July 2, 1968 R. A. SANDS ET AL 3,390,598

BANDSAW MACHINE

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FIG. 1.

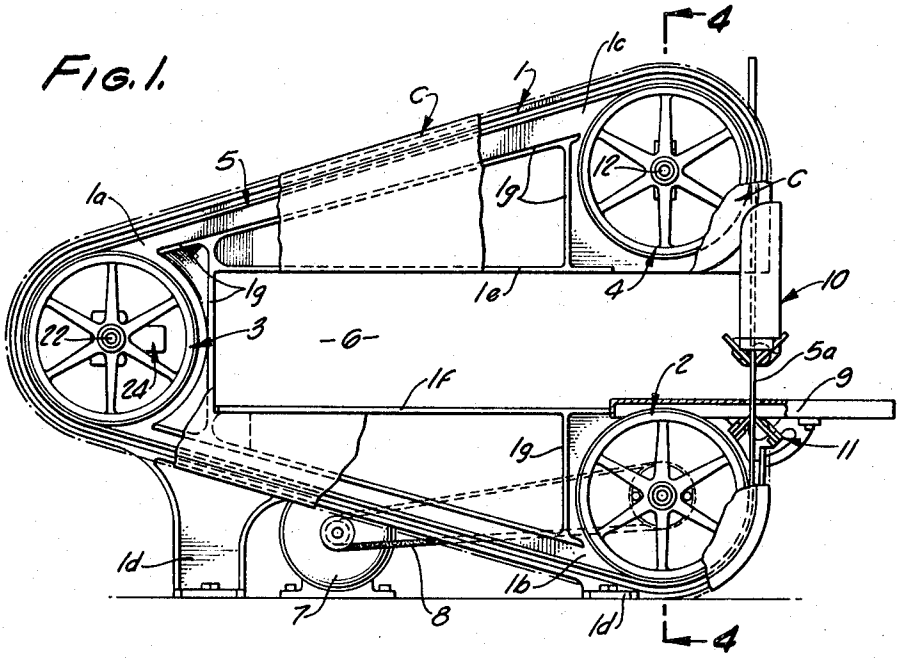

FIG. 2.

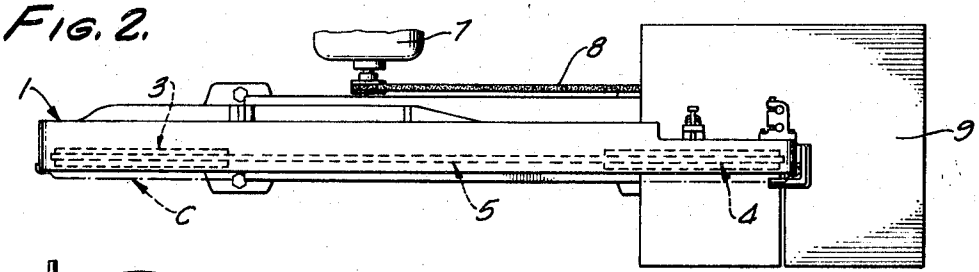

FIG. 3.

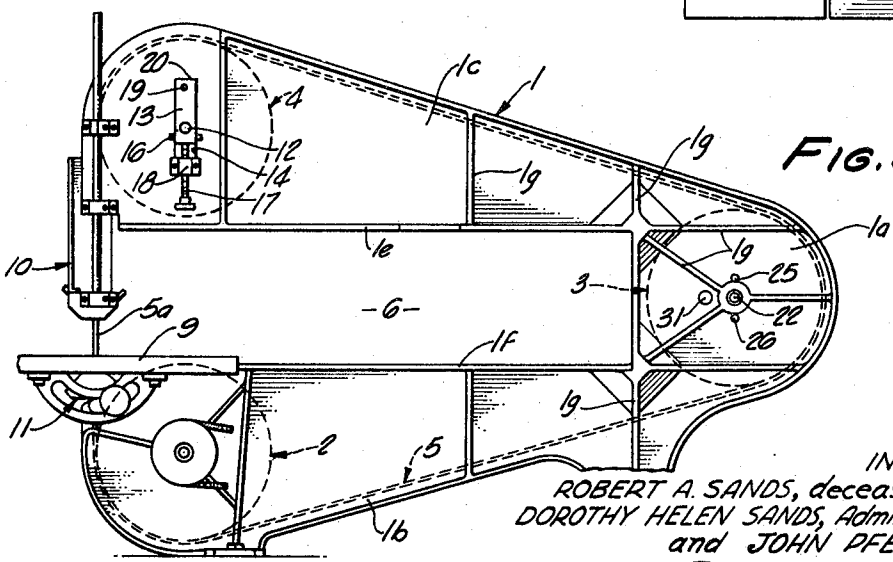

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FIG. 4.

