

(No Model.)

3 Sheets—Sheet 1.

T. F. DOLEN.
DRAFTING BOARD.

No. 534,865.

Patented Feb. 26, 1895.

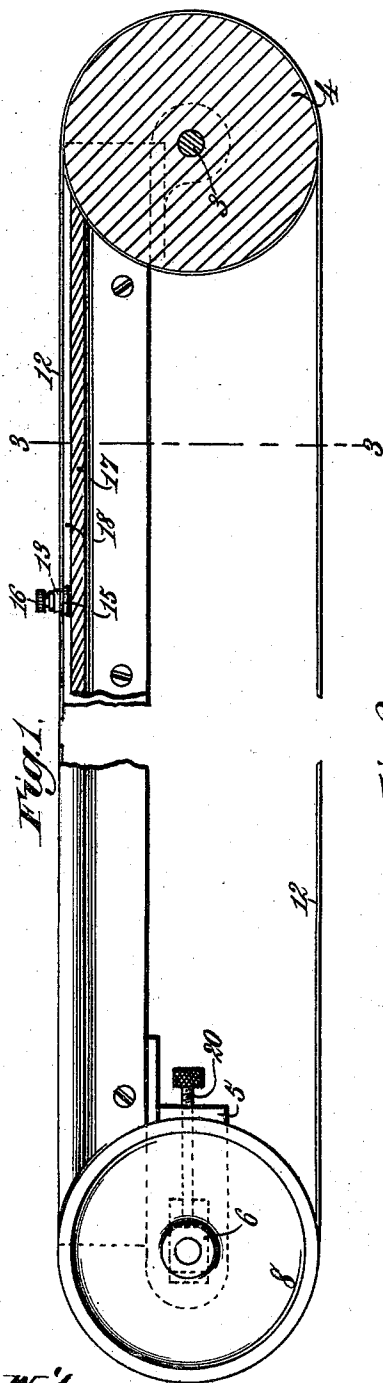


Fig. 1.

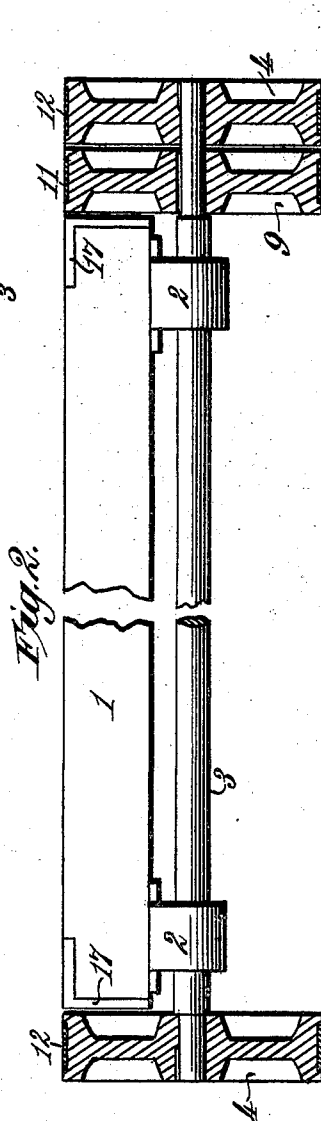


Fig. 2.

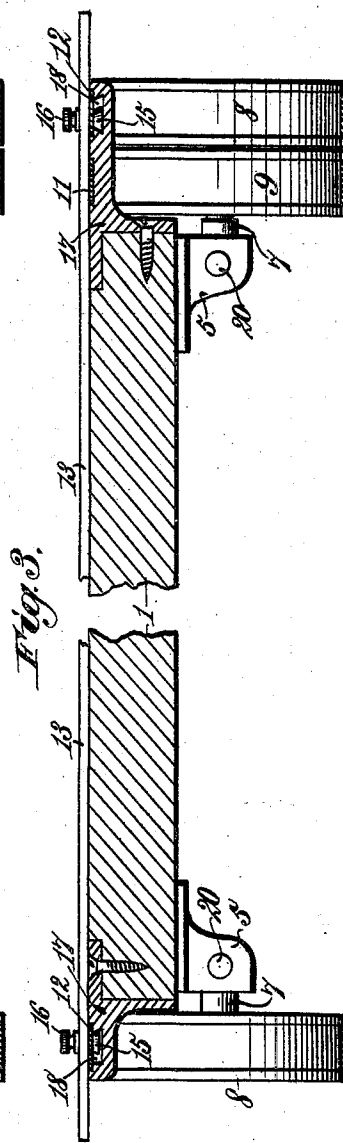


Fig. 3.

