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TESTING SLIDE FASTENER

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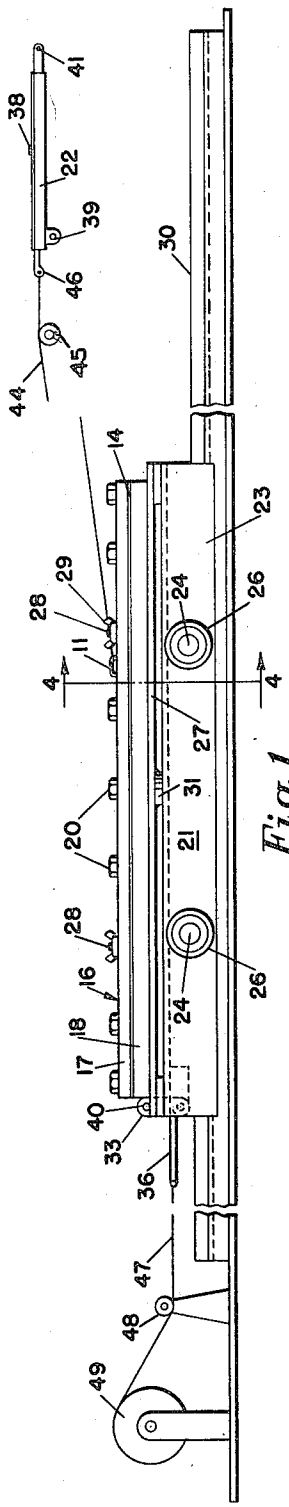


Fig. 1

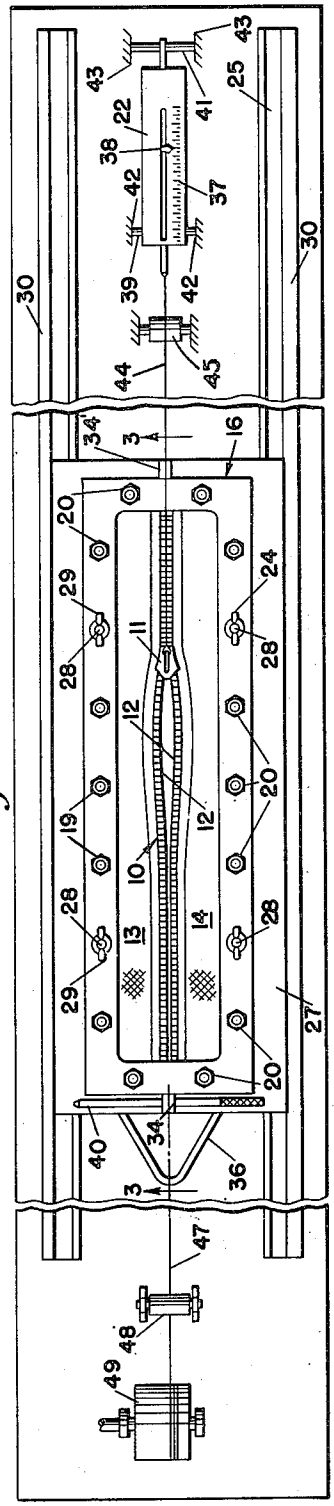


Fig. 2

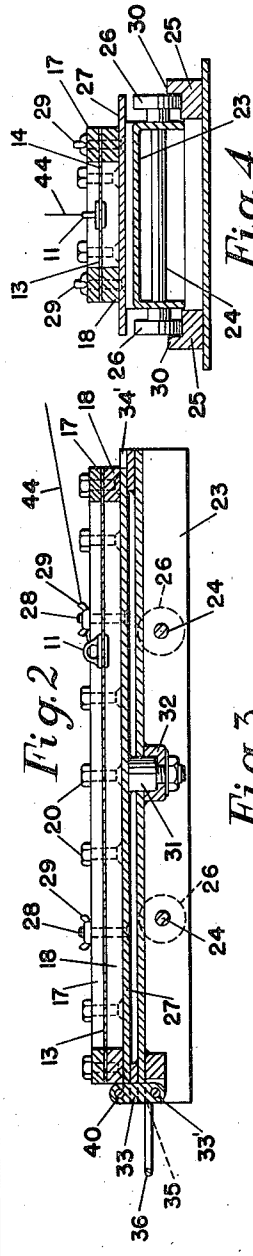


Fig. 3

Fig. 4

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TESTING SLIDE FASTENER

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6 Claims. (Cl. 73—9)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to the art of testing slide fasteners and to apparatus particularly adapted for determining the force required to effect relative movement lengthwise of the fastener and between the latter and the slider.

