Feb. 4, 1941. W. C. BRUTON 2,230,424

DIPPER TOOTH ASSEMBLY

Filed Jan. 7, 1939 2 Sheets-Sheet 1

Fig. 1.

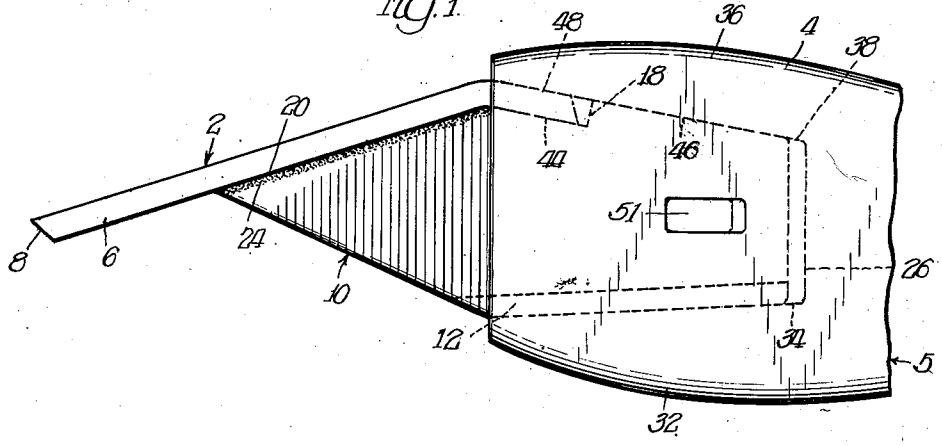


Fig. 2.

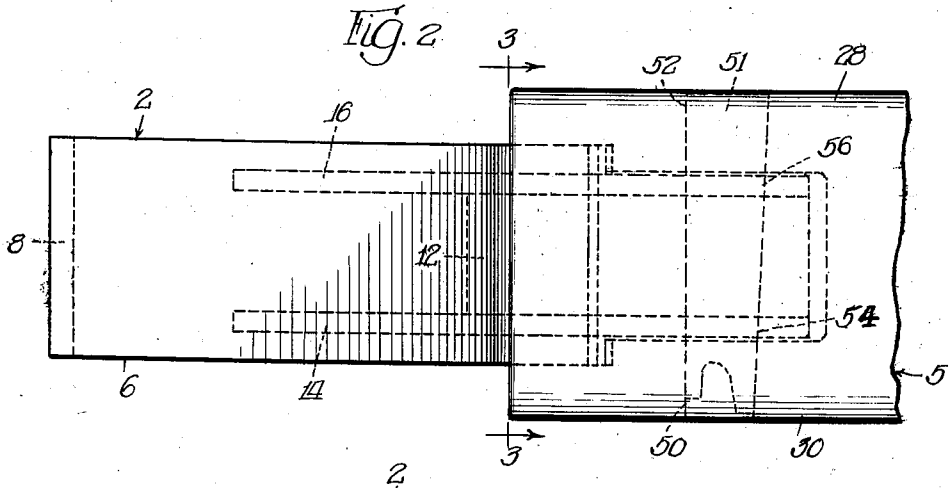
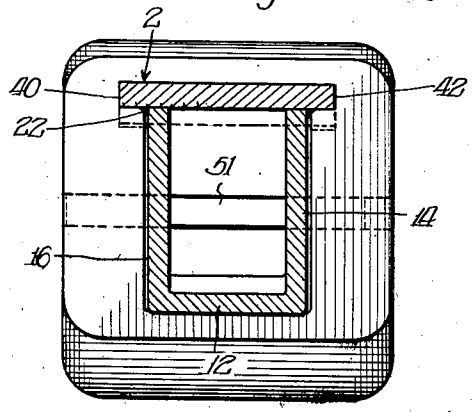


Fig. 3.



