March 10, 1964 P. C. ELY, JR., ETAL 3,124,345

ADJUSTABLE WAVEGUIDE SUPPORT TEST STAND

Filed March 16, 1962 2 Sheets-Sheet 1

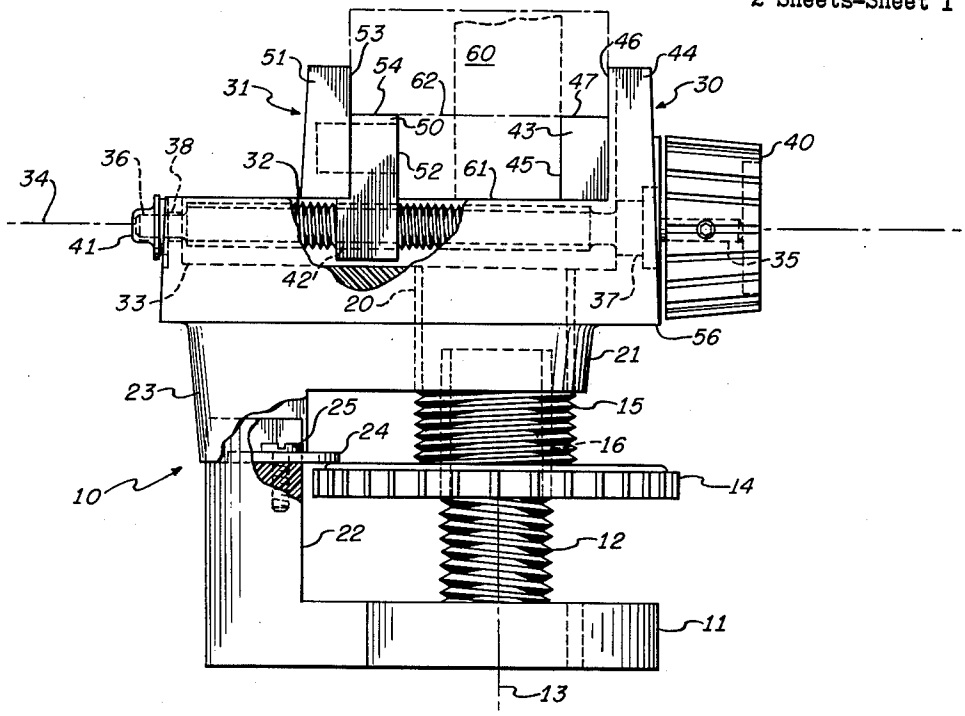



FIG.1.

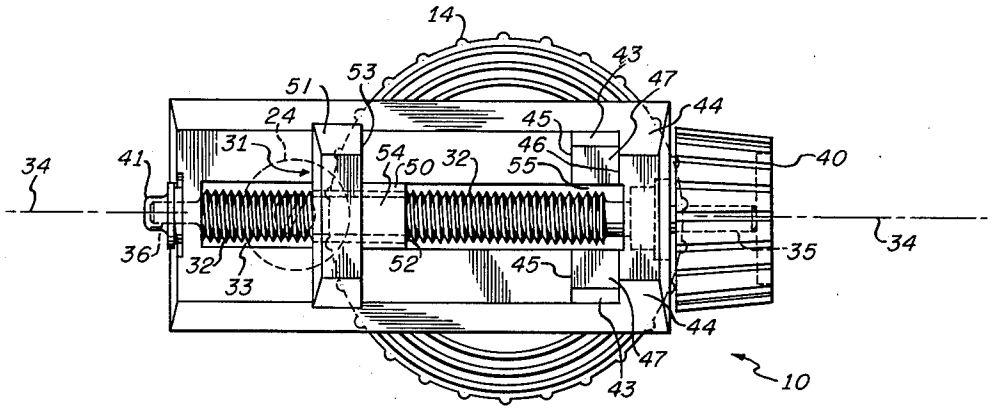



FIG.2.

INVENTORS
PAUL C. ELY JR.
ROBERT J. MC CAW
BY

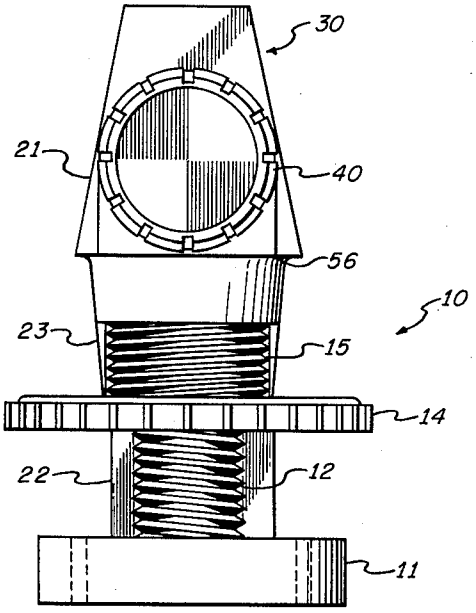
ATTORNEY

March 10, 1964 P. C. ELY, JR., ETAL 3,124,345

ADJUSTABLE WAVEGUIDE SUPPORT TEST STAND

Filed March 16, 1962 2 Sheets-Sheet 2

FIG.3.