In order to determine the suitability of different types and sizes of slide fasteners for specific uses, it is desirable to know the force required to open and close the fastener under various conditions and also, whether a particular slide fastener is capable of withstanding satisfactorily the application of the force requisite for operating it under conditions which may be expected to prevail at times during the contemplated use of the fastener. For instance, ice may form on a portion of a slide fastener, or the fastener may be frozen in mixtures of various compositions, such as earth and water, or the like. It is highly desirable to test the operation of the slider along the fastener in both directions.

The purposes of the present invention are to improve the art of testing the force required to open and close slide fasteners, and to provide improved means for attaining this objective in a simple and efficient manner.

In accordance with this invention, webs joined by a slide fastener may be secured in a frame which may be mounted to pivot on a suitable platform adapted to travel away from a force determining means while the slider is connected thereto. It then becomes possible to test the slider in both directions along the fastener merely by turning the frame from end to end on the platform. Preferably, the platform is in the form of a car or truck mounted on a track which serves to guide the car in a direction substantially parallel to the direction of the length of the slide fastener.

The features of the invention are shown in the accompanying drawing, wherein:

Fig. 1 is a side elevation of apparatus for testing slide fasteners;

Fig. 2 is a top plan view of the apparatus shown in Fig. 1;

Fig. 3 is a section along the line 3—3 of Fig. 2; and

Fig. 4 is a section along the line 4—4 of Fig. 1.

In the embodiment selected for illustration, a slide fastener to be tested is indicated generally at 10, and it comprises a slider 11 cooperating with opposed rows of interengageable fastening

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elements 12 mounted on webs 13 and 14. These webs may be secured in a suitable frame 16, preferably comprising mating upper and lower sections 17 and 18, respectively. For clamping mating sections 17 and 18 together about interposed webs 13 and 14, stud bolts 19 may be mounted on lower section 18, for example, to extend through registering holes in upper section 17 and preferably also through like registering holes in the interposed portions of webs 13 and 14, which may then be secured between mating sections 17 and 18 by tightening nuts 20 on bolts 19.

A suitable platform preferably in the form of a truck or car 21 may be provided for carrying frame 16 away from a suitable force indicating means 22. This car may be of simple construction and comprise a body 23 mounted on axles 24 equipped with suitable wheels 26 preferably mounted on anti-friction bearings (not shown). Preferably wheels 26 have a smooth, unflanged tread and ride in longitudinal grooves on rails 25 between upstanding flanges 30 along the outer edges of the rails.

In order to provide a pivotal connection between this car and frame 16, the latter may be mounted on a bed plate 27, as by means of a suitable number of stud bolts 28 mounted on the plate and extending upwardly through aligned holes in frame 16 and the webs interposed therein. The frame may be clamped to the bed plate by means of wing nuts 29 mounted on stud bolts 28. From the central portion of the under side of the bed plate, a pivot pin or bolt 31 may extend downwardly into a suitable bearing 32 in body 23 of car 21. The bed plate and frame 16 carried thereby may be secured in proper alignment with the car by releasable means, such as a detent or latch 33 pivotally mounted on a transverse axis provided by a pivot pin 33' at one end of the body of the car and operable through a vertical slot 35 in the end of the car body for engagement selectively in either of the complementary notches 34 or 34' at opposite ends of the bed plate. This latch may be secured in the selected notch 34 or 34' by means of a pin 40 inserted in a hole spaced near the free end of the latch to hold the pin against the surface of plate 27. A suitable draft member 36 may also be secured to the body of the car at one end thereof.

If desired, the means 22 for determining the force required to move the slider may be in the form of a spring balance of any suitable construction comprising a scale 37 and a pointer 38 movable thereover. It is also advantageous for many tests to record graphically or otherwise the

instantaneous force applied, but means for this purpose forms no part of the present invention.

