June 17, 1952 R. W. ROGERS ET AL 2,600,923

TEST CLAMP FOR TEST SPECIMEN

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Fig. 1.

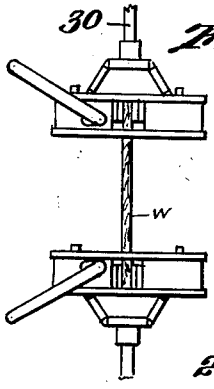

Fig. 2.

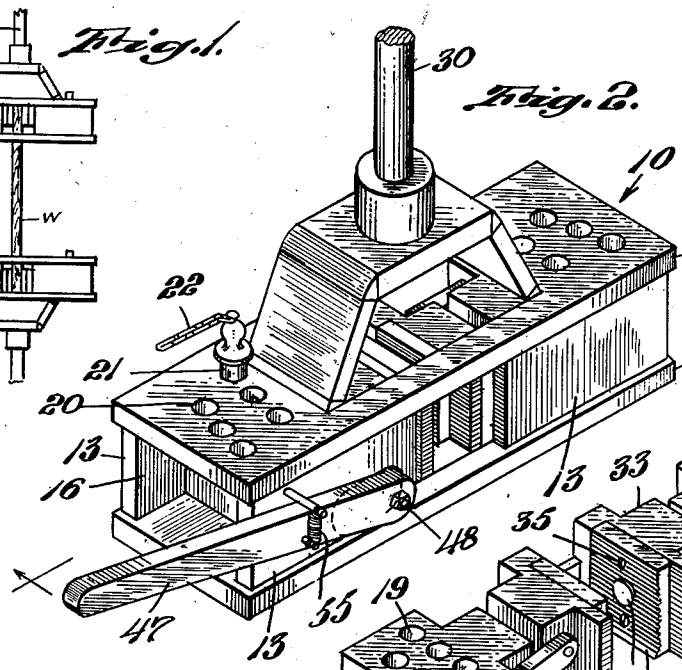

Fig. 3.

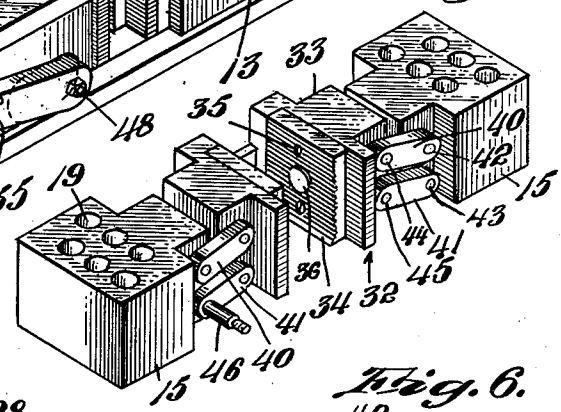

Fig. 4.

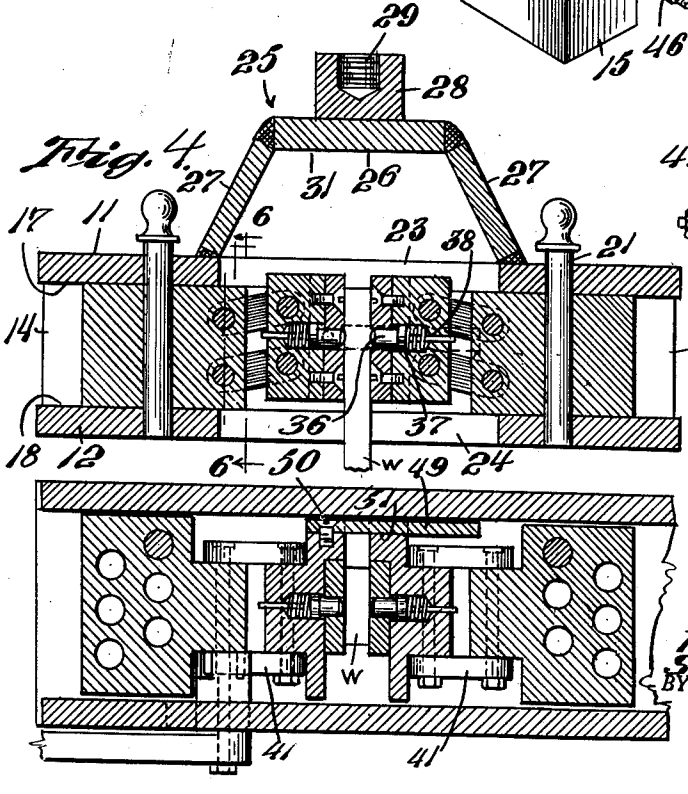

Fig. 6.