Witnesses.
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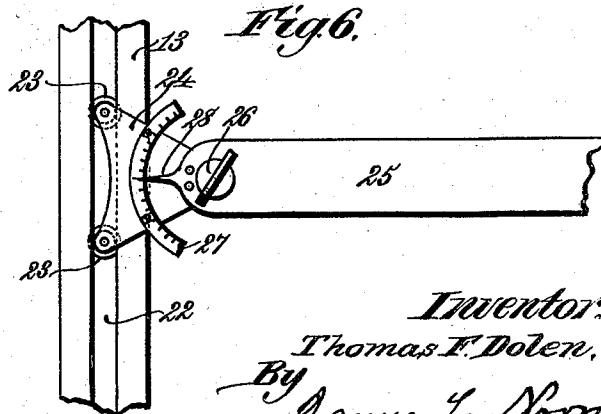
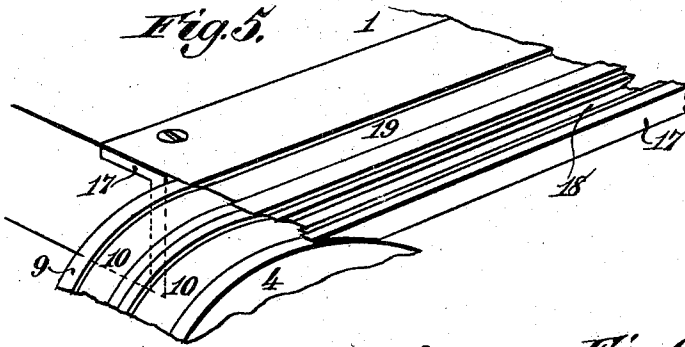
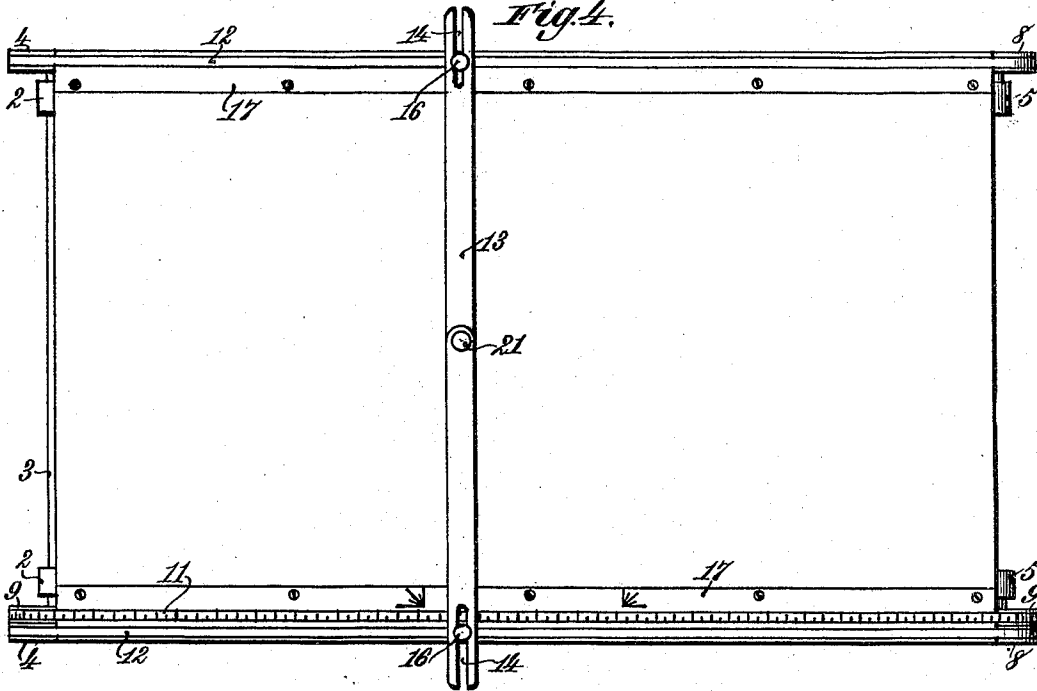
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3 Sheets—Sheet 2.

