Feb. 6, 1945. R. L. TEMPLIN 2,368,900

COMPRESSION TESTING JIG

Filed March 15, 1943 2 Sheets-Sheet 1

Fig. 1

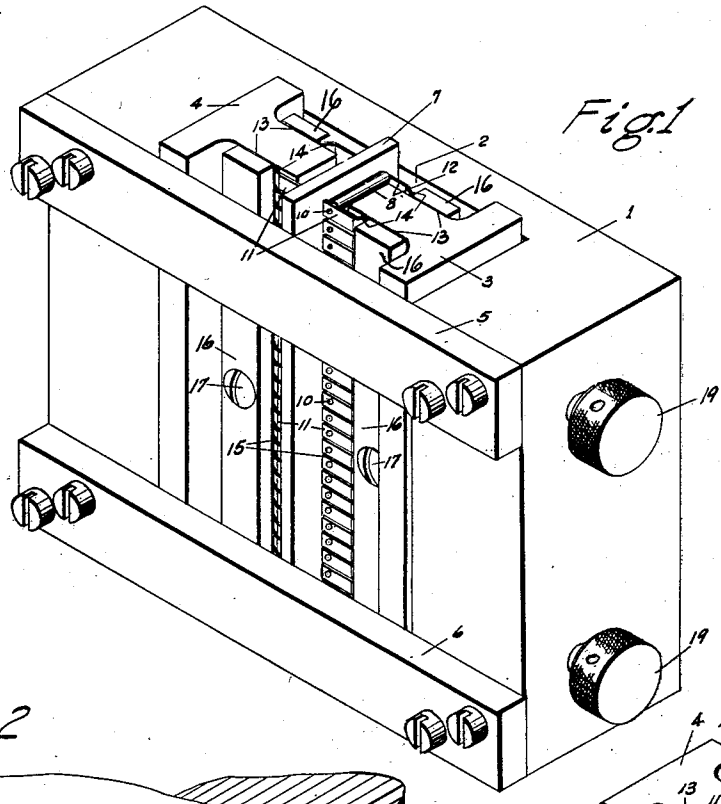


Fig. 2

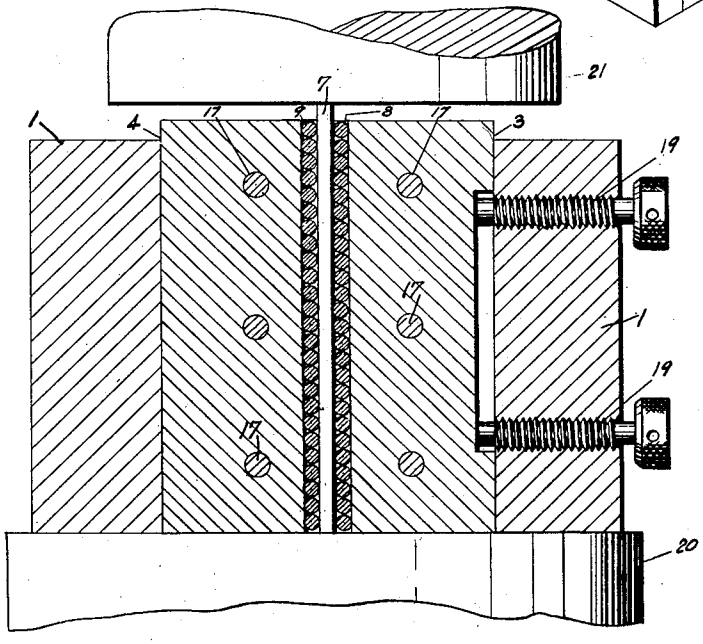
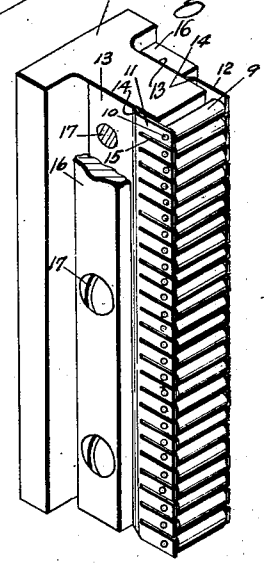