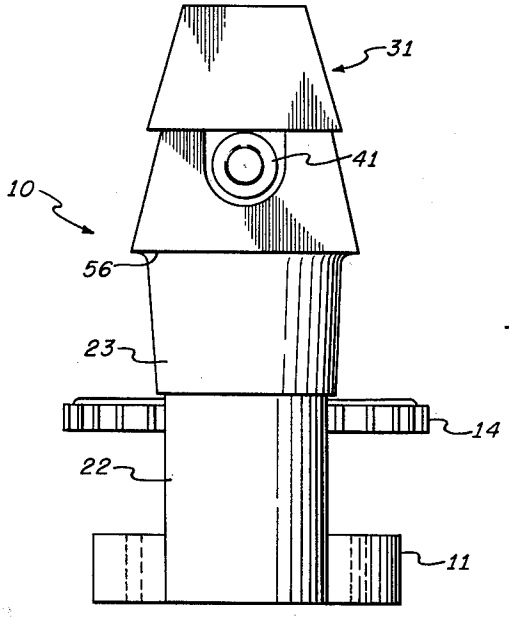




FIG.4.

INVENTORS
PAUL C. ELY JR.
ROBERT J. MC CAW
BY

ATTORNEY

United States Patent Office 3,124,345 Patented Mar. 10, 1964



# 3,124,345
# ADJUSTABLE WAVEGUIDE SUPPORT TEST STAND

Paul C. Ely, Jr., and Robert J. McCaw, Clearwater, Fla., assignors to Sperry Rand Corporation, Great Neck, N.Y., a corporation of Delaware

Filed Mar. 16, 1962, Ser. No. 180,178
6 Claims. (Cl. 269—60)

The present invention relates to an adjustable support test stand for waveguides having broad and narrow walls.

Test stands for waveguides are used primarily to support waveguide sections to form a complete waveguide that has all of its sections accurately aligned with respect to each other. Prior art waveguide test stands require an excessive amount of manual manipulation in order to accurately align the waveguide sections. Since the laboratory personnel which perform these manipulations are relatively high priced, the amount of time involved in making the laboratory waveguide setup involves a considerable expenditure of time and consequently money.

Further prior art waveguide test stands generally are adjustable over a relatively limited range of application and if stable, they are unnecessarily bulky. If they are compact, they are usually undesirably unstable and unduly expensive. In addition, certain of the prior devices do not provide positive clamping of the waveguide under test.

It is therefore a primary object of the present invention to provide a versatile waveguide test stand that is readily adjustable vertically and horizontally while being rugged in service and economical to manufacture.

It is an additional object of the present invention to provide a waveguide test stand that is quickly and easily adjustable with respect to two perpendicular axes that firmly secures the waveguide without damage while being compact and economical to manufacture.

The above objects are accomplished by a test stand for waveguides having broad and narrow walls in which clamping jaws have first and second portions stepped with respect to each other. The first or second portions optionally secure the waveguide when the narrow wall is in a predetermined position and the first or second portions optionally secure the waveguide when the broad wall is in said predetermined position. The test stand further includes a dual threaded adjusting wheel for rapid and easy vertical adjustment. The waveguide test stand is compact, rugged and readily adjustable with respect to two perpendicular axes and requires a minimum of adjustment by the human operator.

Referring to the drawings:

FIG. 1 is a front elevation partially in section of the waveguide test stand of the present invention;

FIG. 2 is a top plan view of FIG. 1;

FIG. 3 is a right elevation of FIG. 1; and

FIG. 4 is a left elevation of FIG. 1.

Referring to FIGS. 1 to 4, the waveguide test stand 10 of the present invention includes a stationary base member 11. The base member 11 may be merely mounted on a test bench or may be secured to the bench by means of screws which protrude through holes in the base plate. An externally threaded stud 12 having a longitudinal axis 13 projects upwardly as viewed in FIG. 1 from the base member 11. A dual threaded hollow adjusting wheel 14 has a threaded hollow cylindrical portion 15 projecting therefrom having a central bore 16 whose longitudinal axis is coincident with the axis 13. The bore 16 is internally threaded to cooperate with the external threads on the stud 12. The projection 15 is externally threaded to cooperate with an internally threaded aperture 20 of a support member 21. The longitudinal axis of the aperture 20 is coincident with the axis 13 whereby rotating the wheel 14 around the axis 13 rapidly adjusts the support element 21 in the vertical direction as viewed in FIG. 1 along the axis 13.