T. F. DOLEN.
DRAFTING BOARD.

No. 534,865.

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Witnesses:
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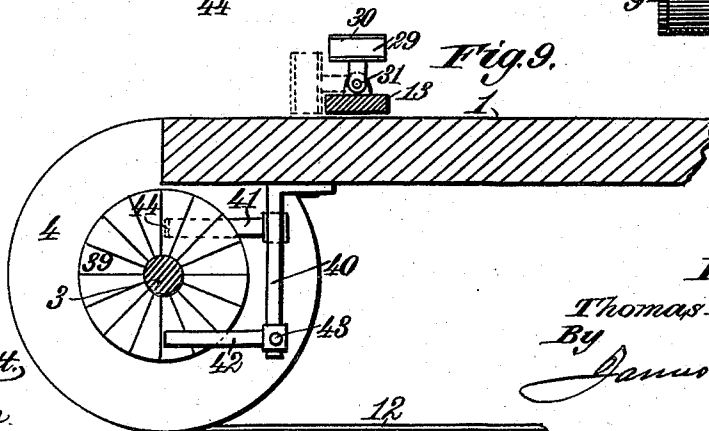
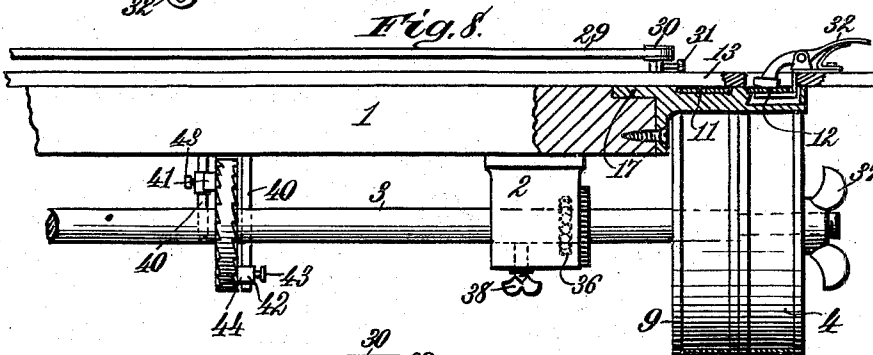
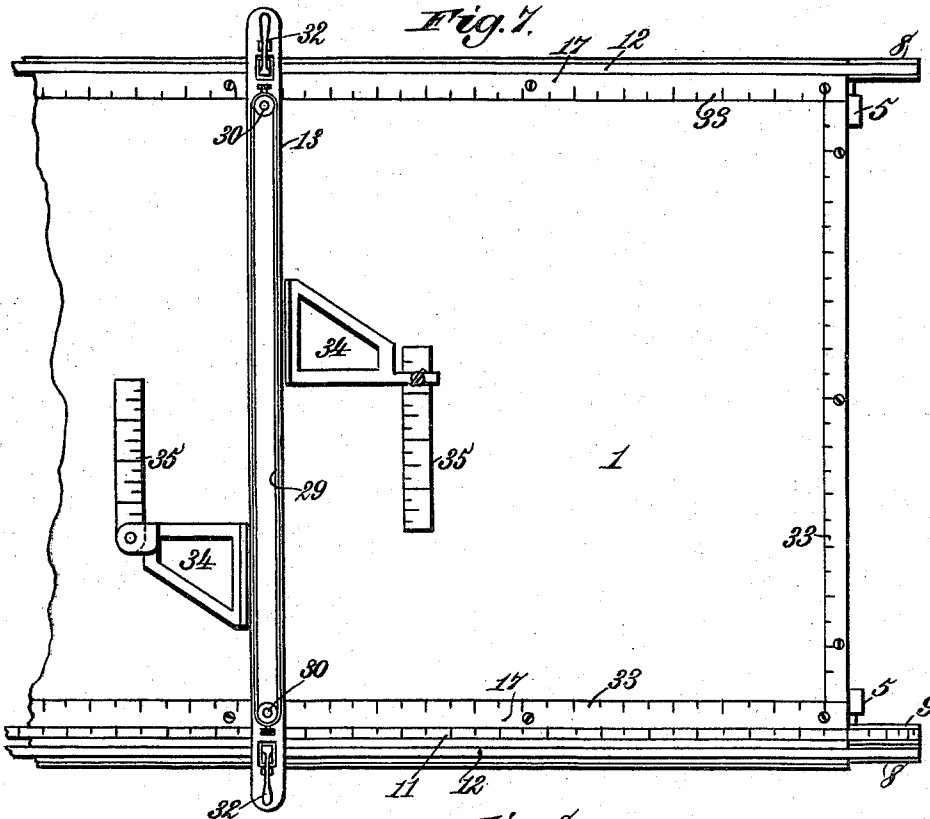
(No Model.)

