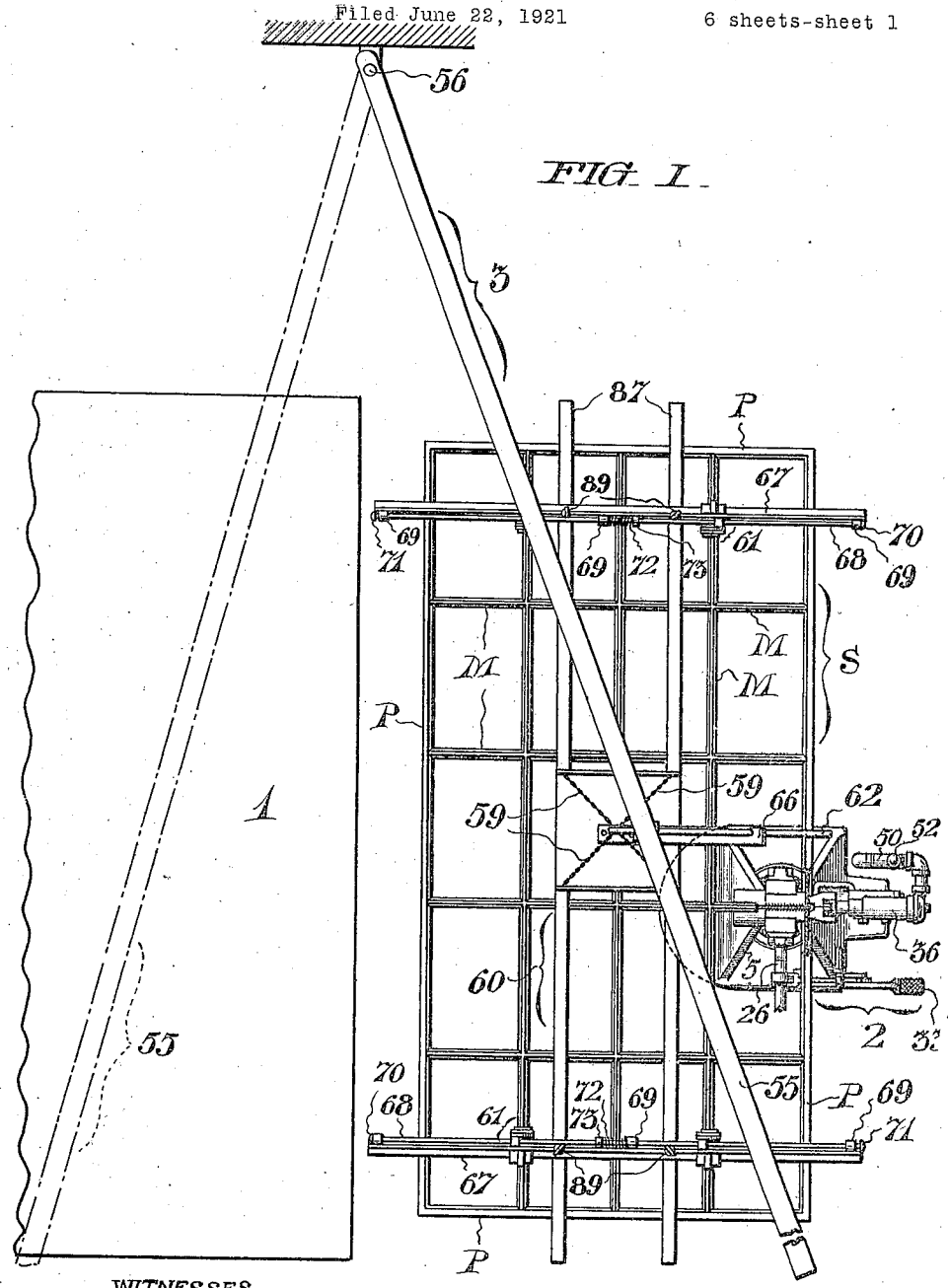
Feb. 20, 1923. 1,445,664

J. BROGDEN

WINDOW SASH ASSEMBLING APPARATUS

Filed June 22, 1921 6 sheets-sheet 1

FIG. 1.



WITNESSES:

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Feb. 20, 1923. 1,445,664

J. BROGDEN

WINDOW SASH ASSEMBLING APPARATUS

Filed June 22, 1921 6 sheets-sheet 2

FIG. II.

