Dec. 22, 1970 B. D. FELTENBERGER 3,548,503

DRAFTING MACHINE

Filed Sept. 5, 1968 3 Sheets-Sheet 1

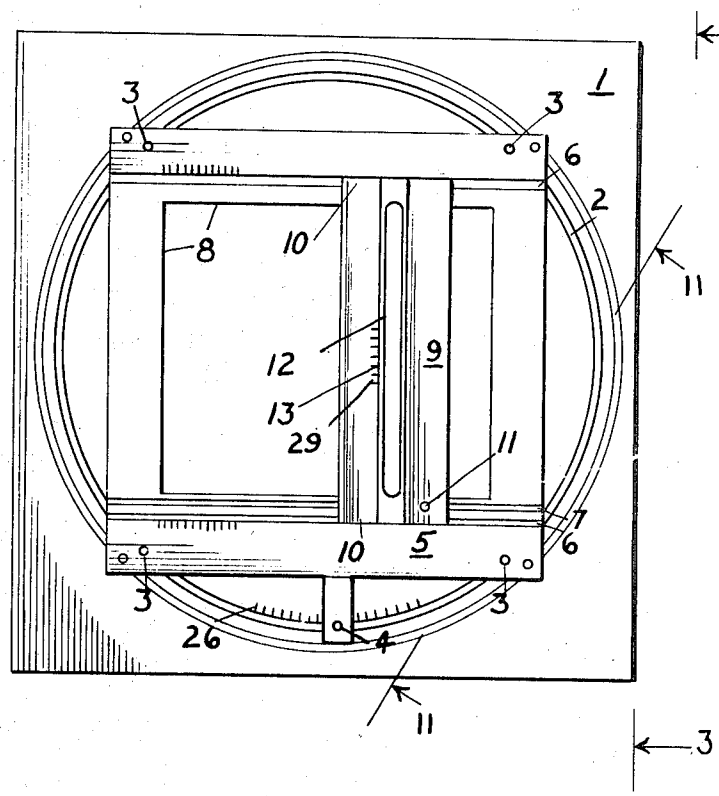


FIG. 1

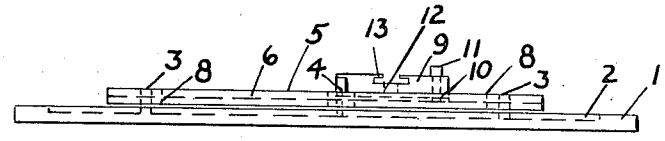


FIG. 2

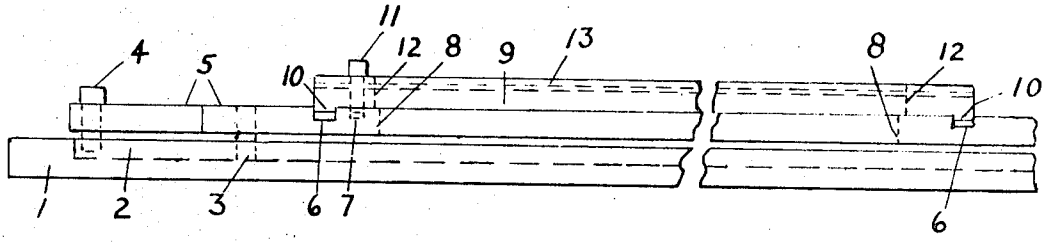


FIG. 3

INVENTOR.

BRUCE D. FELTENBERGER

BY Charles L. Lovercheck
attorney

Dec. 22, 1970 B. D. FELTENBERGER 3,548,503

DRAFTING MACHINE

Filed Sept. 5, 1968 3 Sheets-Sheet 2

FIG. 4

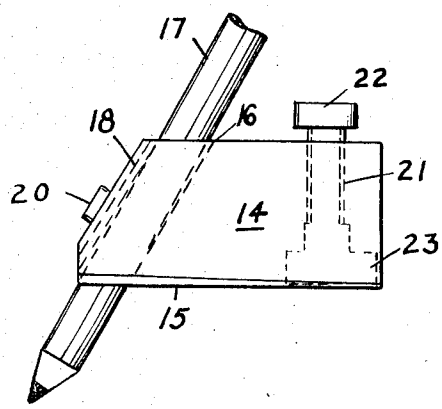
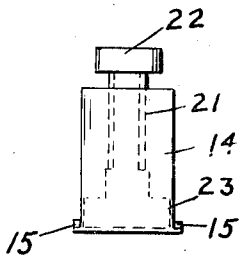


