Feb. 13, 1923. 1,445,358.

T. M. RUSSELL.

SECTIONAL DIE FOR PRODUCING DIFFERENTIAL SHEET METAL CAMS.

FILED DEC. 29, 1921. 2 SHEETS—SHEET 1.

Fig. 1.

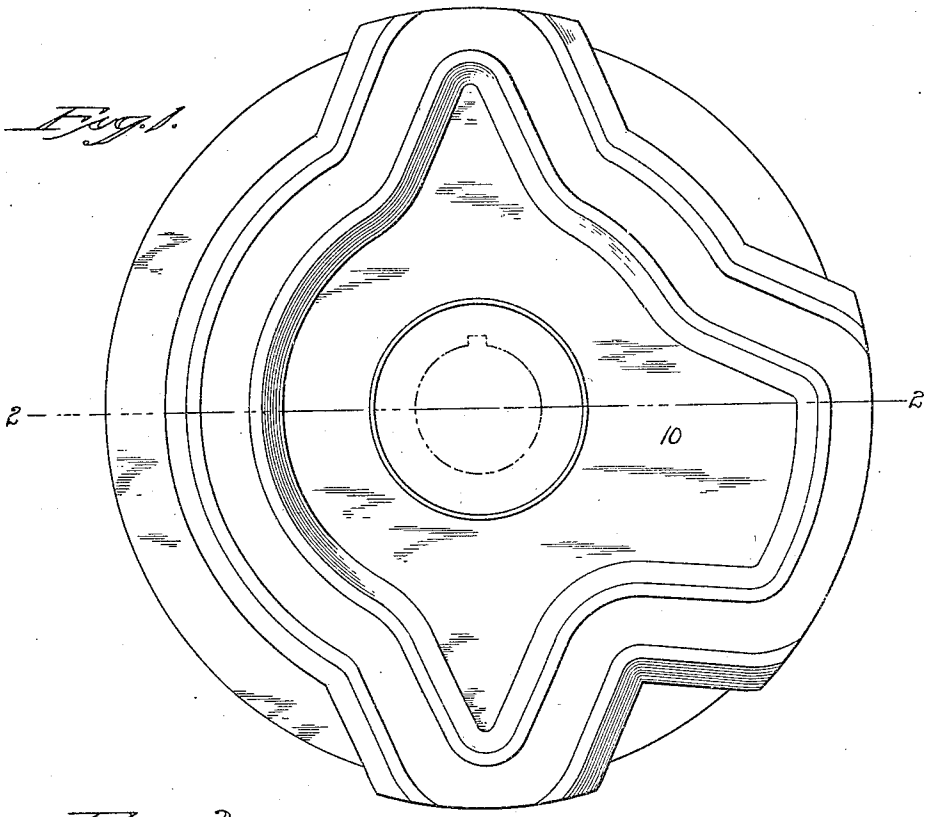


Fig. 2.

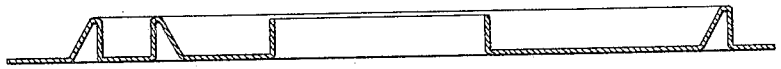
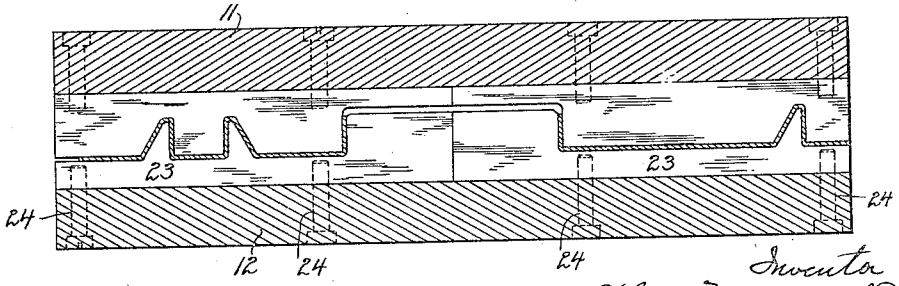


Fig. 3.



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SECTIONAL DIE FOR PRODUCING DIFFERENTIAL SHEET METAL CAMS.

FILED DEC. 29, 1921. 2 SHEETS-SHEET 2.

Fig. 4.