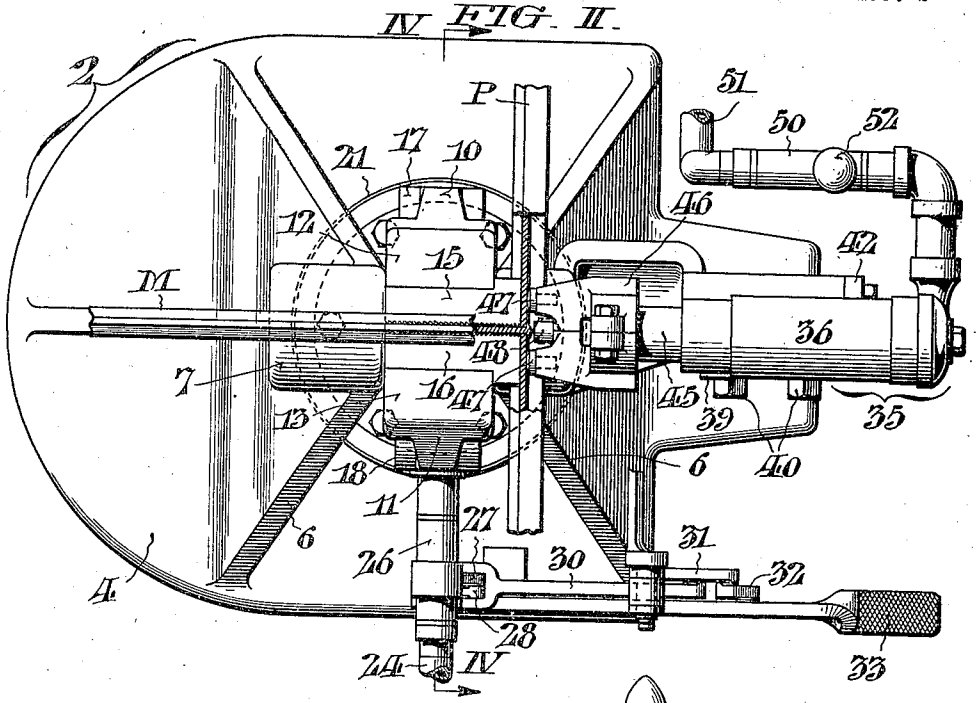


FIG. V.

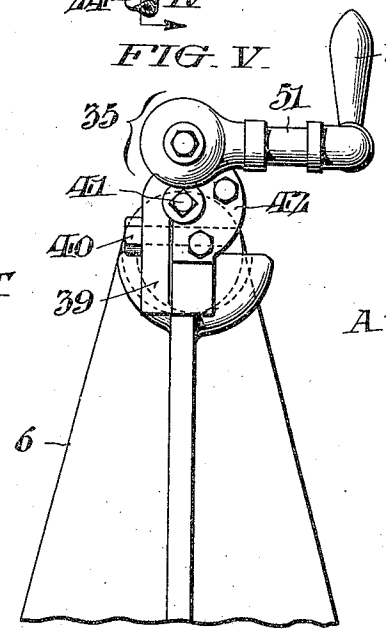


FIG. VII.

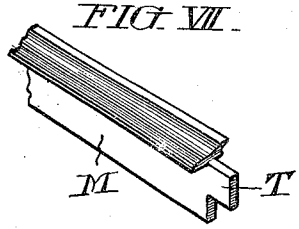
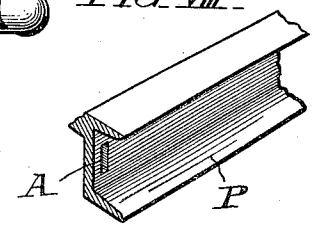


FIG. VIII.



WITNESSES:

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J. BROGDEN

WINDOW SASH ASSEMBLING APPARATUS

Filed June 22, 1921 6 sheets-sheet 3

FIG. III.

