34 and 35. Springs 34 and 35 need not be pre-stressed in this construction. The combined operation of all of the springs ensures operation of the gate frame in a manner described with respect to Fig. 1.

In the construction illustrated in Fig. 8, the suspension of the gate comprises a heel support 40, which may be of the ball-and-socket type, and a pre-stressed tension spring 41. The heel support 40 permits rotation of the frame for swinging as well as for raising and lowering the swinging end of the gate frame. The pre-tension spring 41 connected to the upper end of the member 42, and the gate post 43, holds the upper end of said member 42 to the gate post 43. Undesirable movement of the gate frame toward the post 43 is resisted by the heel support 40 as well as by the weight of the swinging end of the gate frame. Operation of the gate frame in following a grade causes movements of the hinged end illustrated in dotted lines.

There is thus provided an improved gate whereby objects of the present invention listed above as well as a number of additional advantages are attained.

I claim:

1. A swinging farm gate comprising a frame comprising a plurality of vertical members and a plurality of horizontal members, all of said members being made of the same material, said frame having a swinging end and an end hinged to a post, hinge means connecting said hinged end to said post, said means being adapted to support the weight of said hinged end and yieldingly to urge the corners of said frame toward said post.

2. A swinging farm gate comprising a generally rectangular wooden frame having a swinging end and an end hinged to a post, hinge means connecting said hinged end to the post and adapted to support the weight of said hinged end on said post and including a number of springs urging the corners of said frame toward the post, but yielding as said corners tend to move away from said post due to the swinging end following a grade, and rolling means on said swinging end of the frame.

3. A swinging farm gate comprising a generally rectangular frame comprising a plurality of wooden vertical members and a plurality of wooden horizontal members having a swinging end and a hinged end, rolling means on said swinging end, a hook-and-eye hinge adapted to support said hinged end at one point of said hinged end, and a spring provided at another point of said hinged end and urging the frame to remain in a vertical plane as the swinging end of the frame follows a grade.

4. A swinging farm gate comprising a generally rectangular frame having a swinging end and a hinged end; rolling means on said swinging end; a single hook-and-eye hinge provided intermediate the corners of said hinged end and adapted to support said hinged end; and means provided at the corners of said hinged end, said means including springs adapted to urge said corners to a support and yielding as either of said corners moves away from said support due to raising and lowering of said swinging end.

5. A swinging farm gate comprising a generally rectangular frame having a swinging end and a hinged end; a wheel on said swinging end; a single hook-and-eye hinge provided intermediate the corners of said hinged end of the frame and supporting said end on a gate post; and two pre-tensioned tension springs connecting said corners to the gate post.

6. A swinging farm gate comprising a generally rectangular frame; hinge means provided on one of the ends of said frame for hinging the same to a post, said means comprising two tension springs adapted to support the weight of said hinged end, and two tension springs adapted to resist yieldingly movements of the corners of said hinged end of the frame away from the post.

7. A swinging farm gate comprising a generally rectangular frame; hinge means provded on one of the ends of said frame for hinging the same to a post, said means comprising two tension springs adapted to support the weight of said hinged end, and two tension springs adapted to resist yieldingly movements of the corners of said hinged end of the frame away from the post; and a wheel carried by the other end of said frame and adapted to support the same and to roll as the frame is being moved in opening and closing the gate.

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