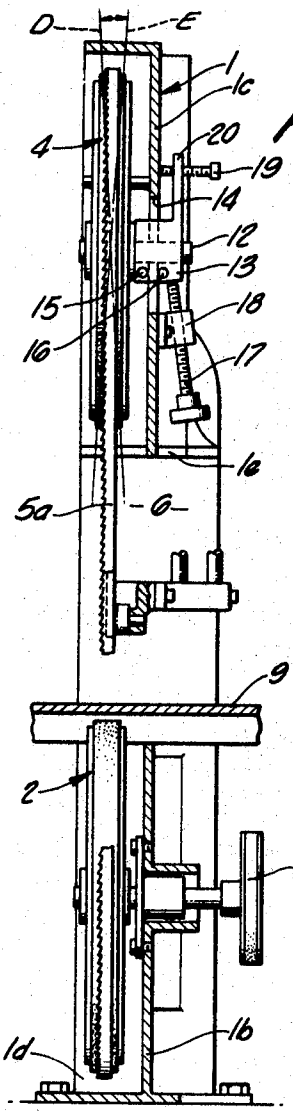


FIG. 5.

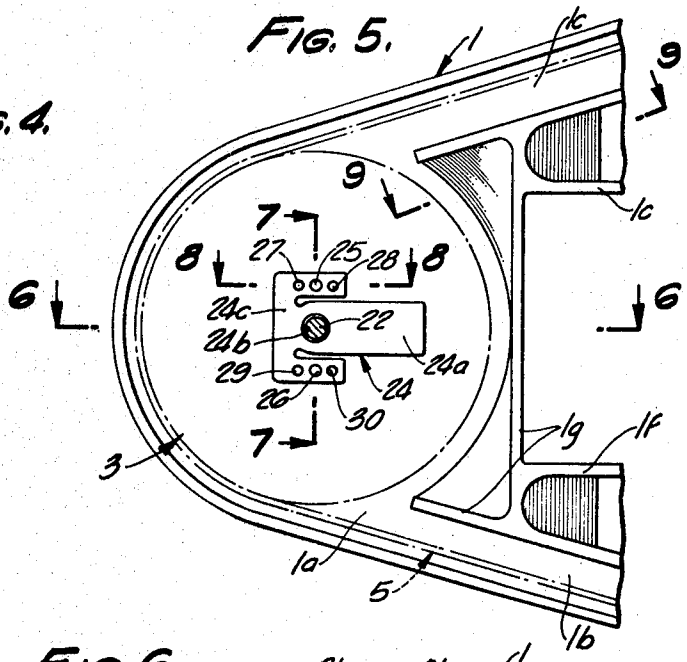
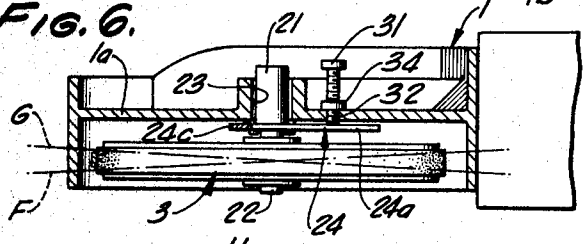


FIG. 6.



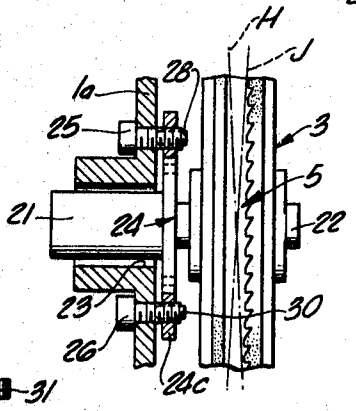


FIG. 9.