To permit movement of the support element 21 in the vertical direction while preventing relative rotation of the support element 21 with respect to the base 11, a semicircular guide post 22 extends vertically upward as viewed in FIG. 1 from the base 11. The semicircular guide post 22 is cooperative with a semicircular aperture 23 within the support element 21. To prevent the adjusting wheel 14 from becoming disengaged from the stud 12, a stop element 24 in the form of a circular washer is screwed to the top of the projection 22 by means of a screw 25.

The support element 21 has mounted thereon cooperative clamping jaws 30 and 31. The jaw 30 is integral with the support element 21 while the jaw 31 is positionably mounted on a threaded shaft 32. The shaft 32 is mounted for rotation around its longitudinal axis 34 in a circular groove 33 in the support element 21. The shaft 32 is rotatably supported by means of its extremities 35 and 36 which project through support apertures 37 and 38 in the support element 21. An adjusting knob 40 is secured to that portion of the extremity 35 which extends beyond the support element 21. A lock nut 41 is secured to that portion of the extremity 36 which extends beyond the support element 21 to prevent movement of the shaft 32 in the direction of the axis 34. The axis 34 is perpendicular to the axis 13. The movable jaw 31 has an internally threaded aperture 42 which cooperates with the external threads of the shaft 32 whereby rotation of the knob 40 causes the jaw 31 to be positioned in the direction of the axis 34 to provide the horizontal adjustment as viewed in FIG. 1 of the test stand 10.

The jaw 30 includes first and second face portions 43 and 44 respectively having first and second respective faces 45 and 46. The first face portion 43 protrudes a predetermined distance from said second face portion 44 in order that the face 45 is spaced from the face 46 thereby forming a stepped jaw face. The first face portion 43 further includes a shelf surface 47. In a similar manner the jaw 31 includes a first face portion 50 and a second face portion 51 having a first face 52 and a second face 53 respectively. The first face portion 50 similarly includes a shelf surface 54. The faces 45, 46 and 52, 53 are parallel with the faces 45 and 52 opposing and being cooperative with respect to each other while the faces 46 and 53 are opposing and cooperative with respect to each other.

As shown in FIG. 2, preferably the first face portion 43 has a slot 55 therein and the first face portion 50 is adapted to fit within the slot 55 in order that the portions 43 and 50 are interlocking to securely grasp small parts.

The support element 21 further includes a protective skirt 56 which extends outwardly to protect the adjusting

wheel 14 and associated threads against dirt and foreign matter getting into the relative moving parts.

Preferably, the axis 13 is located to provide nearly equal weight distribution when it is supporting a waveguide. The entire test stand 10 and especially the jaws 30 and 31 are composed of high impact plastic to prevent damage to the waveguides and to withstand rough usage.

In operation, when it is desired to align one waveguide section with another the adjusting wheel 14 is rotated until a waveguide section 60 is at the proper height. If the narrow walls 61 of the waveguide 60 are to be disposed parallel to the axis 34 as shown in dotted lines in FIG. 1, the waveguide 60 may be supported on the support element 21 and the knob 40 is rotated until the faces 45 and 52 firmly secure the waveguide 60. Then if it is desirable to rotate the waveguide 60 in order that its broad walls 62 are parallel with the axis 34 as shown in the dash-dot lines of FIG. 1, the lower broad wall 62 may be supported on the shelf surfaces 47 and 54 and the knob 40 rotated until the faces 46 and 53 secure the waveguide 60. By means of the stepped jaw faces relatively little manipulation of the knob 40 is required to adjust the waveguide 60 from one position to the other. It will be appreciated that the waveguide 60 may be optionally secured by either the first face portions 43 and 50 or the second face portions 44 and 51 with either the narrow walls 61 or the broad walls 62 parallel to the axis 34 with the stepped jaw face providing an additional height adjustment.