FIG. 5



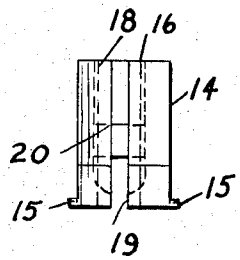


FIG. 6

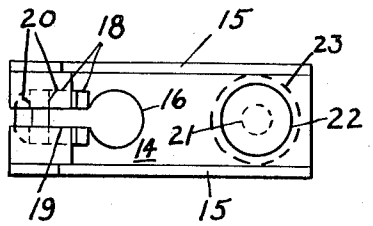


FIG. 7

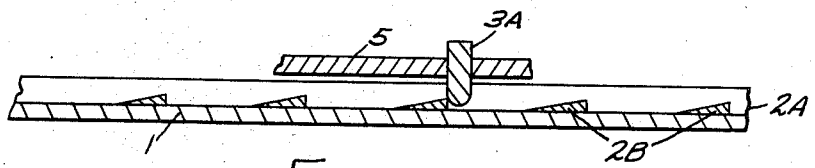


FIG. 11

INVENTOR

BRUCE D. FELTENBERGER

BY Charles L. Loverchek

ATTORNEY

Dec. 22, 1970 B. D. FELTENBERGER 3,548,503

DRAFTING MACHINE

Filed Sept. 5, 1968 3 Sheets-Sheet 3

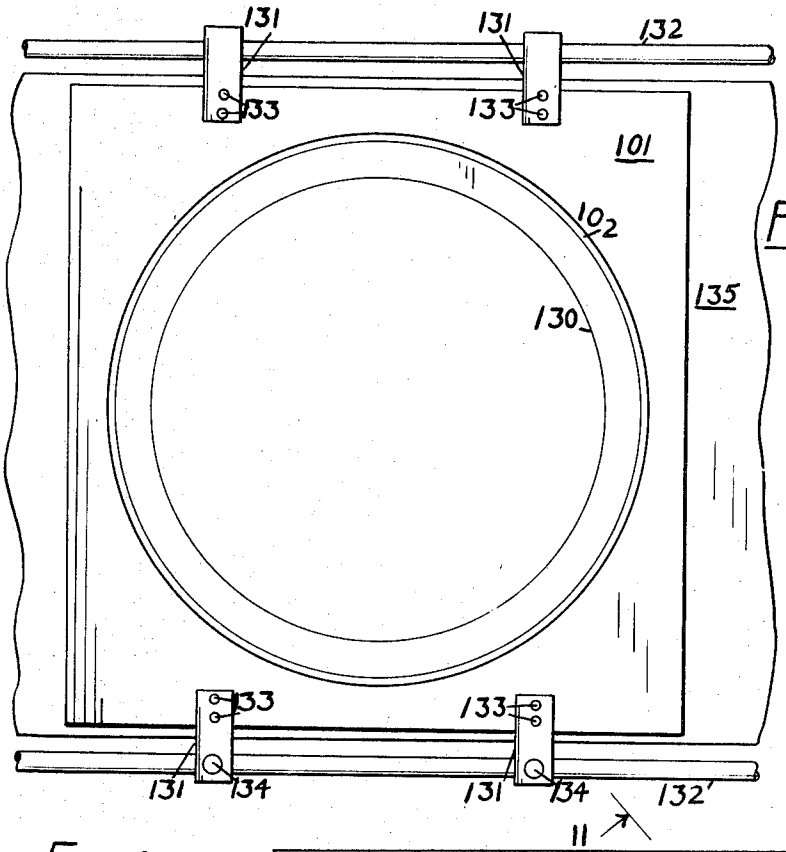


FIG. 8

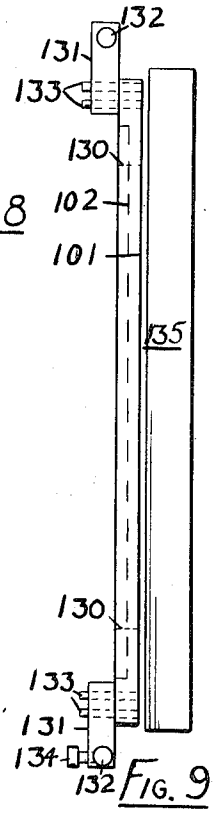
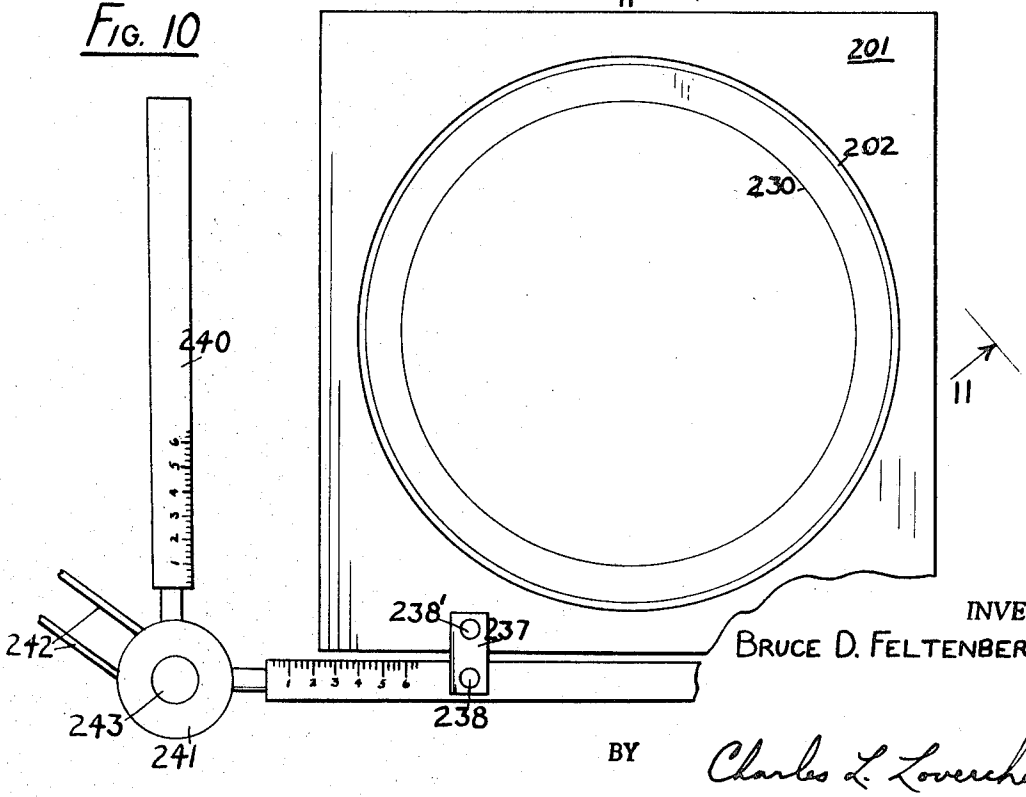


FIG. 9

FIG. 10



INVENTOR
BRUCE D. FELTENBERGER

BY Charles L. Lovercheck
ATTORNEY

United States Patent Office 3,548,503 Patented Dec. 22, 1970

3,548,503

DRAFTING MACHINE

Bruce D. Feltenberger, 22 W. 31st St., Erie, Pa. 16508

Filed Sept. 5, 1968, Ser. No. 757,546
Int. Cl. B43i 9/00, 13/02
U.S. Cl. 33—26 6 Claims

ABSTRACT OF THE DISCLOSURE

A drafting instrument for drawing straight lines, curved lines, and lines at various angles to each other. The instrument is made up of a base of sheet-like material which may be a piece of plexiglass approximately one-fourth inch thick. The base sheet has a circular groove in it which may be approximately one-eighth inch deep and one-eighth inch wide. The straight edge frame may have a window cut out of a single piece of plexiglass of the same thickness as the base. The frame has parallel grooves, one on each side of the window. The frame has four pintles which project below the frame and the pintle ends are received in the circular groove. The purpose of the circular groove is to make it possible to rotate the frame and straight edge and therefore draw a circle or curve. The straight edge has lugs that slide in the parallel grooves and is thereby guided through movement in a plane. The pencil holder may slide in the groove in the straight edge and therefore form lines on a paper that are perpendicular to the lines drawn when the frame is moved on the base.