3 Sheets—Sheet 3.

T. F. DOLEN.
DRAFTING BOARD.

No. 534,865.

Patented Feb. 26, 1895.



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UNITED STATES PATENT OFFICE.

THOMAS F. DOLEN, OF ROCHESTER, NEW YORK.

DRAFTING-BOARD.

SPECIFICATION forming part of Letters Patent No. 534,865, dated February 26, 1895.

Application filed September 26, 1894. Serial No. 524,170. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. DOLEN, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Drafting-Boards, of which the following is a specification.

My invention relates to drafting boards of the kind principally employed in architectural drawing where large surfaces are required for the work, but the board is also adapted for use in the making of drawings requiring less space.

It is the object of my invention to furnish a drafting board with an adjustably mounted cross-bar, one or more, carried at its ends on adjustably mounted endless metallic ribbons; to provide means for preventing endwise and vertical displacement of the bar so that it may be held firmly in any adjusted position to facilitate accurate drafting or shading and other work; also to provide an adjustably mounted and endless metallic scale ribbon suitably marked or graduated to facilitate measurements; also to provide for regulating the tension and effecting a simultaneous or independent adjustment of the several ribbons; and generally to improve the construction of drafting boards intended to be employed in the execution of work on an extensive scale.

The invention consists in the peculiarities of construction and novel combinations of devices in a drafting board as hereinafter described and claimed.

In the annexed drawings illustrating the invention, Figure 1, is a partly sectional side elevation of a drafting board provided with my improvements. Fig. 2, is an elevation of one end of the board with wheels and attached ribbons in section. Fig. 3, is a vertical transverse section of the board on the line 3—3, of Fig. 1. Fig. 4, is a plan of the drafting board illustrating one mode of attaching the cross-bar to its ribbon supports. Fig. 5 is an enlarged detail of portions of grooved wheels and guide way for the ribbons. Fig. 6, represents the cross-bar as provided with an adjustable arm or blade for obtaining various angles. Fig. 7, is a plan of a drafting board illustrating a mode of clutching the cross-bar to its supporting ribbons and show-

ing, also, an endless scale ribbon mounted on the cross-bar and other devices that may be used in connection with the drafting board and its cross-bar. Fig. 8, is a partly sectional elevation of one end of a drafting board showing how the wheels for the supporting ribbons of the cross-bar may be made fast or loose on the shaft extended across that end of the board and how said shaft may be made fast or loose in its boxes or bearings, also illustrating a ratchet wheel for said shaft and showing the cross-bar clutched to its supporting ribbons or tapes. Fig. 9, is a partly sectional side elevation of a portion of a drafting board with cross-bar and ratchet mechanism.

Referring to the drawings, the numeral 1, designates the drafting board which may be of any dimensions required. Beneath one end of the board are bearings 2 in which is mounted a transversely arranged shaft 3, Figs. 1 and 2, having wheels 4 that are adapted to be rigidly secured to its opposite ends. The other end of the board 1, is provided on its under side with bearings or supports 5, Figs. 1 and 3, constructed to receive longitudinally movable slide boxes 6 in which are mounted the studs or spindles 7 of the wheels 8 at that end. On one of the studs or spindles 7, at the inner side of its wheel 8, is a loose pulley 9 and a similar pulley 9 is also placed in like position on the shaft 3 at the other end of the board.