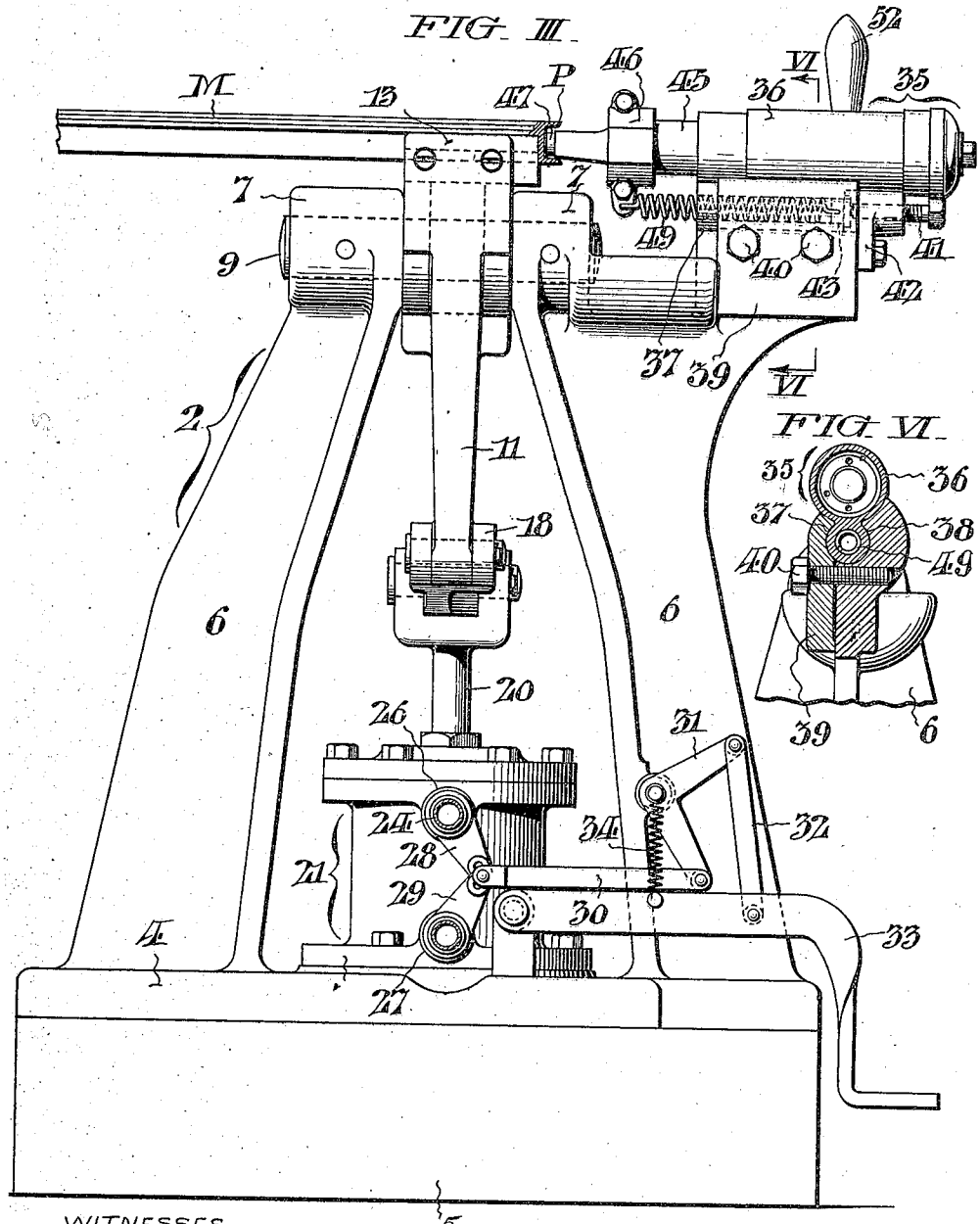


FIG. VI.

WITNESSES:

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James H. Bell.

INVENTOR:

Joah Brogden,

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Feb. 20, 1923.

1,445,664

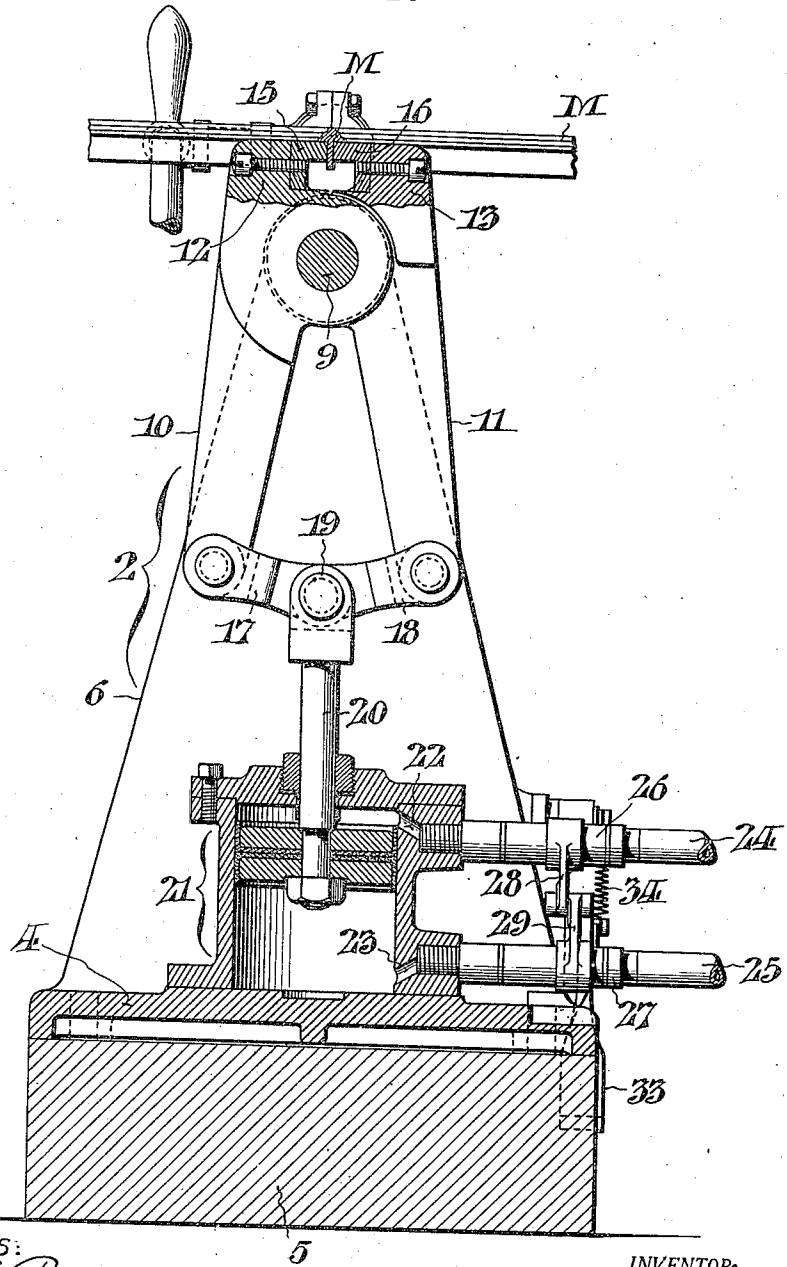
J. BROGDEN

WINDOW SASH ASSEMBLING APPARATUS

Filed June 22, 1921

6 sheets-sheet 4

FIG. IV.