STATEMENT OF INVENTION

This invention relates to drafting machines and, more particularly, to an improved simplified drafting machine.

DESCRIPTION OF PRIOR ART

The invention disclosed herein is an improvement over prior devices of this type in that it is much more simple, has fewer parts, and therefore is more inclined to maintain its accuracy over a long period of time.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved drafting machine.

Another object of the invention is to provide a drafting machine made of single integral parts, which are preferably transparent.

Another object of the invention is to provide an improved drafting machine.

A further object of the invention is to provide a device that eliminates the need for separate straight edges, rulers, triangles, and compasses (except where nonconcentric circles are desired).

A still further object of my invention is to provide a device which will save time when sketching, drawing, or designing, and which is extremely inexpensive to manufacture, and which has the ability to be constructed almost entirely of plastic material.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

FIG. 1 is a top view of the machine according to the invention;

FIG. 2 is a bottom view of the machine shown in FIG. 1;

FIG. 3 is a right side view of the device shown in FIG. 2;

FIG. 4 is a side view of the pencil holder used in the machine shown in FIG. 1;

FIG. 5 is a rear view of the pencil holder shown in FIG. 4;

FIG. 6 is a front view of the pencil holder shown in FIG. 4;

FIG. 7 is a top view of the pencil holder shown in FIGS. 4, 5, and 6;

FIGS. 8 and 9 show a plan view and side view respectively of another embodiment of the invention;

FIG. 10 shows a plan view of another embodiment of the invention;

FIG. 11 is a cross-sectional view taken on line 11—11 of FIG. 1.

DESCRIPTION OF PREFERRED EMBODIMENT OF THE INVENTION

The principal object of my invention is to provide an improved device whereby sketching, drawing, or designing can be done in a way which closely approaches a free hand style, but results in straight lines, and the lines may be made at any angle desired. Arcs and circles can be made also. In addition, graduations are provided so that the aforementioned lines can be measured as they are drawn.

Referring more particularly to the drawing, the base portion **1** of the device is made of a flat piece of material which may be an integral piece of transparent plastic, such as plexiglass. Such a part of the base **1** acts as a drawing surface and has a smooth planar top on which a piece of drawing paper may be supported by means of drafting tape or the like.

A circular groove **2** is formed in the base **1**, which may be symmetrically disposed in the center of the base **1**. The base may be made square or rectangular, depending on the taste of the operator.

The rotatable portion is indicated as a straight edged support **5** and is provided with four pins or rollers **3**. These pins or rollers are received in the groove **2**. The straight edged support **5** is provided with a locking pin **4**, which is received in the groove **2**, and which may be tightened to lock the straight edged support in position relative to the base **1**. The locking pin **4** is slightly larger in diameter than the groove **2**, and it has two flats directly opposite each other. The dimension directly across the flats is slightly less than the width of the groove **2**. By a slight rotation of the pin **4** in either direction, the entire straight edged support **5** will be locked firmly in place, preventing it from rotation.

The two parallel grooves **6** are formed in the straight edged support **5**. These parallel grooves enable the straight edge **9** to slide freely in a direction parallel to the groove **6**. The straight edge has two locating pads **10** which register in the grooves **6**. This straight edge portion **9** can be locked securely at any point by means of the locking pin **11**, which is cylindrical with flattened sides and has the same relationship to the groove **7** as pin **4** has to groove **2**. Groove **7** runs parallel to groove **6** in the straight edged support **5**.

The longitudinal opening **12**, which runs perpendicular to the grooves **6** and **7**, extends just past the opening.

The longitudinal keyway **13** is centrally located in the straight edge **9** and extends the entire length of it. This keyway receives the pencil holder **14**. The pencil holder has two pads **15** which extend laterally from it in opposite directions. These pads have a close tolerance relative to

the keyway **13**. The hole **16** receives the pencil or pen **17**. The pencil or pen fits into the hole and is rotatable within the hole or it may be moved up and down. The longitudinal opening **19** communicates with the hole **16**, and by means of the locking mechanism the pencil holder may be clamped on the pencil or pen. The keyway **18** is formed at a slight angle to the hole **16** into which fits a small locking pad **20**. This locking pad has a close tolerance relative to the keyway **18**. By moving the locking pad **20** upward, it engages the pen or pencil **17** and locks it securely with a cam type action.