The wheels 4 and 8 and the pulleys 9 are of such diameter and are so mounted that the top peripheral portion of each is substantially flush with the top of the drafting board. Each wheel 4 and 8 and each loose pulley 9 is provided with a circumferential groove 10, Fig. 5, to receive an endless ribbon, band or tape 11 or 12, as shown. These ribbons 11 and 12 are preferably made from suitably pliable metal strips.

The endless tape or ribbon 11 connects the two loose pulleys 9 and being scaled or graduated, as shown in Fig. 4, it will be hereinafter termed a scale ribbon.

Attached to the outer ribbons or tapes 12, which connect the wheels 4 and 8, is a cross-bar 13 that is extended across the drafting board. Each end of the cross-bar 13 may be provided with a longitudinal slot 14, Fig. 4,

to be engaged with the vertical pin or journal of a beveled friction wheel 15 arranged on the under side of the belt or ribbon 12, and a thumb nut 16 is provided on the upper end of each journal or pin to clamp it firmly with the cross-bar. To provide for perfect longitudinal parallel lines, the drafting board 1, is provided on each side edge with a metallic guide bar 17, preferably of angular cross-section, as shown in Figs. 2 and 3, and firmly secured to the board. In a laterally projecting portion of this guide bar 17, between the carrying wheels 4 and 8, may be formed a perfectly straight groove or guide way 18 to receive the friction wheel 15, with which the adjacent ribbon 12 and cross-bar 13, may be connected. In each guide bar 17 the inner wall of the groove or guide way 18 is undercut or beveled, as shown in Figs. 3 and 5, to correspond with the beveled periphery of the horizontally arranged friction wheel 15 which bears on the said bevel or undercut wall of the guide way in such manner as to obviate any tendency to the least lateral movement of the cross-bar 13 and at the same time prevent the cross-bar from rising out of place under the impulse of any sudden movement. If desired the friction wheel 15 may be pressed or held against the beveled or undercut wall of the guide way 18 by means of any suitable spring, or otherwise, but this is not essential, as the adjustment given to said wheel through its connection with the ribbon 12 and cross-bar 13 will be amply sufficient to secure its proper action. It is obvious that by connecting the cross-bar 13 and metallic belts 12 through devices provided with beveled friction wheels 15 engaged in bevel guide ways 18 on the side of the board perfectly parallel lines may be obtained and the shrinkage or expansion of the board will have little or no effect on the work. Besides the groove 18 or the friction wheel 15, the guide bar 17 on one side of the board is provided, also with a groove 19, Fig. 5, for the scale ribbon 11, to run in.

For the purpose of controlling the tension of the parallel metallic ribbons 12 and also to permit adjustment of the cross-bar 13, the slide-boxes 6 of the wheels 8 are each provided with an adjusting screw 20, Fig. 1, by means of which either ribbon can be tightened or slackened as may be required. It will be understood that the bearings of the wheels 8 are independently adjustable so that the tension of either belt or ribbon 12 can be regulated independent of the other. By proper relative adjustment of the ribbons 12 the attached bar 13 can be placed directly across the drafting board at right angles with its opposite side edges or either end of said cross-bar 13 may be moved to any desired angle or inclination by imparting a proper adjustment to the ribbon with which it is connected. The adjustment of the ribbons 12 and attached cross-bar 13, may be readily effected by loosening either screw bolt 20 to

slightly slacken one of the ribbons 12 and then moving the ribbon in the required direction either by turning the wheel 8 or by drawing on the under side of the ribbon. After the cross-bar 13 has been thus adjusted to the required angle, the screw 20 can be turned in such direction as to instantly tighten the ribbon and hold the several parts firmly.

The cross-bar 13 is preferably made in two sections jointed at the center, as shown in Fig. 4, so that either or both ends may be moved to any required angle or inclination from the center. In the joint of the cross-bar 13 is mounted a thumb screw 21 that can be loosened to permit a different adjustment of the two ends of the bar and then be tightened to hold it securely in place. It will be seen that the elongated slots 14 in the ends of the cross-bar 13 will readily permit any required adjustment of either or both ends of the bar according to the nature of the work in which it is to be employed.

