No. 820,021. PATENTED MAY 8, 1906.

W. R. SMITH.

TUMBLING DRUM.

APPLICATION FILED AUG. 25, 1905.

Fig. 1.

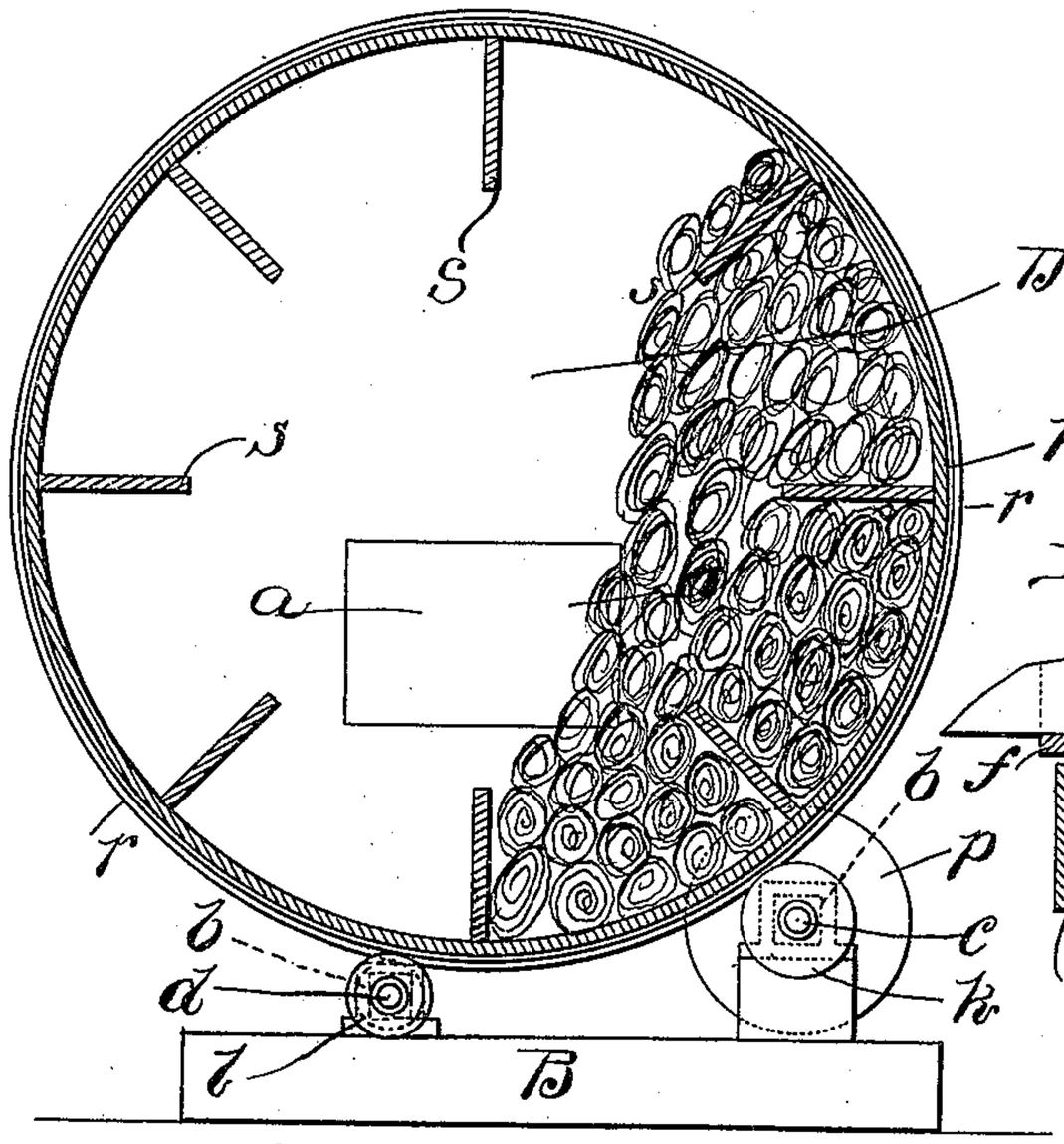


Fig. 3.