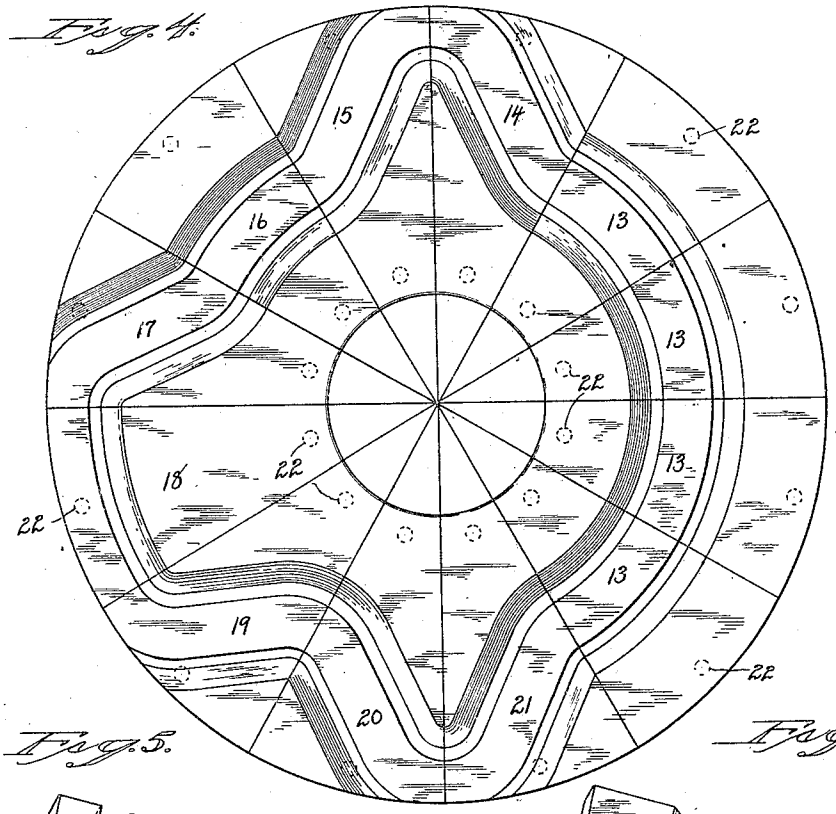


Fig. 5.

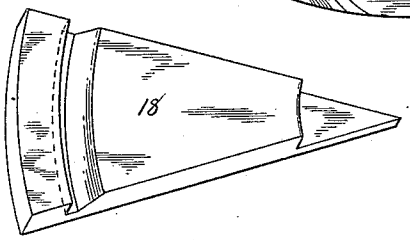


Fig. 6.

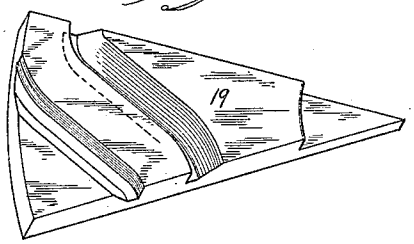


Fig. 7.

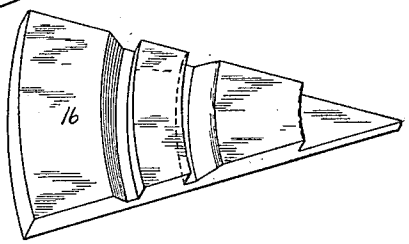
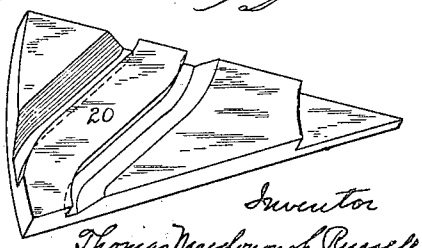


Fig. 8.



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Patented Feb. 13, 1923. 1,445,358

UNITED STATES PATENT OFFICE.

THOMAS MACDONOUGH RUSSELL, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO RUSSELL MFG. CO., OF MIDDLETOWN, CONNECTICUT, A CORPORATION.

SECTIONAL DIE FOR PRODUCING DIFFERENTIAL SHEET-METAL CAMS.

Application filed December 29, 1921. Serial No. 525,658.

To all whom it may concern:

Be it known that I, THOMAS MACDONOUGH RUSSELL, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented a new and useful Improvement in Sectional Dies for Producing Differential Sheet-Metal Cams; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Fig. 1 a face view of a sheet-metal shedding-cam embodying my invention.

Fig. 2 a sectional view on the line 2—2 of Figure 1.

Fig. 3 a sectional view of complementary upper and lower sectional-dies constructed in accordance with my invention, these dies being shown with a sheet-metal cam between them.

Fig. 4 a face view of the upper die as completed.

Fig. 5 a perspective view of a high-dwell die-segment.

Fig. 6 a similar view of a drop die-segment.

Fig. 7 a similar view of a low-dwell die-segment.

Fig. 8 a similar view of a rise die-segment.

My invention relates to an improvement in sectional dies designed for the production, without change, other than the re-combination of their movable segments, of a variety of sheet-metal cams differentiated in the conformation of their tracks, and primarily designed for use in the manufacture of shedding-cams for looms, the object being to provide means for producing a variety of sheet-metal cams without the expense of cutting and maintaining special solid dies for each cam.

With these ends in view, my invention consists in a sectional cam-die characterized by a head and a plurality of segmental die-sections adapted to be mounted thereupon around a common center in a variety of arrangements conforming to the requirements of the work to be done by the finished cam and having edge-to-edge face-configuration.