WITNESSES:

John C. Bergner

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INVENTOR:

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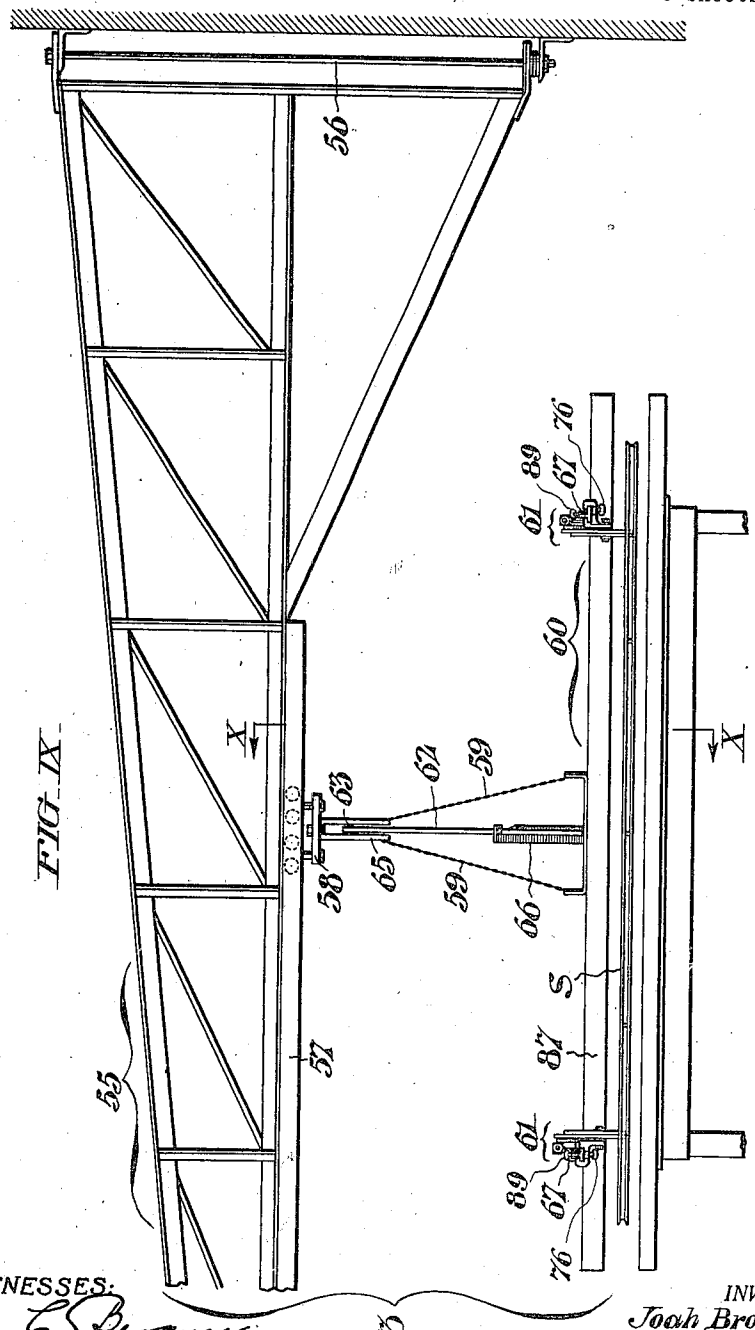
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J. BROGDEN

WINDOW SASH ASSEMBLING APPARATUS

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FIG. IX.



WITNESSES:

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Feb. 20, 1923. 1,445,664

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WINDOW SASH ASSEMBLING APPARATUS

Filed June 22, 1921 6 sheets-sheet 6

FIG. X.

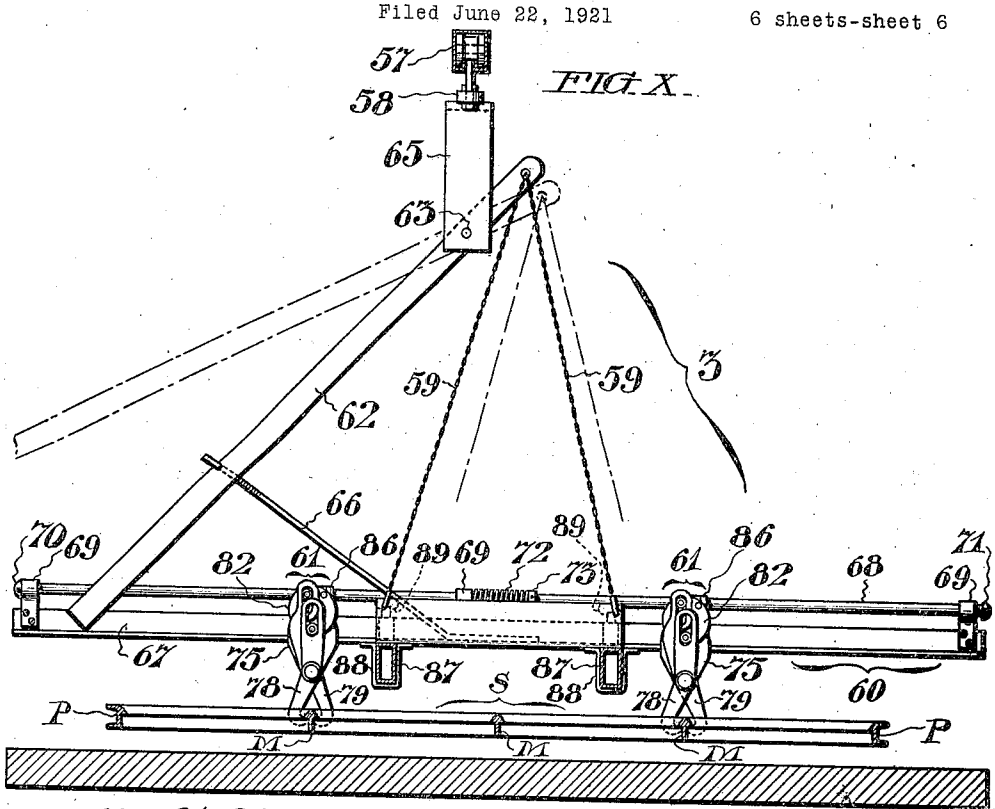


FIG. XI.