The scale ribbon 11 is adjusted or moved along, as required, in the same manner as the ribbons 12 to which the cross-bar 13 is attached, that is, by turning one of the pulleys on which the scale ribbon is mounted, or by drawing on the under side of the ribbon. The screw bolt 20 affords a means for adjusting the position and regulating the tension of the scale ribbon 11 as well as of the ribbons 12 on which the cross-bar 13 is carried.

It is obvious that the cross-bar 13, in any of its adjusted positions, may be readily used for shading in parallel lines. The thumb screw 21 on the cross bar may serve as a handle for turning or moving it to any required position when the ribbons 12, either or both, are slightly slackened. In certain kinds of work the cross-bar 13 will afford support for the usual angle plates or drafting forms which may be attached to the bar or placed in contact therewith, as most convenient. The separate adjustment of either end of the cross-bar, through its jointed center and its connection with the parallel ribbons 12, will readily facilitate a large range and variety of work either with or without the aid of angle pieces or other forms.

It will be readily understood how any desired angle of shading may be effected by resting angle plates against the cross-bar and also how easily and conveniently any angle may be obtained by releasing the tension of either ribbon, through turning a screw bolt 20, and allowing the cross-bar and angle plate to work together; and thus, also, if the angle plate should not be quite correct the cross-bar can be turned or shifted to give the plate the required angle or position.

If desired, the cross-bar 13 may be provided with one or more adjustable arms of any suitable character for convenience in drafting, and such arm or arms may be detachably and adjustably connected to said cross-bar in any

appropriate manner. In Fig. 6, for instance, I have shown the cross-bar 13 as provided with a longitudinal slot or groove 22 adapted to receive and engage guide rollers 23 on a support 24 to which one end of an arm or blade 25 is pivotally attached. The pivotal connection of the support 24 and arm or blade 25 may be made by means of a set screw 26, that will permit securing the said arm at any required angle with the cross-bar. Either the cross-bar 13 or the arm 25, or both, may be scaled or graduated, if preferred. On the support 24 is a graduated arc 27 and on the arm or blade 25 is an index pointer 28 that will indicate on said arc any angle or angles formed by the relative positions of the cross-bar and its arm. By means of the slot or groove 22 and guide rollers 23 the arm 25 may be moved along the cross-bar 13 to any required position and by means of the thumb screw 26, graduated arc 27 and pointer 28, the required angles can be quickly and accurately obtained.

It is my purpose to provide the drafting board with more than one detachable and adjustable cross-bar 13, and it may be preferable to have several cross-bars differently constructed or adapted so as to be available for various uses in drafting. For instance, a cross-bar may be so constructed as to be permanently rigid from end to end, or it may have a joint 21, as in Fig. 4, or be provided with one or more arms, as 25, Fig. 6, according to the requirements of various kinds of work.

As shown in Figs. 7, 8, and 9, an endless scale ribbon may be placed on pulleys 30 mounted in horizontal position on opposite ends of a cross-bar 13 supported by the ribbons 12 hereinbefore described. The scale ribbon 29 may be graduated inside or outside, or both inside and outside; and the box or bearings for its pulleys 30 may be either fixed or pivotally arranged in such manner that the scale ribbon 29 can be thrown over to either side edge of the cross-bar. This may be readily accomplished by providing each pulley support or journal with a knuckle joint controlled by a thumb screw 31, as shown. The endless ribbon 29 can be moved longitudinally along the cross bar, as desired, and when the ribbon is thrown over to either side its scale will be upward or exposed from above the board and can be easily read.

Instead of connecting a cross-bar, or cross-bars 13, to the ribbon 12 by means of the devices shown in Figs. 1, 3 and 4, I may provide each end of the cross-bar with a small spring clutch 32, Figs. 7 and 8, adapted to detachably clamp the said cross-bar to its supporting ribbons in such manner that it can be quickly disconnected and be as rapidly replaced in any required position or adjustment.