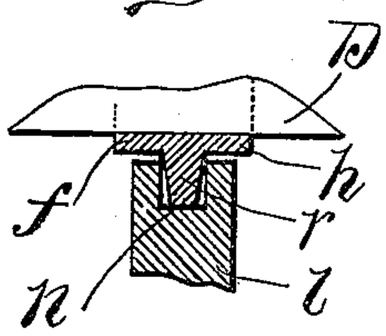
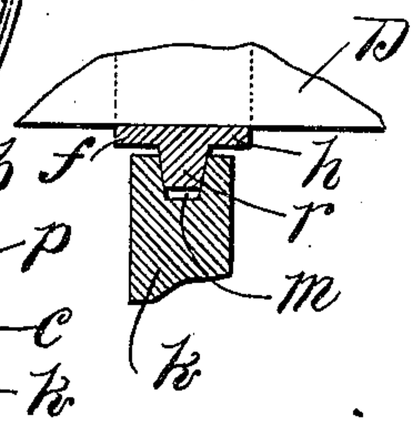


Fig. 4.



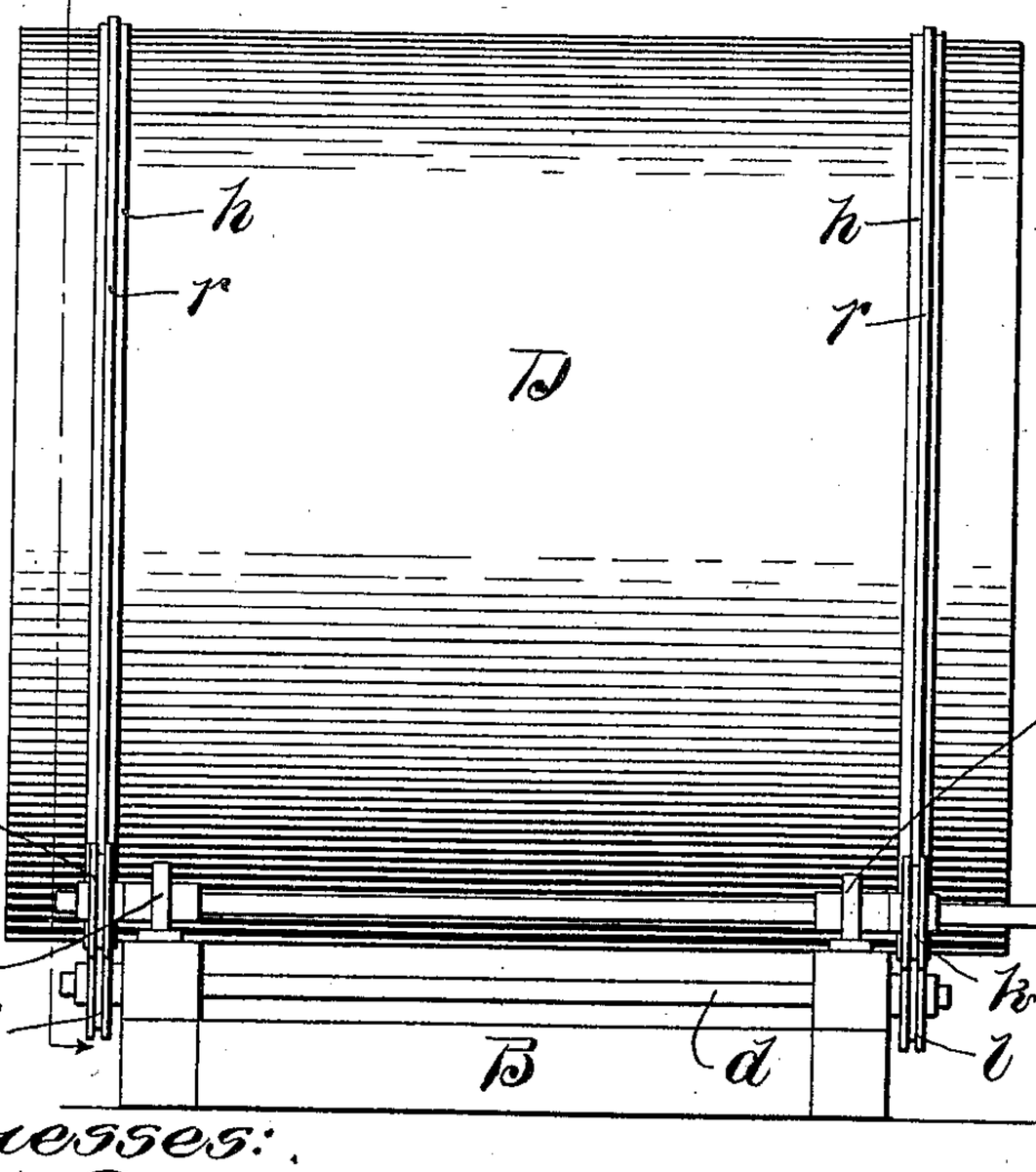


Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM R. SMITH, OF BUFFALO, NEW YORK, ASSIGNOR TO BUFFALO LEATHER CO., OF BUFFALO, NEW YORK, A CORPORATION OF WEST VIRGINIA.

TUMBLING-DRUM.

No. 820,021. Specification of Letters Patent. Patented May 8, 1906.

Application filed August 25, 1905. Serial No. 275,726.

To all whom it may concern:

Be it known that I, WILLIAM R. SMITH, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Tumbling-Drums, of which the following is a specification.

This invention is an improvement in tumbling-drums, and particularly in the means for supporting and rotating such drums. Its object is to furnish a construction and arrangement of supporting and rotating mechanism of the general character described in my prior patent, No. 779,746, granted January 10, 1905, by which the amount of energy necessary to rotate the drum may be greatly reduced.

Of the accompanying drawings, Figure 1 represents a sectional end elevation of a tumbling-drum and operating mechanism therefor embodying the principles of the present invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents a sectional detail view showing one of the idle supporting rolls or wheels for the drum. Fig. 4 represents a similar view of one of the driving-wheels.

The same reference characters indicate the same parts in all the figures.

In the drawings, D represents a tumbling-drum constructed of wooden staves surrounded and bound together by bands or hoops *h* and having in one of its heads a door *a*, through which hides and leather to be treated are introduced. The drum is adapted to contain tanning liquor and is provided on its interior with inwardly-projecting radial shelves *s*, which act to raise and agitate the liquor and hides to subject the latter as thoroughly as possible to the action of the tanning liquor.