In order to draw arcs or circles or similar curves, it is necessary to lock the pen or pencil holder **14** securely in place in a desired position along the keyway **13**. This is accomplished by means of the locking member **21**, which is in the form of a screw or bolt which is in an inverted position and has head **23** and knob **22**. The locking effect results by advancing the screw **21** within the head **23**. This pushes against the bottom of the keyway **13** and forces the back of the member **14** up with pad **15** being held firmly against the top of the keyway **13**. This locks the pencil **17** in position. The point of the pencil **17** is forced against the drawing surface on base **1**.

The practical operation of the device shown herein in as follows:

Tape a sheet of drawing paper in place on the base **1** within the area designed by groove **2** and place the straight edge support **5** over it so that the pins or rollers **3** register in groove **2**. Place the straight edge **9** onto the straight edge support with the pads **10** registering in the groove **6**.

Insert the pen or pencil holder **14** in the keyway **13** and then insert the pen or pencil **17** in the hole **16** until the point of the pen or pencil touches the paper.

Secure the pen or pencil **17** relative to the holder **14** by sliding the locking pad **20** upward to engage the pen or pencil in a cam effect. Then by pushing the pencil holder **14** along the keyway **13**, a line will be drawn parallel to the groove **12** and perpendicular to the grooves **6**. Likewise, by pushing on the pencil holder **14** either to the right or left, the straight edge will slide in the groove **6** causing a line to be drawn parallel to the grooves **6**. This provides straight lines in directions perpendicular to each other.

For lines at any other angle, simply rotate the straight edge support **5** on the base **1** an angle registered by the graduations **26**. When the straight edge support is rotated the desired amount, it may be locked in place by turning the locking pins **4**. For arcs or circles, it is merely necessary to position the pencil holder from the center of the straight edge support an amount equal to the radius of the circle an amount indicated by graduations **29** on the straight edge **9**. The pencil holder **14** is locked in place by knob **22**, and the straight edge **9** locked by turning pin **11**. The arcs are then formed by rotating the straight edge support **5** on the base **1** and thereby drawing an arc of a circle.

In the embodiment of the invention shown in FIGS. 8 and 9, which shows a plan view and a side view of the embodiment, a base **101** is shown with a groove **102** which may support a straight edge support such as the straight edge support **5** shown in the embodiment of FIG. 1. Window **130** is formed in the center of the base **101** through which the draftman can work on a paper supported on a drafting board **135**. The drafting board **135** has a rod **132** fixed along its side edges and the brackets **131** slide on the rods **132**. The pins **133** attach the base **101** to the brackets.

In operation, the draftsman will utilize the T-square and T-square support on the base member **101**, and he may slide the base member **101** to any desired position over the drafting board **135**.

In the embodiment of the invention shown in FIG. 10, a drafting arm **243** is shown of a type that is familiar to those skilled in the art. The drafting arm is supported on the parallelogram linkage **242** and it has a pivot member **241** that supports the vertical ruler **240** and the horizontal

ruler shown. The horizontal ruler has tthe base member **201** fixed to it by brackets **237**, which are fixed at **238** to the ruler and by pins **238'** to the base member **201**. Base member **201** has a groove **202** which would receive pintles like the pintles **3** in the embodiment of FIG. 1. A window **230** is formed in the center of the base member **201**, through which the draftsman can work on a paper supported on a suitable drafting board.

FIG. 11 shows the base **1** and the rotating portion **5** with an optional groove **2A** and optional pins **3A** are provided for drawing dotted arcs and circles. Also, the window **30** is optional. The pins **3** and **3A** are of a nature that they can be raised or lowered relative to the base **1**. When standard lines are desired, raise the pins **3A** and use the device in the regular way. When dotted lines are desired, lower the pins **3A** so that they meet the bottom of the groove **2A**, which has its bottom formed with cam type teeth **2B** which would allow the bottom of pins **3A** to rise and fall systematically which in turn would cause the entire part **5** to rise and fall, thus creating a dotted line.