I have shown in Fig. 7 how the board may be provided on or near all its edges with graduated scales 33, to assist in obtaining any required angles. In this view is also shown how angle pieces 34, or other drafting forms, may

be placed at and against either side edge of the cross-bar 13, in any required position. As a means for instantly catching the scale, without the use of a rule, I may provide an angle piece, as 34, with an arm or plate 35 having a scale graduated thereon. The scale plate 35 may be permanently and rigidly secured to the angle piece 34, or it may be detachably and adjustably connected therewith by means of a set screw or a suitable swivel connection so as to afford any required adjustments, and scale plates variously graduated may be provided, as desired. These devices will greatly assist in obtaining measurements, in different scale drawings, without requiring the ordinary rule.

As all the wheels or pulleys 4, 8, and 9, have the same diameter a movement of either of the wheels 4, rigid with the shaft 3, will produce an exactly uniform movement of the two parallel ribbons 12 to which the cross-bar 13 is attached, or through the independent adjustment of the wheels 8 the scale ribbon 11 and either of the ribbons 12 may be moved independently of the others. It is preferable to mount the shafts or journals of the wheels in ball bearings 36, Fig. 8, to secure easy movement and overcome any torsional strain, but this is not essential. The wheels 4 on the shaft 3 may be keyed thereto, as shown in Fig. 2, or they may be provided with hand jam nuts 37, Fig. 8, either of which may be released to permit a movement of either ribbon 12 to throw the end of the cross-bar 13 to any desired position and again secure it.

In Fig. 8 I have shown one of the boxes or bearings of the shaft 3 as provided with a set screw 38 through which the said shaft may be secured or made fast, or by loosening the set screw the shaft will be free to revolve.

The jam nuts 37 for making the wheels 4 fast or loose and the set screw 38 for securing or releasing the shaft 3 will together provide a means for adjusting the ribbons 12 and attached cross-bar 13 instead of manipulating the screw shaft 20 and slide boxes 6 at the other end of the board, as hereinbefore described. For instance, if it is desired to adjust either ribbon 12 the set screw 38 will be tightened to hold the shaft 3 rigid in its bearings. If the thumb screws 37 on opposite ends of the shaft 3 are turned up tightly the wheels 4 on both sides of the board will, of course, be held from turning. Now by loosening one of the thumb screws 37 the wheel 4 and tape or ribbon 12 on that side may be adjusted in either direction and, in the meantime the tape or ribbon 12 on the other side will be immovable because the thumb screw 37 on that side remains tightened and the shaft 3 is held rigidly in its bearings. An independent adjustment can thus be given to either ribbon 12 to shift either end of the cross-bar 13 as required. By loosening the set screw 38 so as to release the shaft 3 and by having both wheels 4 rigid on the shaft a simultaneous movement or adjust-

ment may be imparted to both ribbons 12 if desired. While I have shown this means of adjustment applied to only one end of the board it is obvious that it may be applied to either or both ends.

In order to provide for obtaining uniformly spaced parallel lines through a simultaneous and uniform movement of the ribbons 12 that carry the cross-bar 13, a ratchet wheel 39, Figs. 8 and 9, may be secured on the shaft 3, the wheel 4 being tightened thereon and the set screws 38 loosened so that the shaft may revolve. The wheel 39 is ratcheted on its opposite sides as shown in Figs. 8 and 9, and the ratchet teeth may be cut to suit the scale to be used. To the under side of the board 1, adjacent to the opposite sides of the ratchet wheel 39, are secured two depending standards or hangers 40 to each of which a wheel actuating dog 41 or 42 is attached. These dogs 41 and 42 may each have one end provided with a collar surrounding its hanger 40 and secured by a thumb screw 43, that may be slackened to permit moving the dog up or down. The other end of each dog is formed with a lateral projection or shoulder 44 to engage the ratchet teeth of the wheel. It will be observed that the dog 41 on one side of the wheel 39 is arranged above the wheel axis while the dog 42 on the other side is below the axis. Now by loosening its thumb screw and moving either dog up or down the wheel 39 may be rotated to the right or left, according to the dog employed, and will thus impart a corresponding movement to the shaft 3, wheels 4, ribbons 12 and attached cross-bar 13, which may thus be uniformly adjusted to the right or left, any required spaces, as desired.