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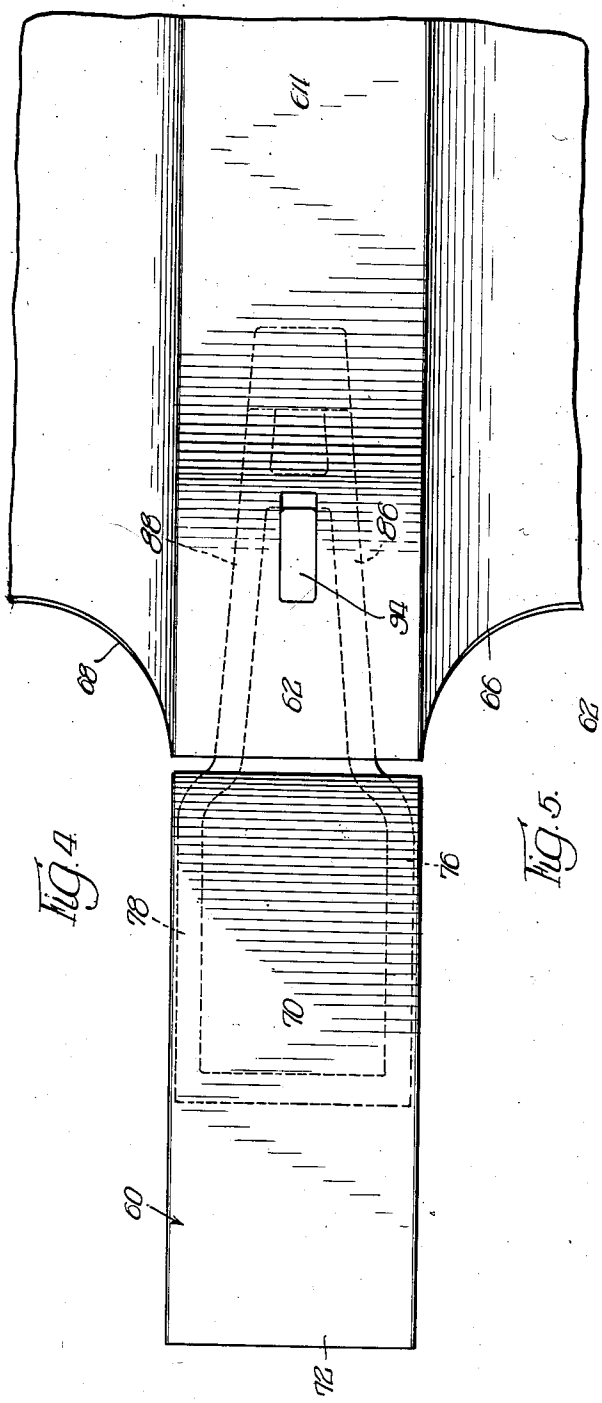


Fig. 4.

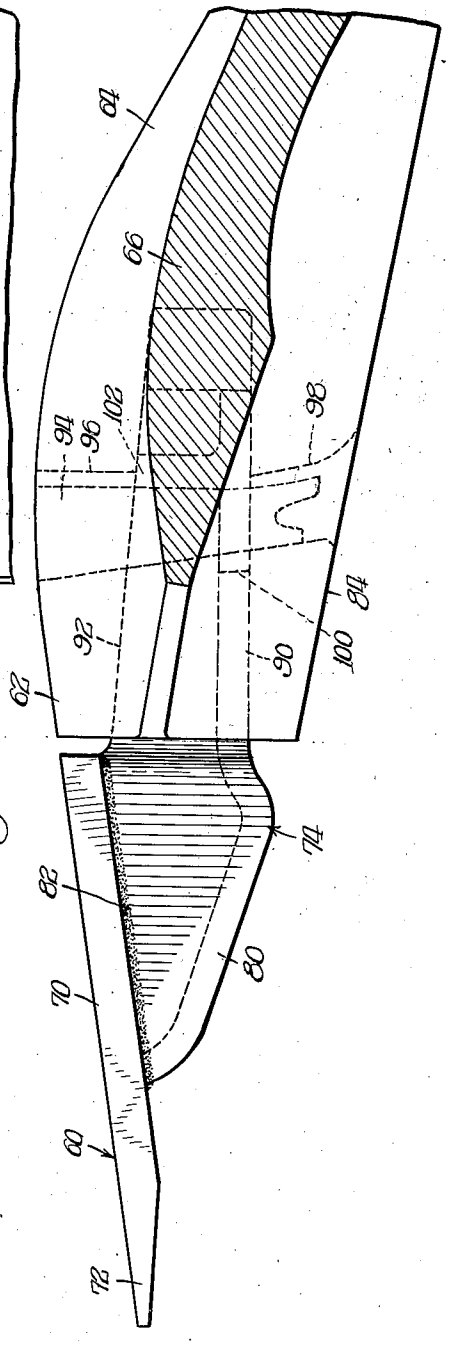


Fig. 5.

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UNITED STATES PATENT OFFICE

2,230,424

DIPPER TOOTH ASSEMBLY

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Application January 7, 1939, Serial No. 249,709

13 Claims. (Cl. 37—142)

The present invention relates to excavating implements, and more in particular to replaceable or detachable tooth points for said implements.

Among the objects of the present invention is to provide a novel excavating tooth which can be easily fabricated and assembled at relatively low costs and one which can be readily replaced with ease and facility when the same has become worn to such an extent as to warrant repair or replacement by a new tooth.

The present invention embodies as one of the salient features the idea of providing an excavating tooth of novel construction comprising a plurality of parts separately fabricated and secured together in assembled relation to provide a tooth which will stand up under excessive wear and abuse and which will effectively resist, under all normal operating conditions, the digging forces to which the same is subjected.