The spring balance 22 may be secured in a fixed position in any suitable manner, as by transversely extending pins 39 and 41 affixed to opposite ends of the frame of the spring balance and mounted on fixed supports 42 and 43, respectively. Any suitable connection, such as a small cable 44 may be provided between slider 11 and pull ring 46 of the spring balance. Preferably, cable 44 is trained over a guide roller 45 so as to give a straight line motion to the pull ring 46 of the spring balance. For moving the car along the track away from the spring balance, any suitable tension element, preferably a small cable 47 may be connected to draft member 36 and extend about a guide roller 48 to a take-up mechanism, such as a winding drum 49.

In practicing the invention with the illustrated apparatus, the webs carrying the slide fastener to be tested, such as webs 13 and 14, may be interposed between mating sections 17 and 18 of the frame 16 and preferably impaled on stud bolts 19 after which these sections of the frame may be clamped together by tightening nuts 20 on bolts 19. This frame may then be secured to bed plate 27 by passing stud bolts 28 thereof through registering holes in the frame and tightening wing nuts 29 on these stud bolts. The bed plate is then adjusted about its pivotal axis comprising pivot bolt 31 until latch 33 may be swung about its pivot into one of the complementary notches 34 or 34' so that the plate is thereby locked against rotation relative to the car. The slider 11 is connected to pull ring 46 of the spring balance with the slider arranged adjacent the end of the car remote from the spring balance. The tension element, such as cable 47, may be connected to draft member 36 and to a suitable take-up mechanism such as winding drum 49. The car may be pulled along the track away from the spring balance by this tension element, as by winding the element on drum 49 so as to effect relative movement between slider 11 and fastening elements 12 lengthwise of the slide fastener. The amount of force required to effect this movement will then be indicated instantaneously by the position of the pointer 38 relative to scale 37.

It will be seen that when the slider has traversed the fastener for one length thereof, the same operation may be repeated any number of times merely by returning the car to its initial position and then causing the car to travel away from the spring balance as just described. It will also be seen that in order to have the slide fastener tested by effecting relative movement between the slider and the fastening elements in opposite directions, this may be accomplished by releasing latch 33 from the notch in which it is engaged, turning the bed plate end for end so that latch 33 may be engaged in the notch in the other end of the bed plate, and then causing the car again to travel away from the spring balance in the same manner as previously set forth herein.

What I claim is:

1. Apparatus for testing slide fasteners comprising a frame for securing webs joined by a slide fastener, force indicating means adapted for connection to the slider of the slide fastener, a platform adapted to travel away from the force indicating means, and a pivotal connection between the platform and the frame for supporting the latter for turning substantially from end to end on the platform.

2. Apparatus for testing slide fasteners comprising a frame for securing webs joined by a slide fastener, force indicating means adapted for connection to the slider of the slide fastener, a car for carrying the frame away from the force indicating means, a track for guiding the car in a direction substantially parallel to the direction in which the length of the fastener is disposed, and a pivotal connection between the car and the frame for supporting the latter for turning substantially from end to end on the car.

3. Apparatus for testing slide fasteners comprising a frame for securing webs joined by a slide fastener, force indicating means adapted for connection to the slider of the slide fastener, a car for carrying the frame away from the force indicating means, a track for guiding the car in a direction substantially parallel to the direction in which the length of the fastener is disposed, and releasable means for holding the frame from turning relative to the car.

4. Apparatus for testing slide fasteners comprising a frame for securing webs joined by a slide fastener, force indicating means adapted for connection to the slider of the slide fastener, a car for carrying the frame away from the force indicating means, a track for guiding the car in a direction substantially parallel to the direction in which the length of the fastener is disposed, a pivot bolt extending downwardly from the underside of the frame, and a bearing on the car receiving the pivot bolt for supporting the frame for turning substantially from end to end on the car.

5. Apparatus for testing a slide fastener having interengageable fastening elements and a slider for engaging or disengaging the fastening elements, comprising means for holding said fastening elements, force indicating means adapted for connection to said slider, and means for moving said holding means to produce relative movement between said fastening elements and said slider, said holding means having a pivotal mounting whereby said holding means may be swung end for end so that relative movement between said fastening elements and said slider may be such as to either engage or disengage said fastening elements.

6. Apparatus for testing a slide fastener having interengageable fastening elements and a slider for engaging or disengaging the fastening elements, comprising means for holding said fastening elements, means for imparting relative movement between said fastening elements and said slider to open said slide fastener, means for indicating the force required to open said slide fastener, and means for pivotably mounting said holding means whereby end for end adjusting movement of said holding means will enable said second-mentioned means to close said slide fastener and said indicating means will determine the force required to close said slide fastener.

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