It will be seen that if the character of the work requires it the cross-bar 13 may be readily raised to admit beneath it a smaller board or several drawings. The cross bar, one or more, may also be quickly and accurately adjusted to any required position. The board may be employed in either a horizontal or a perpendicular position, with great convenience. If desired, the means for attaching and operating the cross-bar 13 may obviously be applied to the vertical black boards for use in school rooms. The board may, also be provided with ribbons on edges of the board at right angles to each other, and thus serve to work both ways and permit the cross-bar being arranged either transversely or in the longitudinal direction of the board, as preferred.

What I claim as my invention is—

1. The combination with a drafting board, of endless ribbons, or belts adjustably supported parallel with each other at opposite edges of the board and flush with the board top, a cross-bar extended across the board and attached to and carried by said ribbons, an endless scale ribbon adjustably mounted at the side of the board and flush with its top, and means for adjustably moving the

scale ribbon and the bar carrying ribbons together or independently, substantially as described.

2. The combination with a drafting board, of a transverse shaft mounted at one end of the board and having on its end wheels adapted to be made rigid therewith, loose wheels mounted at the other end of the board in independently adjustable bearings, loose pulleys mounted at opposite ends of the board on one side, each of said wheels and pulleys provided with a circumferential groove, an endless scale ribbon mounted on the grooved loose pulleys, parallel endless ribbons mounted on the grooved wheels at opposite edges of the board and flush with the top thereof, a cross bar extended across the top of the board and attached to and carried by the said parallel ribbons, and means for adjusting and moving the several ribbons together or independently, substantially as described.

3. The combination with a drafting board, of endless ribbons, or belts adjustably supported at opposite edges of the board and flush with its top, a cross bar extended across the board and attached to and carried by said ribbons, beveled friction wheels connected with the ends of the cross bar and with the bar carrying ribbons, an endless scale ribbon adjustably mounted at the side of one of the bar carrying ribbons, and guide plates attached to the sides of the board and having guide ways for the scale ribbon, the bar carrying ribbons and the friction wheels, the inner walls of the guide ways for said friction wheels being beveled or undercut, substantially as described.

4. The combination with a drafting board, of endless ribbons adjustably mounted at opposite edges of the board and flush with the board top, a cross bar extended across the board and adjustably attached to and carried by said ribbons, the said cross-bar provided at the center with a joint adapted to be adjustably secured by a thumb screw, an endless scale ribbon, and means for regulating the tension of said ribbons and adjusting them to any required position, substantially as described.

5. The combination of the board 1 having the shaft 3 provided with grooved wheels 4, the grooved wheels 8 mounted in adjustable bearings or boxes 6 provided with adjusting screws 20, the grooved pulleys 9, the endless metallic scale ribbon 11 mounted on said pulleys, the parallel endless metallic ribbons 12 mounted on the wheels 4 and 8, the jointed cross bar 13 provided with thumb screw 21 and slotted ends 14, the friction wheels 15 and thumb nuts 16 connecting the ribbons 12 with the slotted ends of the cross bar, and the guides 17 having guide ways 18 for the bar carrying ribbons and friction wheels, one of said guides provided, also, with a guide way 19 for the scale ribbon, substantially as described.

6. In a drafting board the combination with

5 a longitudinally slotted cross bar, of a support provided with a graduated arc and having guide rollers engaged in the slot of the cross bar, an arm or blade pivotally connected to said support and provided with an index pointer, and means for adjusting and securing said arm at any angle, substantially as described.

10 7. In a drafting board, the combination with an adjustably supported cross-bar, of an endless scale ribbon mounted on said bar, substantially as described.

15 8. In a drafting board, the combination with an adjustably supported cross-bar, of pulleys mounted on opposite ends of said bar and provided with pivoted or swinging bearings, and an endless scale ribbon mounted on said pulleys and adapted to be turned with said pivotally mounted or swinging pulleys to either

side edge of the cross-bar, substantially as described. 20

9. In a drafting board, the combination with the shaft 3 having wheels 4 adapted to be made fast or loose on said shaft, of a ratchet wheel 39 on the said shaft, the dogs 41 and 42 for 25 actuating the said ratchet wheel in opposite directions, the endless ribbons or tapes 12 mounted on the wheels 4 and on other wheels, as 8 and a cross bar 13 carried by said ribbons, substantially as described. 30

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

THOMAS F. DOLEN. [L. s.]

Witnesses:

WM. E. CRAIG,
H. B. ALLEN.