(No Model.) 2 Sheets—Sheet 1.

J. & F. ROTHWELL.

APPARATUS FOR GRINDING CARDS.

No. 597,365. Patented Jan. 11, 1898.

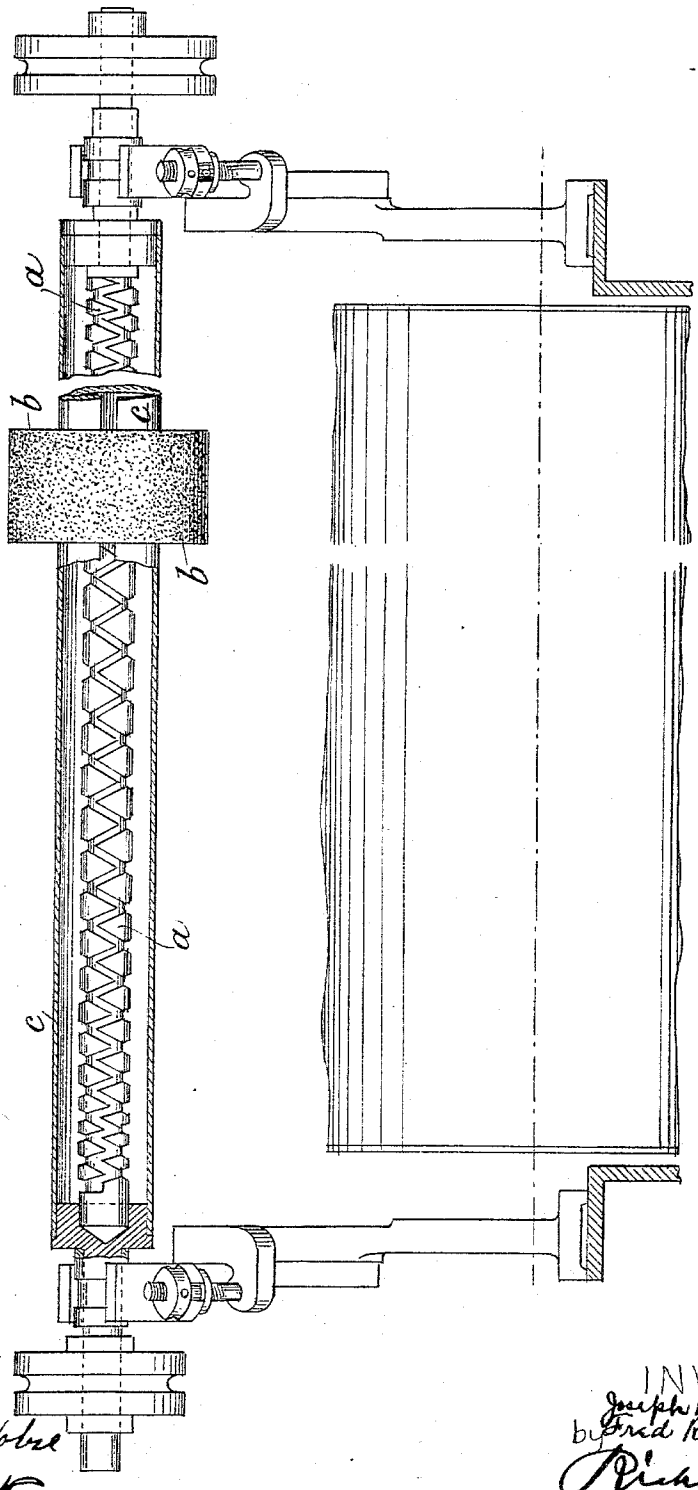


FIG. 1.

WITNESS
H. Richard Wobre
A. B. Ellenk

INVENTORS
Joseph Rothwell
by Fred Rothwell
Richards & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2

J. & F. ROTHWELL.

APPARATUS FOR GRINDING CARDS.

No. 597,365. Patented Jan. 11, 1898.

FIG. 3.

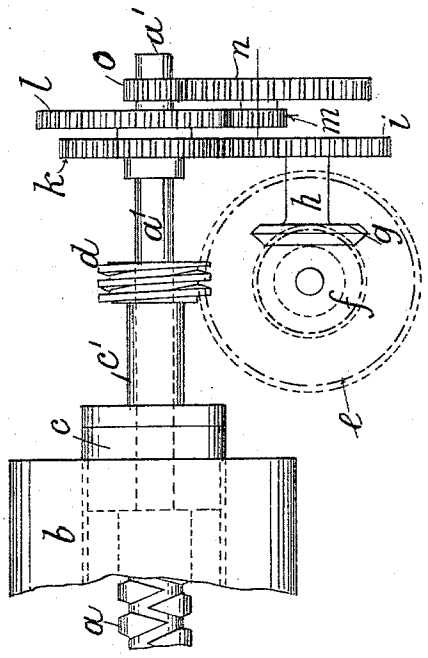
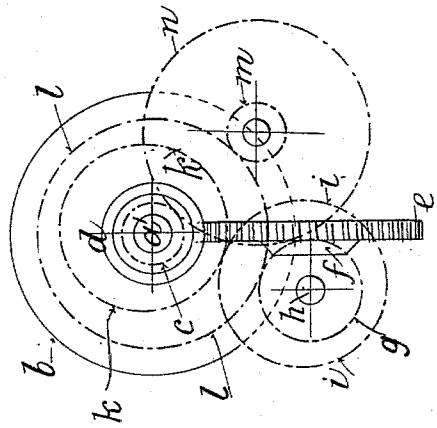


FIG. 2.