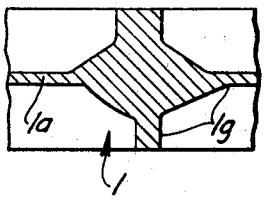


FIG. 8.

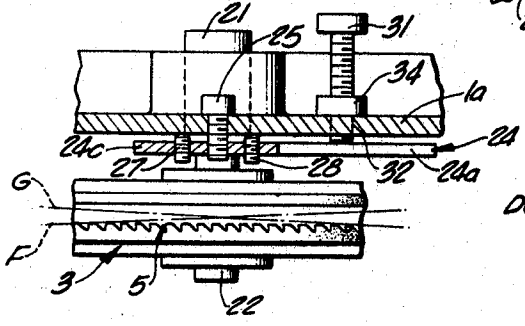


FIG. 7.

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BANDSAW MACHINE

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6 Claims. (Cl. 83—201.15)

ABSTRACT OF THE DISCLOSURE

A vertical frame of the configuration of a triangle having an apex at one end with two divergent legs extending towards the other end is provided with three pulleys at the three corners of the triangular configuration to support a continuous bandsaw. Special adjustment means are operable to tilt two of the pulleys for correct alignment of the running bandsaw.

This invention relates to bandsaw machines.

It is the primary object of the present invention to provide a bandsaw machine which constitutes an improvement in this art in respect to its small size as to height and bulk, low weight, low cost of production, and its reliability of performance compared to bandsaw machines heretofore available, as well as in having a work capacity at least equal to that of known bandsaw machines of considerably greater size, weight, and cost.

It is another object of this invention to provide a bandsaw machine wherein a frame structure, a plurality of pulleys and adjusting means for certain of the pulleys are constructed and arranged in a novel manner to achieve the above noted objectives as well as objects hereinafter set forth.

Further, it is an object hereof to provide a bandsaw machine in which three pulleys are arranged on the frame to drive a bandsaw in a triangular path with the major axis of this path disposed in a substantially horizontal plane and opposed legs of the path one above the other to provide a large work receiving throat therebetween and to make it possible to employ pulleys of considerably smaller diameter than in conventional bandsaw machines with the advantage of greatly reduced height, weight, and bulk.

An additional object of this invention is to provide in a bandsaw machine of the character described, novel means for adjusting certain of the pulleys in a manner assuring that the saw band will track properly on the pulleys regardless of an angular set or other irregularity therein and will have longer life than heretofore. This adjustment of certain of the pulleys and the particular construction and arrangement of the frame and the three pulleys also provide for an efficient operation of the bandsaw machine at a slower speed than usually required for bandsaws to further increase the life of the band.

Other objects and advantages of the invention will be hereinafter described or will become apparent to those skilled in the art, and the novel features of the invention will be defined in the appended claims.

Referring to the drawings:

FIG. 1 is a fragmentary side elevation of a bandsaw machine embodying the present invention.

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

FIG. 3 is a side elevation as seen from the opposite side of that shown in FIG. 1;

FIG. 4 is a sectional view on an enlarged scale taken on the plane of line 4—4 of FIG. 1;

FIG. 5 is an enlarged fragmentary elevational view of one of the pulleys and associated portion of the frame as shown at the left end of FIG. 1;

FIG. 6 is a sectional view taken on the plane of line 6—6 of FIG. 5;

FIG. 7 is a fragmentary vertical sectional view on an enlarged scale taken on the line 7—7 of FIG. 5;

FIG. 8 is a fragmentary horizontal sectional view on an enlarged scale taken on the line 8—8 of FIG. 5; and

FIG. 9 is a fragmentary detailed section on an enlarged scale taken on the line 9—9 of FIG. 5.

A bandsaw machine embodying the present invention as shown in the accompanying drawings, generally comprises a frame **1** on which are mounted three pulleys designated **2**, **3**, and **4** arranged for driving a band saw **5** in a triangular path on one side of the frame and around a horizontally disposed work receiving throat **6** formed by the frame. The side of the frame **1** on which the pulleys and saw blade are exposed is covered by a suitable removable cover C, portions of which are shown in FIG. 1. This cover leaves exposed the vertical leg **5***a* of the saw blade at the mouth of the throat.