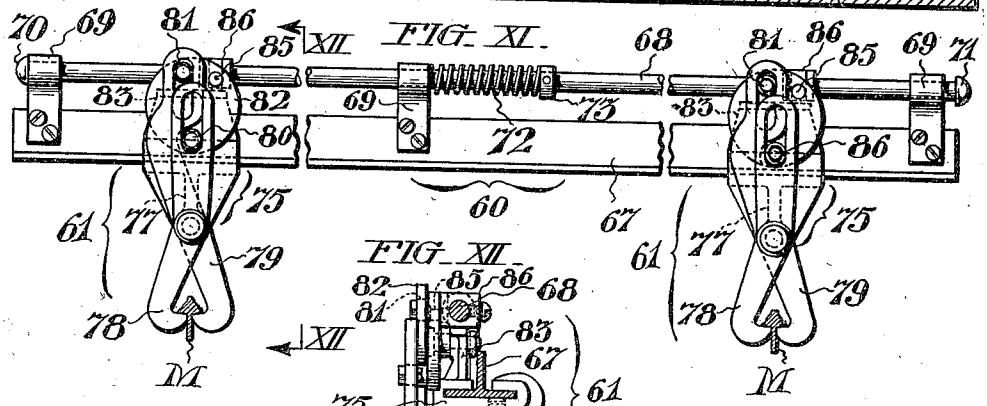
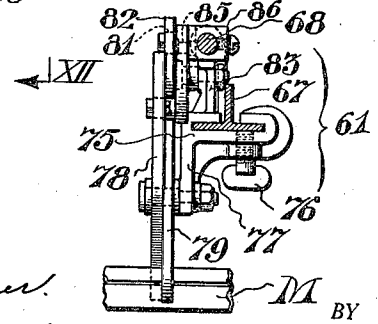


FIG. XII.



WITNESSES:

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Patented Feb. 20, 1923. 1,445,664

UNITED STATES PATENT OFFICE.

JOAH BROGDEN, OF MELROSE PARK, PENNSYLVANIA, ASSIGNOR TO DAVID LUPTON'S SONS COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

WINDOW-SASH-ASSEMBLING APPARATUS.

Application filed June 22, 1921. Serial No. 479,565.

To all whom it may concern:

Be it known that I, JOAH BROGDEN, a citizen of the United States, residing in Melrose Park, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Window-Sash-Assembling Apparatus, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to apparatus useful in assembling and riveting together the composite members of metallic window sashes. Sash structures of the type referred to are ordinarily composed of rails of standard cross sectional shapes comprehending not only the muntins and mullions, but the perimetrical rails of the sash as well. It is generally customary to assemble as a unit, those elements which constitute the muntins and mullions, and then to attach the perimetrical rails about said unit in completing the sash frame. The muntins and mullions, according to standard practice, are formed at their ends with shouldered terminal tongues adapted to be inserted through appropriate apertures in the perimetrical rails of the sash, the protruding portions of said tongues being subsequently headed or upset to form rivet heads whereby the sash structure is thereafter held permanently assembled. Such riveting has heretofore been accomplished manually by aid of hand hammers, and as a result was not only a comparatively slow and tiresome procedure, but uneconomical as well.

The primary object of my invention is to render such riveting less tedious of accomplishment than possible heretofore, so that permanent assemblage of the sash structures may be accordingly more cheaply and efficiently effected. This desideratum I attain by use of a pneumatically operated riveting device adapted to head over the tongues of the muntins and mullions, and in association, means whereby the sash frames may be supported in suspension for ready manipulation in being shifted from one position to another in the riveting device preparatory to the numerous riveting operations involved.

Other objects and attendant advantages of my invention will become readily apparent from the detailed description which follows.

In the drawings, Fig. I is a plan view of a window sash frame assembling apparatus conveniently embodying my invention.

Fig. II is a plan on an enlarged scale of the riveting device comprised in the apparatus.

Fig. III is a side elevation of the riveting device as it appears looking from the bottom of Fig. II.

Fig. IV is a central, vertical sectional elevation of the riveting device viewed in the direction of the arrows IV—IV in Fig. II.

Fig. V is an end elevation of the upper portion of the riveting device viewed from the right of Fig. II.

Fig. VI is a detail cross section of the riveting device along the line VI—VI in Fig. III.

Figs. VII and VIII are, respectively, fragments of one of the muntins or mullions and one of the perimetrical rails of a metallic window sash of the type for assembling of which, the apparatus of my invention is especially adapted.

Fig. IX is an elevation of the means by which the sash is supported in suspension so that it may be readily manipulated in the course of the several riveting operations involved in assembling the same.

Fig. X is a cross section along the line X—X in Fig. IX.

Fig. XI is an elevation on an enlarged scale showing to better advantage certain of the details of the organization shown in Fig. X; and

Fig. XII is a cross section viewed in the direction of the arrows XII—XII in Fig. XI.