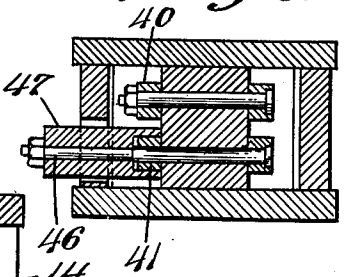

Fig. 5.

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TEST CLAMP FOR TEST SPECIMEN

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3 Claims. (Cl. 24—248)

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This invention relates to a clamp for gripping a specimen to be tested and more particularly to a clamp usually referred to as a toggle clamp.

Clamps of the character here referred to provide movable jaws which are each hung upon a pair of links to move in parallel relation as the jaw moves relative to the part to which the links are connected. The links cannot properly function at an angle higher than 20° to a perpendicular to the face of the jaws as the proper clamping action is not obtained. Thus, such a clamp has a very limited range as to the thickness of a specimen which may be received in the clamp. It is desirable that the links which mount the jaws be at approximately 10° to a perpendicular to the jaws in order that the best gripping action at maximum pull may be provided for. It is also desirable that the specimen clamped shall be on the center line of pull on the clamp in order that irregularities due to angular direction of pull may be minimized or eliminated.

One of the objects of this invention is to provide an adjustment for the jaws which will enable a single clamp to have a greater range of capacity for engaging work of different thicknesses.

Another object of this invention is to provide a releasing means for the jaws which will permit the jaws to be simultaneously moved away from gripping engagement with the work.

Another object of this invention is to provide an adjustment which may be calibrated and marked so that the jaws may be preset for different thicknesses or for different types of specimens.

Another object of this invention is to provide an arrangement for ejecting a specimen from the jaws when the jaws are moved to release the specimen.

Another object of this invention is to provide a guide for positioning the specimen between the gripping jaws.

Another object of this invention is to provide an arrangement so that the jaws may be opened by one hand of the operator.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is an elevation illustrating a pair of clamps and a specimen to be tested;

Fig. 2 is a perspective view of one of the clamps;

Fig. 3 is a perspective view of the gripping jaws and the adjustable blocks which are movable in the clamp body;

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Fig. 4 is a central sectional view through the clamp as shown in Fig. 2;

Fig. 5 is a sectional view taken substantially through the center of the jaws at right angles to the section shown in Fig. 4;

Fig. 6 is a section on substantially line 6—6 of Fig. 4.

In proceeding with this invention, we provide a body of a general frame structure which has guide ways formed in it for directing the movement of a pair of blocks toward and from each other. Each of these blocks provides an anchor or mounting means for one of the gripping jaws for the work, the jaws being pivoted to the block by two pairs of parallelly arranged links. The arrangement is such that, when the work is gripped by the jaws, the links will be at an angle to a perpendicular to the face of the jaws so that, as pull occurs on the jaws, the jaws will tend to swing the links and will move toward each other into firmer gripping relation. The blocks are adjustably mounted in the body so a different spaced relation of the jaws may occur, the adjustment being by means of holes and a pin so set that the pin can enter holes that are in registry when in but a certain definite position which is known and which may be calibrated for different sizes or characteristics of different specimens. Each of the jaws may be provided with an ejecting pin, and the jaws may be equipped with a means so that through a single handle both jaws are moved together by one hand of the operator. Guides for positioning the work may be conveniently positioned in the clamp.

With reference to the drawings, the body of the clamp is designated generally 10 and comprises a pair of plates 11 and 12 which are supported in spaced relation by means of spacing members 13 placed along the longitudinal edges of the plates 11 and 12 and provide with the plates 11 and 12 guides 14 for directing the movement of blocks 15 in the body, that is, the inner surfaces 16 of the members 13 will form back and front guiding surfaces, while the inner surface 17 of the plate 11 and the inner surface 18 of the plate 12 will provide top and bottom guiding surfaces.