As here shown, a motor **7** and belt drive means **8** are provided to drive the pulley **2**. An adjustable saw table **9** is provided at the mouth of the throat **6** and conventional saw guide units **10** and **11** are arranged above and below the table for guiding the leg **5***a* of the saw band extending through the table between the pulleys **3** and **4**.

The frame **1** as here shown, is generally V-shaped and disposed with its major axis in a horizontal plane, thereby providing as one end of the frame an apical portion **1***a*, from which extend divergently a pair of legs **1***b* and **1***c* of equal length arranged one above the other. The lower leg **1***b* is provided with anchoring feet **1***d* which may be suitably anchored to a floor or other support for the machine.

In accordance with this invention, the drive pulley **2** is mounted on the outer end of the lower leg **1***b* of the frame **1**, the pulley **3** is mounted on the apical portion **1***a* and the pulley **4** is mounted on the outer end of the upper leg **1***c*. The three pulleys are disposed in a common vertical plane for rotation about substantially horizontal axes, with provision, however, for adjusting the pulleys **3** and **4** bodily and by tilting them. The driven pulley **2** requires no adjustment and has its axis fixed in a horizontal plane.

The adjustment provisions for the pulleys **3** and **4** make it possible to provide the desired tension of the saw band and to set these pulleys with their surfaces so angularly disposed that the saw band will track properly on the three pulleys regardless of an angular set or other irregularity in the band or in the frame or mountings for the pulleys. It has been found that by having two of the three pulleys adjustable for the purpose above noted, the critical total adjustment that would be required if but one pulley were adjustable is eliminated and a better control of the position of the pulleys for an effective tracking of the saw band is assured.

Before describing the means for adjusting the idler pulleys **3** and **4**, it should be noted that in having the V-shaped frame positioned as here shown with the pulleys arranged in a triangular pattern thereon, the machine as a whole is of small size as to height and bulk in consideration of the size of the work receiving throat and can be operated with pulleys of much smaller diameter than usually required in bandsaws, it being possible for example, to provide with 10″ pulleys the same work capacity as afforded by a 26″ conventional bandsaw wherein the pulleys are 26″ in diameter. Furthermore, it should be noted that the V-frame as here provided is a simple one-piece construction and of such small bulk and low weight that the machine readily and easily may be transported.

Referring more specifically to the construction of the frame **1**, it will be noted that the legs **1***b* and **1***c* gradually increase in thickness vertically thereof from the apical portion **1***a* to the outer ends of the legs and that the

opposed inner edges of the legs are provided with flanges 1*e* and 1*f* which define the upper and lower margins of the throat 6. This construction of the frame makes the legs yieldable toward one another in response to the tension of the bandsaw, and to control this yieldability the two legs are provided at various points with reinforcing webs, ribs or flanges 1*g*. This bracing of the frame makes the frame yieldable in a plane normal to the axes of the pulleys and prevents angularity of yield that may cause misalignment of the pulleys. Should any angular yielding take place or an undesired yielding occur in a plane normal to the axes of the pulleys, this can be corrected by the adjustments afforded by the tilting of the idler pulleys 3 and 4 about their axes.

With reference to FIGS. 3 and 4, it will be noted that the upper pulley 4 is vertically adjustable bodily for the purpose of regulating the tension of the saw band and is also tiltable to angularly dispose the pulley to compensate for irregularities and to assure proper tracking of the band on the pulleys.

The angular adjustment is effected by tilting the axis of the pulley 4 upwardly or downwardly from the horizontal so that the bandsaw engaging surface of the pulley may be inclined from the horizontal in either direction, for example the extent indicated by the dot-dash lines D and E in FIG. 4. This adjustment is effected to the extent that will cause the bandsaw 5 to track properly on the pulley.

For the purpose of effecting adjustments of the pulley 4, its shaft 12 is mounted in a bearing block 13 vertically slidably and tiltably supported in a slot 14 in the upper leg 1*c* of the frame 1. The block 13 has opposite sides slidably engaged with opposite vertical walls of the slot 14 and is retained in the slot by means of a pair of pins 15 and 16 extending through the block and projecting therefrom so as to bear against opposite faces of the leg 1*c* of the frame 1. The pins 15 and 16 guide the block 13 vertically with the aid of the side walls of the slot 14 and also permit rocking of the block about a horizontal axis in such a manner as to incline the pulley to the extent indicated by the dot-dash lines D and E.