As shown in Fig. I of the drawings, the sash assembling apparatus of my invention comprises a work table 1 upon which a metallic window sash is initially placed; a riveting device 2; and a device 3 which is dually functional in serving, in one capacity, as a means for transferring the sash to and from the riveting device 2, and in the other, in supporting the sash in suspension so that it may be readily manipulated and shifted in any desired direction in the course of the several riveting operations involved in effecting permanent assembly of the sash.

In order that the purpose of my invention may be readily understood, it will perhaps be advantageous at this juncture, to briefly describe the structural characteristics of a metallic window sash such as hereinbefore briefly outlined. By again referring to Fig. I, it will be observed that the sash

shown at "S" comprises a series of cross rails or muntins designated at "M—M", and a series of perimetrical rails "P—P". The muntins and mullions "M—M" have a standard cross sectional configuration such as best shown in Figs. VII and XI, and are united to form an insert unit to which the perimetrical rails are subsequently attached. The muntins and mullions "M—M" have shouldered terminal tongues "T—T" which are inserted through appropriate apertures "A" in the perimetrical rails "P", see Fig. VIII. The protruding ends of the tongues "T" are thereupon headed over upon the perimetrical rails by riveting to effect permanent union of the sash members.

Referring now more particularly to Figs. II to VI inclusive, it will be noted that the riveting device 2 there shown in detail has a base or bed plate 4 which is supported preferably at a slight elevation from the floor, by means of a separate sub-base 5. The base or bed plate 4 has rising from it, a pair of spaced, integral, standards 6—6, which have formed upon their upper ends, aligned bosses 7—7 respectively. Said bosses are axially bored to receive a fixed pivot shaft 9 which serves as a common fulcrum for pincer or clamp arms 10 and 11. The jaws 12 and 13 above the fulcrum of said arms are respectively provided with replaceable face plates 15 and 16, which are serrated as clearly shown in Fig. II, so as to securely engage the sash members which are to be riveted. The lower ends of the arms 10 and 11 are connected by toggle links 17 and 18, which are interpivoted at 19, and there coordinated with the piston rod 20 of a vertical pressure fluid cylinder 21 mounted to the base 4 centrally in the interval between the frame standards 6—6. From Fig. IV, it will be observed that the cylinder 21 is of the double acting type, it being accordingly provided with ports 22 and 23, which communicate with pipes 24 and 25 respectively, under control of suitable interposed rotary valves 26 and 27 capable of admitting and exhausting motive fluid to and from the cylinder ends. Said pipes lead from an appropriate source of supply of fluid pressure (not shown) preferably compressed air.

In order that the valves 26 and 27 may be simultaneously operated, their actuating levers 28 and 29 are interconnected and coupled by means of a link 30 with a bell crank 31 which is in turn connected by a link 32 with a fort treadle 33. The treadle mechanism is returned to normal position after release of the treadle 33, by a coiled tension spring 34.

In the course of assembling the window sash, the muntins and mullions "M" are successively engaged between the jaws 12 and 13 of the pincer or clamp arms 10 and 11 as shown in Fig. IV, while the tongues "T" which project beyond the perimetrical rails "P" are headed over by means of the automatic riveting tool indicated comprehensively at 35. Said tool, as will be observed from Fig. II, is axially aligned in the plane of meeting of the jaws 12 and 13, and its barrel 36 has formed integrally with it, a cylindrical lug 37 which fits within a seat 38 in the top of the frame standard 6 and is held by a clamp plate 39, mounted to said standard by screw boltes 40. By this arrangement, the tool 35 may be shifted in an axial direction, as desired, for adjustment with respect to the pincer or clamp elements. Adjustment of the tool 35 in a direction toward the jaws 12 and 13 of the pincer clamp is facilitated by aid of a set screw 41 which is carried in the boss of a plate 42 bolted to the standard 6. The screw 41, it will be noted, is axially aligned with the cylindrical lug 37, and engages the end of a stop plug 43 inserted within the bore of said lug.

While the tool 35 is of standard construction, in order that its operation with reference to the special purpose for which it is here used may be more readily understood, I will proceed to describe in detail, certain of its adjunctive parts. A sleeve 45, shiftable automatically with respect to the barrel 35 of the tool, has clamped upon its outer end, a yoke 46 which is bifurcated as clearly shown in Fig. II. The extremities of the yoke carry abutment stops 47—47 which, during the riveting operation, bear against the perimetrical rail "P" of the window sash and hold the same in engagement with the shoulder of the muntin or mullion whose tongue is being headed by the rivet "set" 48. Normally, the sleeve 45 is held in retracted position by means of a spring 49 which, for the most part, is housed within the bore of the lug 37 of the tool, and has its anchorage, at one end, in the plug 43, while its opposite end is attached to the yoke 46. The tool 35 is controlled by means of a rotary valve 50 interposed in a compressed air pipe line 51, and has a handle 52 whereby it may be manually operated.

After a muntin or mullion is properly engaged within the pincer clamp by pressure applied to the arms 10 and 11 of the latter under control of the foot treadle 33, and the perimetrical rail "P" properly placed with relation thereto, the operative turns the handle 52 of the valve 50 to admit compressed air to the tool 35, whereupon the sleeve 45 is immediately projected so that the abutment stops 47 firmly engage the perimetrical rail "P" while the reciprocations of the upsetting tool 48 effect the heading over the projecting tongues "T" in a manner which is clearly obvious from Fig. II.