WITNESS

N. Richard Wobse

Otto Munn

INVENTORS

Joseph Rothwell

Fred Rothwell

by Richards & Co.

Atty's.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH ROTHWELL, OF GLASGOW, SCOTLAND, AND FRED ROTHWELL, OF BURY, ENGLAND, ASSIGNORS TO DOBSON & BARLOW, LIMITED, OF BOLTON, ENGLAND.

APPARATUS FOR GRINDING CARDS.

SPECIFICATION forming part of Letters Patent No. 597,365, dated January 11, 1898.

Application filed December 5, 1896. Serial No. 614,617. (No model.) Patented in England January 3, 1896, No. 176.

To all whom it may concern:

Be it known that we, JOSEPH ROTHWELL, of Glasgow, in the county of Lanark, Scotland, and FRED ROTHWELL, of Bury, in the county of Lancaster, England, both subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Apparatus for Grinding Cards, (for which we have obtained Letters Patent in Great Britain, No. 176, bearing date January 3, 1896,) of which the following is a specification.

This invention relates to that class of apparatus for grinding the surface of card-covered cylinders, doffers, flats, and rollers in which a narrow grinding wheel or disk is caused to traverse across the length or width of the card-covered surface as it grinds the teeth of the latter, this class of apparatus being commonly known as the "Horsfall" type.

It is found that the above-named grinding wheel or disk has a tendency to grind the cylinders, doffers, flats, and rollers somewhat more deeply toward the center than at the edges or ends of the same. We propose to remedy this defect by imparting to the grinding wheel or disk a differential traverse motion slower at the ends or sides and gradually quicker as it approaches the center, and by thus altering the speed of the traverse of the grinding wheel or disk we compensate for any irregularity in the grinding.

The manner in which we propose to carry our invention into practical effect will be readily understood on reference to the sheet of drawings hereunto annexed and the following explanation thereof.

We may effect this differential traverse in various ways. For example, we may vary the rapidity of traverse by altering the pitch of the screw which effects the said traverse, so that the pitch is slower at the ends and quicker toward the center, as shown in elevation and partial section at Figure 1 of the drawings, or we may effect the same by means of differential gear for driving the ordinary Horsfall screw so as to move the grinding wheel or disk slower at the beginning and end of each traverse and quicker at the center, as illustrated in end view at Fig. 2 and elevation at Fig. 3 on the drawings.

Referring to Fig 1, which is drawn partly in section, it will be seen that, instead of using the ordinary Horsfall screw with the crossed thread made of the same pitch from end to end, we make a screw *a* with a differential pitch that is slower at each end and getting gradually quicker toward the center, which will, it is evident, give the required differential traverse to the grinding wheel or disk *b* outside the slotted tube or barrel *c*. It will be understood that this arrangement is used when the grinding wheel or disk is placed above the roller or other surface to be ground; but in cases where it is more convenient or otherwise desirable to place the grinding wheel or disk *b* below the surface to be ground, then the pitch of the screw *a* may be arranged in the reverse manner—that is to say, it may be quicker at each end or side and slower toward the center.

In the arrangement illustrated by Figs. 2 and 3 the screw *a* is made, as usual, with the thread at a regular pitch from end to end, and the differential traverse of the grinding wheel or disk *b* is effected in the following manner: On a sleeve *c'* at the end of the barrel *c* we fix a worm *d*, driving a worm-wheel *e*, say of forty-four teeth, on the boss of which is a bevel-wheel *f*, driving a similar wheel *g* of the same size on one end of a short shaft or axle *h*, at the other end of which is keyed an eccentric spur-wheel *i*, driving a similar eccentric spur-wheel *k* of the same size, mounted loosely on the screw-shaft *a'*, both having, say, thirty-five teeth. To the latter wheel is cast or fixed an ordinary spur-wheel *l* of, say, fifty teeth, driving a pinion *m* of, say, ten teeth, cast upon the boss of a spur-wheel *n*, having also fifty teeth, and driving a spur-pinion *o*, having ten teeth, keyed upon the screw-shaft, thus giving the barrel *c* sufficient lead over the screw *a* to cause the grinding wheel or disk *b* to traverse from end to end of the barrel. The eccentric wheels *i* and *k* are so proportioned as to make one revolution to each traverse of the grinding wheel or disk from end to end of the barrel, and their position with regard to each other and their amount of eccentricity are so arranged as to give the required differential motion to the speed of

the screw-shaft. In this case it will be understood that the barrel *c* is the first driver.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim, and desire to secure by Letters Patent of the United States, is—

1. In a card-grinding apparatus the combination of the cylinder carrying the card-teeth, the double and reversely threaded screw extending across the cylinder and supported at its ends, the intermediate portion of the screw being unsupported, the grinding-wheel on said screw adapted to traverse the same from end to end, said wheel having a differential movement on the said screw whereby the cards at the center of the cylinder will be subjected to a grinding action of different duration from those at the edges of the cylinder, and means for rotating the screw continuously in one direction, substantially as described.

2. In a card-grinding machine, the combination of the cylinder, the double and reversely threaded screw extending across the same and supported at its ends, the said screw having threads of differential pitch, the grinding-wheel directly on the screw and means for operating the screw continuously in one direction whereby the cards at the center of the cylinder will be subjected to grinding action of different duration from those at the edges of the cylinder, and means for rotating the screw continuously in one direction, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

JOSEPH ROTHWELL.
FRED ROTHWELL.

Witnesses to the signature of the said Joseph Rothwell:

JAMES BAIN,
JOHN CATHANACK.

Witnesses to the signature of the said Fred Rothwell:

H. B. BARLOW,
S. W. GILLETT.