The hoops *h* completely surround the drum and hold the parts thereof together, and each is formed with a longitudinal rib *r*, extending continuously the entire length of the hoop and projecting outwardly away from the periphery of the drum. The sides of the rib are inclined convergently as they extend away from the surface of the drum, so that the cross-sectional shape of the rib is that of a wedge. On each side of the ribs the bands are formed with flanges *f*, which are annular and have external cylindrical bearing-faces.

A bed-frame B supports bearings *b*, in which are rotatably mounted two parallel shafts *c* and *d*, the first of which has secured to it driving wheels or rolls *k*, while the other carries rolls or wheels *l*. The first shaft is adapted to be rotated by power through any suitable means, such as the pulley *p*, and thereby the driving-wheels *k* are driven. These wheels have in their circumferential faces annular grooves *m*, the sides of which are inclined and converge toward the axis of the wheels on slants corresponding to the inclinations of the sides of the ribs. The grooves are of such width and depth that when the ribs *r* are inserted in them the sides thereof will engage with the sides of the grooves. The rolls *l* are provided with grooves *n*, which are of greater width than the ribs *r*, so that when the latter are introduced into the grooves there will be no engagement between the sides thereof.

In use the drum is placed upon and supported by the rolls *k l*, which are arranged in such a manner that the ribs of the bands enter the grooves, the inclined sides of the ribs engaging the inclined sides of the grooves *m* of wheels *k* and causing a frictional engagement therewith, while the ribs enter grooves *n* of rolls *l* without side engagement. As shown in Fig. 3, the grooves *n* are of less depth than the ribs, so that the outer cylindrical surfaces of the ribs bear upon the cylindrical surfaces of the rolls *l* at the bottoms of the grooves; but it is obvious that this arrangement may be reversed and the grooves made of greater depth. In that case the bearing would be between the outer faces of the rolls and the cylindrical surfaces of the flanges *f* on each side of the ribs; but in either case the contact between these rolls and the drum would be a simple rolling contact without wedging frictional engagement.