The various necessary shiftings of the

window sash in the course of the riveting operations may be readily effected by aid of the device 3 previously mentioned.

As best shown in Figs. I, IX and X, the crane arms 55 of the device 3 overhang both the table 1, and the riveting device 2, and is swingable about a fixed pivot rod indicated at 56. Secured to the arm 55 is a rail 57 which serves as a guide for a shiftable roller carriage 58 wherefrom is hung, preferably by means of chains 59—59, a horizontally disposed attachment frame 60. Said frame carries a number of sash engaging devices 61—61 which are adapted to engage individual muntins and mullions of the window sash, and which, as will be presently explained, are relatively adjustable, so that they may be spaced at different intervals in accordance with the spacing of the muntins and mullions of the sashes of different sizes. The chains 59—59 are not directly attached to the carriage 58 but to one end of an interposed hand lever 62 fulcrumed about a pin 63 spanned between the sides of a yoke piece 65 which is bolted or otherwise secured to the carriage. By means of the hand lever 62, the attachment frame 60 may be raised or lowered to facilitate "picking up" of the window sash from the work table and vice versa in the manner suggested in Fig. X.

In order that the sash may be maintained in free suspension while being transferred to and from the work table, and for convenient manipulation in the riveting device as aforesaid, I provide a locking means in the form of a hook 66 which projects from the attachment frame 60 and is adapted to engage the hand lever 62 as clearly shown in Figs. IX and X. A very slight lateral motion of the hand lever is sufficient to bring about disengagement thereof from the locking hook 66 when the window sash is to be deposited upon the work table after the completion of the riveting operations.

The sash engaging devices 61, of which there are in the instance shown (Fig. I) four in number, are arranged in groups of two each. These groups are respectively carried by the parallelly extending T rails 67—67 of the attachment frame. The sash engaging devices of each group are adapted to be simultaneously operated by means of slide rods 68—68 mounted in appropriate brackets 69—69 secured to said rails. For the purpose of limiting the shifting allowed the rods 68—68, the latter are respectively provided with heads 70—71 which cooperate with the end brackets 69—69 of the series, and are normally yieldingly held in the illustrated positions by springs 72—72 which, at one end, abut against the intermediate brackets 69, and at the other end, engage collars 73—73 on said rods.

Coming now to the sash engaging devices illustrated to best advantage in Figs. XI and XII, it will be noted that these devices are similar in construction and that each of them comprises a bracket 75 which may be set in different adjusted positions along the T rail 67 by means of a clamp screw 76 for a purpose previously alluded to. Fulcrumed about a common fixed pivot secured in a depending arm 77 of the bracket 75, are tong members 78 and 79 whose hooked ends are opposed so as to be capable of engaging individually between them, muntins or mullions (as the case may be) of the window sash. The extended portions of the tong members 78—79 above their common fulcrum are respectively slotted for cooperation with projections in the form of rollers 80, 81 extending laterally from one face of a disk 82. Said disk is mounted for rotation to an upwardly extending arm 83 of the bracket 75. Projecting from the opposite face of the disk is a pin 85 which is engaged within the groove of a collar 86 on the slide rod. The collar 86 is adjustably mounted on the rod, so that it may be shifted in accordance with the positioning of the bracket 75 as aforesaid. From Fig. XI, it will be apparent that movement of the rod to the left will induce counter-clockwise rotation of the disks 82 of the two sash engaging devices there shown, and, through the interposed instrumentalities already described, separation of the hooks of the respective tong members 78—79 to release the window sash when the latter is to be deposited on the work table. Manipulation of the control rod 68 is unnecessary when the sash is initially engaged since the tong members 78—79, by reason of the complementarily disposed curvature of their hooks, yield readily to separation as they engage the muntins or mullions of the sash when the frame 60 is lowered. If further adjustment for accommodation of different sized window sashes should be desired, this may be had by adjusting the rails 67—67 along the bars 87—87 of the frame 60. To this end, I have attached to the lower face of the rails 67—67, stirrups 88—88 which extend about the bars 87—87, and serve as appropriate guides, while the adjustments are made, see Fig. X. Such adjustments are fixable by means of set screws shown at 89—89 in the illustration last referred to. The bars 87—87 are made tubular and preferably rectangular in cross section so as to be substantially rigid against bending.

Having thus described my invention, I claim:

1. A window sash assembling apparatus including: a riveting device comprising a clamp, and an associated automatic riveting tool; in combination with means for supporting, in suspension, the insert unit of a

metallic window sash consisting of a series of interconnected muntins and mullions, so that said unit may be readily manipulated in placing its several muntins and mullions successively within the clamp of the riveting device preparatory to the riveting operations, whereby integral shouldered terminal tongues of said muntins and mullions, after being passed through appropriate apertures in the perimetrical rails of the sash, may be headed over by the automatic riveting tool in effecting permanent assembly.

2. A window sash assembling apparatus including: a riveting device comprising a supporting frame; opposed clamp or pincer elements for engaging window sash members which are to be riveted, said elements being fulcrumed about a common pivot mounted in said frame; toggle links connecting said clamp or pincer elements; means for operating said toggle links; and a pneumatic riveting tool attached to said supporting frame adjacent said clamp or pincer elements; in combination with means for supporting the window sash so that it may be readily manipulated in being changed from one position to another in the riveting device.