The two pads **15** as shown in FIGS. 4, 5, 6, and 7 have a slight angle on them as shown in the drawings. In FIGS. 4, the pads **15** are shown as being thicker on the end near the pencil and tapering down somewhat on the other end. The thickest part of these pads **15** by the pencil is very slightly less than the depth of the keyway **13** as shown in FIG. 2. The other end of the pads **15** is about $\frac{1}{32}$" of an inch less than the part just discussed. This provides a rotating principle when locking knob **22** in part **14**, forcing the pencil point down onto the paper.

The device is portable and can be made of such a size as to be fastened to a clipboard and the base part can be left off and the pins **3** and **4** removed if only straight right angled lines are desired.

A second groove **2** can be provided to allow for dotted lines when rotating the part **5** by having another set of pins, or rollers **3** riding in a groove **2A** which has its bottom formed with cam type teeth which would allow the bottom of the pins to rise and fall systematically and thereby creating a dotted line from the pencil.

When it is necessary to move the pencil holder **14** from one place to another without drawing lines, it can be done by lifting up on the front part of the pencil holder near the pencil where the pads **15** are thickest until the top of the pads contact the top of the keyway B, thus creating a small space between pencil point and paper.

A still further improvement in the application of the device is providing a means of locking the base to the arm of a standard drafting table to allow movement over larger distances and also nonconcentric circles. Another window or opening in the base would be necessary here to allow the pencil to protrude through to the drafting table surface.

A further improvement would be to adapt this device to a drafting table with the aforementioned window in the base part, where the base could completely span the vertical direction of the table connected on two parallel rods **1** on each side, (top and bottom) so the device could move horizontally and be locked into position.

In all of the embodiments, multiple pencil holders could be used to allow more than one line to be made at the same time.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A drafting machine comprising a base, a rectangular straight edge frame having a window in it, and a straight edge,

said base having an area adapted to support a sheet of material for having lines drawn thereon,

at least two circular grooves in said base adjacent said area,

at least two pintles on said straight edge frame disposed in at least two corners for said frame,

each said pintle being received in a said groove,

straight edge guide means on said straight edge frame,

guide means on said straight edge engaging said guide means on said straight edge frame whereby said straight edge is guided for movement in a planar path,

a holder on said straight edge,

said holder having means thereon to receive a drawing instrument and to hold said drawing instrument in position relative to said relative flat surface,

and a slot comprising guide means on said straight edge for guiding the movement of said holder relative to a sheet of paper, whereby a line can be drawn by said instrument on a sheet supported on said area,

said means on said straight edge frame engaging said guide means on said straight edge comprising two grooves in said straight edge frame,

said grooves in said straight edge frame being generally parallel to each other,

one said groove in said straight edge frame being disposed on each side of said window in said straight edge frame and said guide means on said straight edge moving in said grooves in said straight edge frame.

2. The machine recited in claim **1** wherein said slot in said straight edge extends generally perpendicular to said slots in said straight edge frame,

and said holder has side edges cooperating with the edges of said slot in said straight edge whereby said holder may be moved laterally in said slot in said straight edge.

3. The machine recited in claim **2** wherein a locking pin is attached to said straight edge,

said locking pin being slidably received in a second slot when in released position,

said locking pin being adapted to cooperate with said second slot to lock said straight edge when in locked position.

4. The machine recited in claim **3** wherein said holder comprises an integral block of material having a hole therein receiving said drawing instrument,

said block has a width of a magnitude to be slidably received in said slot in said straight edge,

and said block has laterally extending pads overlying a part of said straight edge.

5. The drafting machine recited in claim **3** wherein said machine has brackets thereon and said machine is supported on a drafting board,

said drafting board has a horizontal extending rod extending from one side of said drafting board to the other,

and said brackets are slidably received on said rod whereby said machine can be moved from one side of said drafting board to the other.

6. The drafting machine recited in claim **3** wherein said machine is supported on a drafting board,

said drafting board has an arm supported on parallel linkages thereon,

and said machine is attached to said arm.

References Cited

UNITED STATES PATENTS

1,100,878	6/1914	Higgins et al.	33—32(B)
1,927,992	9/1933	Pulver	33—189
392,143	10/1888	Wright	33—32
3,346,960	10/1967	Miles	33—1

FOREIGN PATENTS

441,574	12/1948	Italy.

HARRY N. HAROIAN, Primary Examiner

U.S. Cl. X.R.

33—80, 81