The waveguide test stand of the present invention has several important advantages including the following:

(1) It can be rapidly and accurately adjusted vertically and horizontally, with only one hand if necessary,

(2) It is easily adjustable and accessible from the front and sides for use in cramped spaces,

(3) it is compact for use in limited spaces yet stable,

(4) The location of the axis 13 provides centralized loading,

(5) The movable rear jaws 31 provides that the supported waveguide will always be near the front of the stand 10 for easy access,

(6) The plastic jaws protect the delicate waveguides,

(7) The plastic construction throughout provides a practically unbreakable test stand,

(8) It provides positive clamping without damage to the clamped waveguide,

(9) The protective skirt 56 prevents dirt and foreign matter from getting into the threads and relatively moving parts associated with the base,

(10) The wide base provides stability and support, and

(11) The interlocking jaws securely clamp small parts without damage to the parts.

While the invention has been described in its preferred embodiments, the words which have been used are words of description rather than the limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of the invention in its broader aspects.

What is claimed is:

1. An adjustable support test stand for waveguides having broad and narrow walls comprising,

(*a*) a stationary base member,

(*b*) a support element adjustably mounted on said base member for positioning in a direction along a first axis,

(*c*) adjustable means for positioning said support element in the direction of said first axis,

(*d*) means mounted on said base member and cooperative with said support element for preventing rotation of said support element relative to said base member,

(*e*) first and second cooperative clamping jaws,

(*f*) said support element including said first clamping jaw integral therewith,

(*g*) said second clamping jaw being adjustably mounted on said support element and arranged for positioning with respect to said first jaw along a second axis perpendicular to said first axis,

(*h*) each of said jaws having first and second face portions,

(*i*) said first and second face portions being cooperative respectively with respect to each other,

(*j*) each of said first face portions protrude a predetermined distance from said second face portions respectively in the direction of said second axis and towards each other thereby forming cooperative stepped jaw faces,

(*k*) and means for adjusting said jaws relative to each other.

2. An adjustable support test stand for waveguides having broad and narrow walls comprising,

(*a*) a stationary base member having a threaded stud projecting therefrom coaxial with respect to a first axis,

(*b*) a dual threaded adjusting wheel coaxial with said first axis having internal threads cooperative with the external threads of said stud and external threads,

(*c*) a support element having a threaded aperture coaxial with said first axis and cooperative with said external threads of said wheel whereby rotating said wheel around said first axis rapidly adjusts said support element in the direction of said first axis,

(*d*) means mounted on said base member and cooperative with said support element permitting movement of said support element relative to said base in the direction of said first axis while preventing relative rotation thereof around said first axis,

(*e*) adjustable clamping jaw means having a first jaw mounted integral with said support element and a second jaw positionably mounted on said support element along a second axis perpendicular to said first axis,

(*f*) each of said jaws having first and second face portions having first and second faces parallel to and opposing each other and cooperative with respect to each other,

(*g*) said first faces being disposed closer to each other along said second axis than said second faces thereby forming cooperative stepped jaw faces,

(*h*) and means for adjusting the spaced relationship between said jaws in the direction of said second axis.

3. An adjustable support test stand as recited in claim 2 further including stop means associated with said base member for preventing movement of said wheel in the direction of said first axis beyond a predetermined amount.

4. An adjustable support test stand as recited in claim 2 in which one of said jaws has a slot formed therein and the other of said jaws has a projection formed thereon that mates with said slot whereby said first face portions are adapted to interlock.

5. An adjustable support test stand as recited in claim 2 in which said support element includes a skirt portion extending therefrom to protect said threads from dirt contamination.

6. An adjustable support test stand for waveguides having broad and narrow walls comprising,

(*a*) a base member having threaded stud projecting therefrom coaxial with respect to a first axis,

(*b*) a dual threaded adjusting wheel coaxial with said first axis having internal threads cooperative with the external threads of said stud and external threads,

(*c*) a support element having a threaded aperture coaxial with said first axis and cooperative with said external threads of said wheel whereby rotating said wheel around said first axis rapidly adjusts said support element in the direction of said first axis,

(*d*) means mounted on said base member and cooperative with said support element permitting movement of said support element relative to said base in the

direction of said first axis while preventing relative rotation thereof around said first axis,

(*e*) adjustable clamping jaw means having a first jaw mounted integral with said support element and a second jaw adjustably mounted on said support element for positioning along a second axis perpendicular to said first axis,

(*f*) each of said jaws having first and second face portions having respective first and second faces parallel to and respectively opposing each other,

(*g*) said first faces being disposed closer to each other along said second axis than said second faces thereby forming cooperative stepped jaw faces,



(*h*) each of said first face portions further including third surfaces cooperative with said second faces,

(*i*) and means for adjusting the spaced relationship between said jaws in the direction of said second axis.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 499,291 | Gury | June 13, 1893 |
| 1,912,313 | Schwab | May 30, 1933 |
| 2,211,287 | Neubig et al. | Aug. 13, 1940 |