3. A window sash assembling apparatus including: a riveting device comprising a rigid supporting frame consisting of a base, and two spaced, integral formed vertical standards; a pivot shaft supported horizontally between bosses at the upper ends of the frame standards; opposed clamp or pincer elements for engaging the window sash members which are to be riveted, said elements being fulcrumed to the pivot shaft; toggle links connecting said clamp or pincer elements; a pressure fluid cylinder supported by the base plate of the supporting frame centrally in the interval between the standards, and adapted to actuate the aforesaid toggle links; and an automatic riveting tool mounted to said supporting frame adjacent the clamp or pincer elements; in combination with means for supporting the window sash so that it may be readily manipulateed in being changed from one position to another in the riveting device.

4. A window sash assembling apparatus including: a riveting device comprising a pair of opposed clamp or pincer elements for engaging the window sash members which are to be riveted, said elements being fulcrumed about a common pivot shaft; toggle links connecting said clamp or pincer elements; a double acting pressure fluid cylinder for actuating said toggle links; means for controlling the operations of said cylinder and an automatic riveting tool secured to said supporting frame adjacent the clamp or pincer elements; in combination with means for supporting the window sash so that it may be readily manipulated in being changed from one position to another in the riveting device.

5. A window sash assembling apparatus including: a riveting device comprising a pair of opposed clamp or pincer elements for engaging the sash members which are to be riveted, said elements being fulcrumed about a common pivot shaft; toggle links connecting said clamp or pincer elements; a double acting cylinder for actuating said toggle links, said cylinder having rotary valves governing admission and exhaust of pressure fluid at its opposite ends; a foot treadle for simultaneously shifting said valves; and an automatic hand controlled riveting tool secured to said supporting frame adjacent the clamp or pincer elements; in combination with means for supporting the window sash so that it may be readily manipulated in being changed from one position to another in the riveting device.

6. A window sash assembling apparatus including means for supporting a window sash, in combination with a riveting device comprising a rigid supporting frame; a pincer clamp mounted to said frame and adapted to hold a window sash bar, said bar having a shouldered terminal tongue which is to be headed over after being passed through an appropriate aperture in a cross bar of the window sash frame extending at right angles to the first mentioned bar; a pneumatic riveting tool secured to the supporting frame adjacent to, and in line with the sash bar which is to be headed; and means carried by the tool for firmly holding the cross bar of the sash against the shoulder of the other during the riveting operation.

7. A window sash assembling apparatus comprising a work table; and a riveting device; in combination with a transfer device including a freely fulcrumed, overhanging crane arm; window sash engaging means carried by said arm; and means whereby the window sash engaging means may be lifted from the top of the work table so that the window sash may be transferred in suspension to and from the riveting device.

8. A window sash assembling apparatus comprising a work table; and a riveting device; in combination with a transfer device including a freely fulcrumed, overhanging crane arm; window sash engaging means hung from said arm; and an interposed hand lever whereby the window sash engaging means may be lifted above the work table so that the window sash may be transferred in suspension to and from the riveting device.

9. A window sash assembling apparatus comprising a work table; and a riveting device; in combination with a transfer device including a freely fulcrumed, overhanging crane arm; window sash engaging means hung from said arm; an interposed hand

lever whereby the window sash engaging means may be lifted above the work table so that the window sash may be transferred in suspension to and from the riveting device; and means for locking the lever to maintain the sash engaging means in the position aforesaid.

10. A window sash assembling apparatus comprising a riveting device; in combination with means for supporting a window sash in suspension so that it may be readily manipulated in the riveting device, including a freely pivoted, overhanging crane arm; a roller carriage shiftable along said arm; and window sash engaging means hung from said carriage.

11. A window sash assembling apparatus comprising, in combination, a riveting device; and means for supporting the window sash in suspension so that it may be readily manipulated in said riveting device, including a freely pivoted, overhanging crane arm; an attachment frame hung from said arm; tongs for engaging the muntins and mullions of the window sash; and means whereby said tongs may be operated in groups in effecting their engagement and release.

12. A window sash assembling apparatus comprising, in combination, a riveting device; and means for supporting a window sash in suspension so that it may be readily manipulated in said riveting device, including a freely pivoted, overhanging crane arm; an attachment frame hung from said arm; window sash engaging devices carried by said frame, each of said devices comprising a pair of opposed, pivoted tong members for engaging a muntin or mullion of the sash; an associated rotatable disk; pins projecting from said disk adapted for cooperation within slots of the tong members; and means whereby the several disks of the sash engaging means may be simultaneously rotated in groups to actuate the tongs in engaging or releasing the window sash.

13. A window sash assembling apparatus comprising, in combination, a riveting device; and means for supporting a window sash in suspension so that it may be readily manipulated in said riveting device, including a freely pivoted, overhanging crane arm; an attachment frame hung from said arm; window sash engaging devices carried by said frame, each of said devices comprising a pair of pivoted, opposed tong members; an associated rotatable disk; pins projecting from said disk adapted for cooperation within slots of said tong members; and means for simultaneously actuating the engaging devices in groups including slide rods; instrumentalities carried by said slide rods for imparting rotative movement to the aforesaid disks; and means operative upon said rods for normally yieldingly holding the tongs in closed position.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 20th day of June, 1921.

JOAH BROGDEN.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.