Fig. 3



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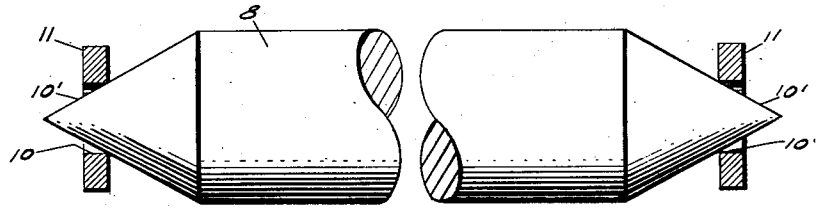


Fig. 4

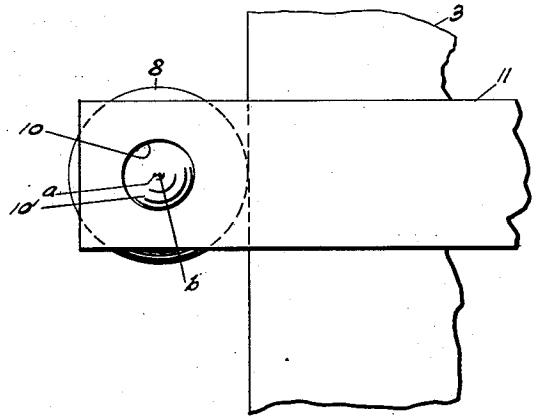


Fig. 5

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COMPRESSION TESTING JIG

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Application March 15, 1943, Serial No. 479,297

5 Claims. (Cl. 73—94)

This invention relates generally to materials testing apparatus and more particularly to a device for compression testing of thin sheet metal specimens.

In a compression device or jig of the general type disclosed herein a thin sheet metal specimen is placed between two jaws having small diameter rollers to engage the side surfaces of the specimen to prevent the same from buckling or flexing. These rollers have heretofore been supported in an uncertain manner as by heavy grease in order that the rollers would offer minimum resistance to the compressive deformation of the specimen and to allow the specimen to have its maximum deformation at its top end and its minimum deformation at its lower end. For instance, the upper end of the specimen moves for the full distance of whatever deformation takes place while the bottom edge of the specimen theoretically has no deformation and accordingly the extent of movement of the specimen progressively increases from top to bottom. In addition to having the rollers accommodate themselves to this variable movement it is also desirable to support the rollers so that upon removal of a specimen the rollers remain in a predetermined supported relation to the jaws as a self-contained part thereof.

It is an object of my invention to provide an improved compression jig whereby anti-friction rollers which engage the side surfaces of a thin sheet metal specimen are adapted to be supported at all times in a predetermined relation to the supporting jaws and yet allow such rollers during a test to have free movement and adaptability in following the compressive deformation in the specimen but without imposing any undesirable resistance or restraint on the specimen. A further object is to provide improved roller supports in a compression jig that will allow complete freedom of action of the rollers when the specimen undergoes deformation due to compressive loading, and yet will restore the rollers to a predetermined normal position upon removal of the specimen.

Other objects and advantages will be more apparent to those skilled in the art from the following description of the accompanying drawings in which:

Fig. 1 is a perspective of my improved device with a specimen disposed thereon;

Fig. 2 is a sectional view through the device showing the specimen being compressed between the usual opposed loading elements of a testing machine;

Fig. 3 is a perspective of one supporting jaw of my device partially broken away to show details of construction;

Fig. 4 is an enlarged view axially of a roller showing the character of its pivotal ends and the support thereof in the flexible fingers which are shown in section; and

Fig. 5 is an enlarged end view of a roller and its supporting fingers to show a preferable offset relation between the axes of the roller and the holes in the fingers for journalling the roller.

This type of device broadly comprises a frame 1 having a vertical recess 2 extending for the full height of the frame to receive a pair of vertically adjustable T-shaped jaws or supports 3 and 4. The bases of the T-jaws bear against the opposed walls of the recess while a pair of transverse strips 5 and 6 extend across the open side of the recess to hold the members 3 and 4 in position. Disposed along opposed edges of the two T-shaped members are a series of small rollers 8 and 9 to support a sheet metal specimen 7. It will be understood that the jaws and roller structures on each side are identical and hence the description of one will suffice for both. The rollers have machined conical ends 10 (preferably about 60° total included angle) journalled in holes 10' in flat spring-like fingers 11 and 12. These fingers are formed preferably from a single continuous sheet of material, such as spring brass, having a vertically extending base portion 13 bent slightly outwardly as at 14 and then forwardly. The fingers 11 and 12 are then formed by cutting or milling a series of slots 15 in the extended portion of the sheet metal. The base portion 13 is clamped against sides of the T-stem by keeper plates 16 and screws 17. The jaw and roller structure 3 and 8 may be adjusted to accommodate specimens of different thickness by screws 19. As shown in Fig. 5, the center *b* of the holes in the fingers are slightly closer to the face of the T-supports than the center of the roller. This offset relation together with a slight axially inward pressure of the flexible fingers against the conical ends of the rollers will thus hold the same against the face of the T-supports at all times while still allowing freedom of movement of the rollers during compressive deformation of the specimen.