Vertical adjustment of the block 13 and pulley 4 to vary the tension of the bandsaw is effected by means of a screw 17 threadedly connected with a bracket 18 fixed on the leg 1*b*. As shown in FIG. 4, one end of the screw 17 bears against the underside of the block 13 at an angle to the vertical and will raise and lower the block depending upon the direction of rotation of the screw.

Another adjusting screw 19 is threadedly engaged with an upward extension 20 of the block 13 and bears against the leg 1*c* above the slot 14. When the screws 17 and 19 are adjusted, for example to the position shown in FIG. 4, to hold the block 13 against tilting relative to the horizontal upon advancing the screw 17, the block 13 and pulley 4 will be raised to increase the tension of the band saw. Opposite rotation of the screw 17 will permit of lowering of the pulley 4 and consequent reduction of the tension of the bandsaw.

When it is desired to tilt the block 13 in a fore and aft direction, for example so that the pulley will achieve an angular position inclined from the horizontal toward or up to the dot-dash line E shown in FIG. 4, the screw 17 is backed off or retracted and the screw 19 is advanced, thereby tilting the block 13 and the pulley as above noted. In order to tilt the pulley 4 in the opposite direction from the horizontal to the extent indicated by the dot-dash line D, the screw 19 is backed off or retracted and the screw 17 is advanced so that screw 17 will exert a force against the underside of the block 13 for tilting it as above stated.

The means provided for adjusting the pulley 3 located at the apical portion 1*a* of the frame 1, provides for the tilting of this pulley to the extent indicated by the dot-dash lines F and G in FIG. 6 and also provides for tilting the pulley in a direction normal to that indicated in FIG. 6, to the extent as shown by the dot-dash lines H and J in FIG. 7. With this arrangement, the adjusting means serves as a gimbal affording substantial universal adjustment of the pulley 3. Accordingly, the adjusting means for pulley 3 as shown in FIGS. 5 through 8, includes a bearing 21 for the shaft 22 of the pulley 3, mounted in a generally circular opening 23 in the apical portion 1*a* of the frame 1 and freely movable in all directions in said opening. The bearing 21 is supported by a T-shaped plate 24 adjustably mounted upon the apical frame portion 1*a* with the bearing fixed to the shank 24*a* of the plate 24 and the shaft 22 extended through an opening 24*b* in the shank.

Bolts 25 and 26 extend through openings in the frame portion 1*a* and are threadedly connected to the upper and lower ends of the head portion 24*c* of the T-shaped plate 24. Set screws 27 and 28 are threadedly connected to the upper end of the head portion 24*c* and disposed on opposite sides of the upper screw 25 so as to be engaged with the surface of the frame portion 1*a* as shown in FIG. 8. A similar pair of set screws 29 and 30 are threadedly connected to the lower end of head portion 24*c* and disposed on opposite sides of the lower screw 26 so as to abut the frame portion 1*a*. With this arrangement the plate 24 is supported in spaced relation to the frame portion 1*a* and is movable relative thereto in response to appropriate adjustment of the screws 25 and 26 and the set screws 27, 28, 29, and 30.

The shank portion 24*a* of the plate 24 extends laterally to one side of the axis 22 and the plate 24 is subject to movement by means of an adjusting screw 31 threadedly mounted in an opening 32 in the apical portion 1*a*. One end of the screw 31 bears against the shank 24*a* for moving the plate 24 to effect angular adjustments of the pulley 3. A lock nut 34 is provided on the screw 31 to hold it in adjusted position.

It is apparent that the two bolts 25 and 26 are aligned with a given diameter of the bearing 21 and permit tilting of the plate 24 about the given diameter as an axis. It is also apparent that the adjusting screw 31 is in screw threaded engagement with the frame in abutment with a portion of the plate 24 that is spaced substantially from the given diameter and is in alignment with a second diameter of the bearing that is perpendicular to the given diameter.

Adjustment of the apical pulley 3 the extent indicated by the dot-dash line F in FIGS. 6 and 8 is effected by advancing the screw 31 so as to flex the shank 24*a* of the plate 24 while the screws 25, 26, 27, 28, 29, and 31 serve to hold the head portion 24*c* of the plate 24 against movement, the bending or flexing of the shank 24*a* taking place at the juncture thereof with the head 24*c*. Adjustment of the pulley 3 up to the dot-dash line G may be effected by retracting the screw 31 and appropriate manipulation of the set screws 27, 28, 29, and 30 also the two screws 25 and 26, thereby angularly disposing the pulley as desired.