My invention further consists in a sectional cam-die having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In carrying out my invention for the production of a one-piece, struck-up, sheet-metal shedding-cam 10, I employ an upper and a lower die respectively furnished with complementary segmental die-sections having edge-to-edge face-configuration and capable of a considerable range of corresponding re-combination upon their die-heads 11 and 12, according to the nature of the tracks in the sheet-metal cams to be produced, these tracks being determined by the character of the weave which it is intended the loom shall turn out.

For the disclosure of my invention, it will be sufficient to describe one die-head and one set of die-sections, since the other die-head and its sections must be complementary. Thus, the upper die-head 11 is provided, as shown, with four low-dwell segments 13, grouped together, a rise segment 14, a drop segment 15, a low-dwell segment 16, a rise segment 17, a high-dwell segment 18, a drop segment 19, a rise segment 20, and a drop segment 21,—this nomenclature having been adopted as to the rise and drop segments on the assumption that the cam to be produced is a right-handed cam. But this nomenclature would be reversed as to the rise and drop segments if it be assumed that the sheet-metal cam to be produced is to be rotated in a left-hand direction. The several segments listed are secured by machine-screws 22 to the head 11 around a common center. The sectional-die thus produced is used in conjunction with a corresponding complementary sectional-die consisting of the head 12 upon which twelve complementary-segmental die-segments 23 are arranged in the same manner, and similarly secured in place by machine-screws 24. The segments 13 to 21 inclusive of the die-head 11 are formed with face-configurations consisting of grooves intersecting their edges, while the segments 23 of the die-head 12 are formed with face-configurations consisting of ribs extending between the edges of the segments and registering with the grooves of the corresponding segments of the upper die-head.

I have not shown the full set of segments necessary to the lower die, but it will be

understood that they correspond in form and arrangement to the twelve segments shown and described as characteristic of the upper die, to which the lower die must be complementary, as in the case of ordinary solid dies.

The two dies, having been produced in the manner described, are used in the manner of solid dies for the production of sheet-metal cams of the character of the sheet-metal shedding-cam 10.

It will be readily understood by any one familiar with the art of weaving, that in the operation of a loom, the shedding of the warp-threads is controlled by a shedding-cam, the track of which is plotted according to the desired shedding of the threads, which determines the character of the weave. To change the shedding for changing the weave, the track of the shedding-cam must be plotted accordingly. The plot of any given shedding-cam having been predetermined by the character of the weave to be produced, it will be seen that under my invention the die-segments may be re-combined upon the die-heads, so as to produce the specific rises and dwells requisite to effect the shedding of the warp-threads necessary to produce the desired weave. The die-segments having been thus re-combined, in the same way as to both the upper and lower dies, the dies are used in the manner of solid dies in the production of a one-piece, sheet-metal shedding-cam. The same dies may thus be used in producing a range of differentiated sheet-metal cams limited only in weave-differentiation by the number of re-combinations which may be made with a given number of die-segments.

My improved sectional die for producing cams of different tracks may be compared to the use of types in printing, the die-segments being interchanged to produce different weaves in the same manner that types, representing different letters, are re-combined for printing different words.

While I have described my improved die with particular reference to the production of shedding-cams for use in looms, my invention is obviously not so limited, since it may be used in the production of sheet-metal cams for whatever purpose available, if it is desired to change their tracks without producing a new die for each new cam. It is equally obvious that the number of die-segments employed will be varied in accordance with the character of the machine in which the sheet-metal cams are to be used. Thus, some looms call for cams of six, eight, ten, twelve, and sometimes even sixteen stations. My improved sectional dies will be constructed accordingly. Thus, the die shown is a die designed for the construction of twelve-station cams, but obviously the principle would remain unchanged if the die were constructed for the production of cams having any other number of stations. By my invention, I am enabled to produce a wide range of sheet-metal cams with a sectional die consisting of a head and, to continue the simile, a "font" of die-segments.

I claim:

1. A sectional die for the production of sheet-metal cams of differential track-conformation, the said die consisting of a die-head and a font of segmental, die-sections adapted to be mounted thereupon around a common center in a variety of re-combinations, according to the specific track-conformation of the cam to be produced, the respective sections having edge-to-edge face-configuration.

2. A pair of sectional dies for the production of sheet-metal cams of differential track-conformation, one die consisting of a die-head and a font of segmental die-sections adapted to be mounted upon it around a common center in a variety of re-combinations according to the specific track-conformation of the cam to be produced, and the other die consisting of a die-head and a font of segmental die-sections adapted to be mounted upon it around a common center in a variety of re-combinations, according to the specific conformation of the cam to be produced, the respective segmental sections of the two dies having registering edge-to-edge face-configuration.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

THOMAS MACDONOUGH RUSSELL.

Witnesses:
J. R. STUBBINGS,
F. C. FAGAN.