In operation, the specimen 7 is placed between the rollers which are adjusted to provide an initial contact with the specimen, the jaws 3 and 4 and specimen then being placed in a flush position on a lower table 20 of a testing machine while an upper loading head 21 engages the specimen at a sufficient distance above the jaws to allow

compression of the specimen without any liability of bending over its upper end. As compressive deformation of the specimen takes place the rollers 9 laterally stabilize the thin sheet specimen against possible flexure. The rollers not only bear against the end faces of the T-jaws which provide a firm lateral support for the specimen but also have a rolling action along the jaw faces in which case a very small space between the rollers will be sufficient to allow the rollers to roll along without rubbing against each other, the rollers at the top of the jaw, of course, having maximum movement and accordingly the spacing between the rollers is preferably large enough to accommodate such extent of movement although a smaller spacing might be possible.

From the foregoing disclosure, it is seen that I have provided a compression jig or device for thin sheet metal specimens whereby lateral supporting rollers for the specimen are not only maintained at all times in a predetermined operative relation to the supporting jaws but also the axes of the individual rollers are kept mutually parallel and perpendicular to the longitudinal or vertical axis of the specimen. In addition, the rollers are held in the apparatus so that the axes of any pair of rollers (one on each side of the specimen) are in the same horizontal plane, that is, each roller is directly opposite its complementary mate. As a result of my improved arrangement a specimen may be removed from between the rollers and the rollers will still remain in their normal position ready to receive another specimen. However, the spring-like flexible supporting fingers for the rollers and the offset axes of the rollers and holes insure that the rollers can readily adapt themselves to any necessary relative movement either solely about the roller pintles or along the faces of the T-jaws in which latter case the fingers automatically restore the rollers to their initial position when the specimen is removed. The foregoing and other advantages are particularly desirable in an apparatus for either commercial testing or scientific investigation of physical properties of materials, particularly thin sheet material which easily buckles or flexes when subjected to compressive loads.

It will of course be understood that various changes in details of construction and arrangement of parts may be made by those skilled in the art without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A device for holding a thin sheet specimen for a compression test comprising, a frame, jaw members supported in said frame and having opposed faces spaced from each other, anti-friction rollers positioned adjacent each of said faces to support the sides of a specimen, and flexible means supported by said jaw members for rotatably supporting said rollers and for allowing the latter to follow deformations of the specimen.

2. A device for holding a thin sheet specimen for a compression test comprising, a frame, jaw members supported in said frame and having opposed faces spaced from each other, anti-friction rollers disposed substantially at right angles to the direction of compression loading and positioned adjacent each of said faces to support a relatively thin specimen, and parallel spring-like fingers supported by said jaws for individually rotatably supporting said rollers.

3. A device for holding a thin sheet specimen for a compression test comprising, a frame, jaw members supported in said frame and having opposed faces spaced from each other, anti-friction rollers disposed substantially at right angles to the direction of compression loading and positioned adjacent each of said faces to support a relatively thin specimen, spring-like fingers for individually rotatably supporting said rollers, means for supporting said fingers by said jaws, and said fingers having portions bent laterally outwardly from said jaws to provide a flexible support for the rollers both in the direction of rolling action and transversely thereof.

4. A device for holding a thin sheet specimen for a compression test comprising, a frame, jaw members supported in said frame and having opposed faces spaced from each other, anti-friction rollers positioned adjacent each of said faces to support the sides of a specimen, and means carried by said jaw members for urging said rollers into contact at all times with said jaw faces.

5. A device for holding a thin sheet specimen for a compression test comprising, a frame, jaw members supported in said frame and having opposed faces spaced from each other, anti-friction rollers positioned adjacent each of said faces to support the sides of a specimen, said rollers having conical ends, and flexible means supported by said jaws and having bearing surfaces for rotatably supporting said conical ends at a point on the side thereof away from the jaw faces, said flexible means being biased axially inwardly of said rollers whereby said bearing surfaces in acting on the outer portion of the conical surfaces of the rollers urge the same into contact with said jaw faces.

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