Each of the blocks is provided with a plurality of openings 19, while the plates 11 and 12 are provided with a plurality of openings 20. The openings 20 are angularly arranged with reference to the guided direction of movement of the block and are so staggered that but one hole will register with a hole 19 in the block. Thus, when the

pin is in one hole, the block will be at one definite position with relation to the body and when in another hole will be at another definite position with relation to the body along the guide; and, thus, there may be had a calibration so that different holes may be used for different thicknesses of specimens. A pin 21 will be inserted through the holes in the plates 11 and 12 and through the block for this purpose and may have an anchoring chain 22 for attaching the same to the clamp.

The plates 11 and 12 will have central openings 23 and 24 in alignment for positioning the specimen in the clamp; and, above the opening 23, there will be provided an attaching bridge 25 comprising a horizontal plate 26 and two inclined plates 27 spacing the plate 26 a distance above the plate 11. A boss 28 is provided on this plate 26 having a threaded socket 29 for the reception of an attaching rod 30 upon which pull, or resistance to pull on the other end of the specimen, may be applied. The under surface 31 of this bridge may serve as a means for limiting or guiding one end of the specimen into a desired position between the clamping jaws.

The clamping jaws are designated 32 and consist of a T-block 33 having a separable face member 34 with serrations thereon which may be attached by means of screws 35 to the block 33. A spring-pressed pin 36 is slidable in the jaw and facing member and is pressed by a spring 38 outwardly and is limited in its movement by the facing member 34 engaging the shoulder formed by the head 37 on the pin 36. Each of these jaws 32 is attached to one of the blocks 15 by links 40 and 41 arranged in parallel relation and pivoted as at 42 and 43 to the block and as at 44 and 45 to the jaw. These parallelly arranged links are provided both at the front and back edge of the jaws and blocks. One of the pivots comprises a shaft 46 (see Fig. 3) which passes through one of the blocks and has its link such as 41 fixed to the shaft. This shaft is also provided with a lever 47 acting as a handle which is secured in place on the shaft by a nut 48 so that movement of this lever to different positions will serve to swing the link 41 and by reason of the connection above mentioned also the link 40 to move the jaw toward and from a center line through the clamp. In order that both jaws may be moved at the same time, we provide a bar 49 secured to the jaw which is equipped with the handle as by means of a screw 50 which bar is slidably related to the other jaw in guides 51 so that as one jaw is raised the other jaw will also be raised and thus will swing toward and from the center of the clamp a like amount. This bar also has a means for limiting the insertion of the work between the jaws by acting as a back guide in instances where desired.

From the above it will be apparent that we have provided a pair of jaws which will remain centralized with reference to the pull rod 30 at all times if the blocks which carry them are adjusted to equal positions from the center line.

The blocks may be adjusted in small increments and held there by reason of the particular arrangement of the holes which is provided. In fact, the adjustment may be had between centralizing positions by adjusting one block while leaving the other block fixed although the center of pull will be slightly off in such case. When it is desired to release the jaws from gripping position which they will assume as the work is pulled, it is merely necessary to move the handle 47 by one hand for lifting the jaws, as in Fig. 1, and releasing the work. As the work is released, the spring pins 36 will eject the work from the jaws.

A spring 55 urges the lever in a direction to cause the jaws to close so that after the work is inserted release of the handle will permit the spring 55 to move the jaws so as to grip the work.

We claim:

1. A clamp for gripping a specimen subjected to a pulling force for testing or the like comprising a hollow body having sides, top, and bottom walls, said top and bottom walls having aligned openings therethrough through which the said specimen may be passed, a pair of blocks slidably guided in said body by said walls on opposite sides of said openings, a pair of gripping jaws within said body and out of engagement with said body and having opposite flat surfaces for engaging the specimen, a pair of parallelly arranged links on opposite sides of each block for movably mounting each jaw on a block for suspension therefrom only by said links and for parallel motion of said jaws to and from each other, said links and said blocks being so related that the links extend at an acute angle to the gripping face of the jaws to cause the jaws to move toward each other as pull is exerted on the specimen, a shaft to which one of said links is fixed for pivotally mounting the link, a handle fixed to said shaft for moving the jaws from each other, and spring means for moving said jaws towards each other.

2. A clamp as in claim 1 wherein a plurality of parallel rows of holes are provided in the body and a plurality of parallel rows of holes are in the block and with the rows of holes in said body extending at an angle to the rows of holes in said block so that one hole in the block will only register with one hole in the body whereby a definite size relation less than the distance between said rows may be provided.

3. A clamp as in claim 1 wherein a bar is fixed to one of said jaws and slidably related to the other of said jaws whereby said jaws are moved together by said handle.

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