It will be noted that the shaft *c* is arranged at a higher elevation than is shaft *d*. This has the effect of throwing the center of the drum more nearly over shaft *d* than over shaft *c*, so that shaft *d* and rolls *l* are nearer than are shaft *c* and rolls *k* to a vertical plane extending through the axis of the drum, whereby the greater proportion of the weight is borne by the rolls *l*, while only a fraction is supported on the rolls *k*, and the elevation of

the shaft *c* is such that the center of gravity of the drum lies only just far enough to the right of shaft *d*, as seen in Fig. 1, to retain the drum in place and to cause sufficient frictional engagement between the ribs and grooves *m*, so that the driving-wheels may rotate the drum without slipping. The wheels *k* are the only ones which are driven and which act to turn the drum, the other wheels simply rotating idly. It is therefore unnecessary for the latter to be mounted upon the same shaft, and they may as well be independently mounted, but arranged in line.

As the contact between the rolls *l* and the drum is simply a rolling one and there is no frictional resistance to be overcome in separating the rib from the sides of the groove and as the pressure tending to wedge the ribs into the grooves of the driving-wheels is much less than would be the case if a larger proportion of the weight of the drum were carried by these wheels, it is evident that the resistance to turning the drum resulting from friction is less by a great amount than is the case where all of the supporting-rolls are wedged upon the sides of the rib. I have found by experiment that the power required to rotate a drum having the usual charge of tanning liquor and stock to be treated when arranged as herein described and illustrated is much less than when all the rolls are constructed as drivers having a wedging engagement with the ribs and arranged on the same level as in my prior patent above referred to. In fact, the power required to operate the drum when arranged in the manner described in said patent is in the neighborhood of five times as great as that necessary with the arrangement here illustrated.

I claim—

1. A leather-treating apparatus comprising a drum, bands surrounding the drum, a plurality of wheels or rolls arranged beneath and near the center line of the drum for supporting the greater part of the weight thereof, driving wheels or rolls on the other side of the center line and at a greater distance therefrom than the supporting-rolls, in frictional engagement with the bands, and means for rotating said driving-wheels.

2. The combination of a drum, wheels or rolls arranged in two sets beneath the drum, the drum resting thereon and one set of wheels being higher than the other, whereby the greater proportion of the weight of the drum is supported on the lower set, bands surrounding the drum having inclined-sided ribs projecting into and frictionally engaging the sides of tapered grooves in the upper wheels, and means for rotating said upper wheels.

3. The combination of a drum having surrounding bands, each formed with a longitudinal rib wedge-shaped in cross-section, a set of supporting-wheels, driving-wheels beside and at a higher elevation than the supporting-wheels and having grooves with inclined sides complemental to the ribs, and means for rotating the driving-wheels.

4. The combination of a drum, bands having longitudinal ribs wedge-shaped in cross-section surrounding the drum, driving and idle wheels supporting the drum, the driving-wheels having grooves with inclined sides embracing and frictionally engaging the sides of the ribs, and the idle wheels having a free rolling engagement with the drum, said wheels being so arranged that the proportion of the weight of the drum borne by the idle, is greater than that supported by the driving wheels.

5. The combination of a drum, bands surrounding the drum, each formed with a longitudinal rib wedge-shaped in cross-section, and cylindrical flanges on each side of the rib, idle rolls beneath the drum having grooves to receive the ribs without engaging the sides thereof, and cylindrical surfaces at the bottoms of the grooves engaging and supporting the outer surfaces of the ribs, and driving-rolls having grooves with flaring sides in frictional engagement with the sides of the ribs, the idle rolls being located nearer than the driving-rolls to a vertical plane extending through the axis of the drum.

6. The combination of a drum, bands surrounding the drum, each formed with a longitudinal rib wedge-shaped in cross-section and cylindrical flanges on each side of the rib, idle rolls having grooves to receive the ribs without engaging the sides thereof, and supporting the outer surfaces of the ribs on the surfaces at the bottoms of the grooves, and driving-rolls having grooves with flaring sides in frictional engagement with the sides of the ribs, said rolls being arranged to support the entire weight of the drum in unequal proportions, the idle rolls receiving the greater part, and the driving-rolls but a fraction, of such weight.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM R. SMITH.

Witnesses:
JOHN W. DOBBIE,
L. WYATT.