Adjustment of the pulley 3 up to the extent indicated by the dot-dash lines H and J in FIG. 7, may be effected by advancing screw 25 and retracting screw 26 for one adjustment and the reverse of this operation of the screws 25 and 26 for the opposite adjustment, the set screws 27, 28, 29 and 30 and the operating screw 31 being also appropriately manipulated, it being apparent that the several adjusting screws and the manner in which the axis of the pulley is supported, make it possible to effect universal adjustment of the pulley 3 to angularly position it best to assure that the saw band will track properly on the pulley 3 as well as on the pulleys 2 and 4.

With reference to the foregoing description and the accompanying drawings, it will be apparent that the control of the position of two of the pulleys in accordance with this invention assures that an accurate tracking of the bandsaw around the pulleys will take place and this, together with the construction and arrangement of the frame, make it possible to provide for an efficient sawing

operation at a slower speed than heretofore employed in conventional bandsaws, with the additional advantage of increasing the life of the bandsaw.

While the control of the operation of the pulleys is effected primarily by actually tilting the pulleys **3** and **4** in a plane normal to their plane of rotation, the fact that the frame is yieldable makes it possible to effect a vernier or minor adjustment better to position the pulleys by the simple expedient of utilizing the adjusting means for the pulley **4** to vary the tension of the saw band.

Another feature of importance is that the pulley **3** is capable of only tracking the band in one plane of rotation. This pulley when properly positioned, causes the saw band to move across the face of the pulley parallel to the plane of rotation of the latter but does not change the angle of this plane. When the pulley **3** is adjusted to the correct plane for tracking of the band, it does not require further adjustment. Any additional adjustment of a vernier nature can be effected by varying the position of the upper pulley **4** and also by the aforementioned variation in the tension of the band and consequent flexure of the frame.

While specific structural details have been shown and described, it should be understood that changes and alterations may be resorted to without departing from the spirit of the invention as defined in the appended claims.

We claim:

1. In a bandsaw machine having a frame with an end portion and a pair of legs extending from said end portion one above the other and defining therebetween a substantially horizontally disposed work-receiving throat and having three pulleys including a power driven pulley, said three pulleys being located respectively on said end portion and on said two legs, the pulleys being arranged for driving thereon a bandsaw in a triangular path around said throat, one of said pulleys having a bearing,

the improvement for adjustably tilting the axis of said one pulley comprising:

a plate fixed to said bearing, said plate being flexible;

fastening means supporting said plate on said frame and being operable to move the plate relative to the frame; and

operating means connected with said frame and with a portion of said plate that is spaced from said fastening means, said operating means being operable to flex said plate while the latter is held by said fastening means to tilt said bearing.

2. An improvement as set forth in claim **1** in which the fastening means comprises screw threaded fastenings rotatable to move the plate, and the operating means comprises an operating screw threadedly connected with the frame and in abutment with said portion of said plate.

3. An improvement as set forth in claim **1** in which said one pulley is the pulley on said end portion of the frame.

4. An improvement as set forth in claim **1** in which said plate is formed with an aperture, and in which the pulley is mounted on a shaft journalled in said bearing and extending through said aperture.

5. An improvement as set forth in claim **2** in which said screw threaded fastenings comprise two anchoring fasteners in alignment with a given diameter of the bearing and connecting the plate with the frame so as to be tiltable about said diameter as the axis;

and in which said screw threaded fastenings further include a pair of adjusting screws adjacent each of said anchoring screws on opposite sides of said diameter to act between the plate and the frame.

6. An improvement as set forth in claim **5** in which said operating screw is aligned with a diameter of the bearing that is substantially perpendicular to said given diameter.

References Cited

UNITED STATES PATENTS

120,949	11/1871	Doane et al.	143—31 X
181,107	8/1876	Sanson	143—21
1,392,990	10/1921	Vaughan.	
2,307,190	1/1943	Bell	143—31

FOREIGN PATENTS

429,165	5/1926	Germany.

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