An object within the purview of the present invention is to provide an excavating tooth of novel construction wherein the working part comprises a plate member secured to the tooth body as by means of a housing, which housing is of box-like construction providing adequate securing means for the working part and one which will resist to an ample degree in a reinforcing capacity all forces to which the working part is subjected.

Still a further object of the present invention is to provide a replaceable excavator tooth of assembled construction comprising a plurality of parts secured together in assembled relation wherein the parts have structural and physical characteristics selected in view of the particular location of the same in the assembly with specific reference to the work to be done and the forces and abrasion to which the same are subjected, it being recognized that the parts may be of like or different character, depending upon the use to which the particular tooth is to be put.

The invention still further comprehends the idea of securing not only the advantages of an assembled tooth construction, but those resulting from fabricating the point body as a housing and using said housing as a means for securing the point to the tooth body, thereby providing ample securing relation between the tooth point and tooth body to resist forces tending to cause a "working" between the point and body and to effectively hold the point in its digging position at all times.

As a still further object comprehended by the invention, the securing portion of the assembled tooth may be more effectively interlocked with the tooth body as by means of novel structure incorporating interlocking means whereby the tooth, in its normal position, is interlocked with the body and is assembled and disassembled in respect thereto only by movement of the tooth in a single direction.

More particularly, the contemplated structure above described incorporates one or more undercut recesses in the body adapted to receive in one position only one or more projections on the tooth, thus interlocking the tooth point to the body.

A still further object of the present invention is to provide a novel tooth point including a working tip and a housing secured thereto, which housing extends beyond said working tip to provide securing means having certain bearing surfaces adapted to cooperate with a securing pin for effectively holding the tooth point in its secured relation to the tooth body.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawings:

Figure 1 is a fragmentary view in side elevation of a digging tooth made in accordance with the present invention;

Figure 2 is a fragmentary top plan view of the structure shown in Figure 1 of the drawings;

Figure 3 is a view in cross section taken in the plane represented by line 3—3 of Figure 2 of the drawings;

Figure 4 is a fragmentary top plan view of a modified construction for an excavating tooth made in accordance with the present invention; and

Figure 5 is a fragmentary view partly in section and partly in elevation of the modified construction shown in Figure 4 of the drawings.

Referring now more in detail to the drawings, an illustrative embodiment selected to disclose the invention is shown in Figure 1 as comprising a tooth point 2 and a tooth body 4, the assembly as shown being one of a plurality which are disposed along the digging edge of an excavating implement or the like 5. The tooth point 2 comprises a working tip 6 in the form of a plate provided with a chisel edge 8 and which plate, when the point 2 is disposed in working relation to the body 4, is at such an angle that the same is effective in digging operations in loosening dirt, earth, or other substances being excavated.

This tooth point further includes a body 10 which, in the illustrative example, is substantially

of box-like construction including the transverse wall 12 and side walls 14 and 16. The forward part of these walls is substantially of V-shaped construction, one edge of which is cut away as at 18 to provide abutting surfaces 20 disposed in abutting relation to the under surface of the plate 6. The plate 6, as clearly disclosed in Figure 3 of the drawings, overhangs the side walls to provide a structure which can be easily and readily welded as at 22 and 24, thereby holding the plate 6 in associated relation with the housing forming the body 10. The edges of the side walls in opposite relation to the edges secured to plate 6 are disposed in substantial conformity to the general contour of the bottom of the tooth body 4 to assist in the digging operation. This body 10 of the point has its rear portion including the side walls 14 and 16 and the connecting wall 12 formed to provide a securing means adapted to be received within a socket 26 of the tooth body 4. This socket is formed in part by the substantially parallel disposed side walls 28 and 30, the bottom wall 32 having a surface 34 disposed in substantially parallel relation to the axis of the tooth body and the top wall 36 having a surface 38 inclined with respect to the axis of the body 4 and converging toward the rear part of the socket.

The side walls 28 and 30 are provided with recesses 40 and 42 laterally disposed with respect to the socket 26 and having the longitudinal axis thereof in substantially parallel relation to the plane of the top wall 36. The securing portion of the tooth point conforms substantially to the socket 26 of body 4 and the upper edges of the walls 14 and 16 are inclined and converge with respect to the wall 12 thereof, as well as the axis of the tooth point so as to have a comfortable fit between wall surfaces 34 and 38 of the tooth body.

The abutting surfaces 20 of the side walls 14 and 16, as at 44, are inclined with respect to the axis of the tooth point and are in a plane substantially parallel to the plane of the rearwardly disposed edges of the side walls 14 and 16 as at 46 to receive the rear edge 48 of plate 6, all as disclosed in Figure 1 of the drawings. The overhanging portions of the rear edge 48 of the plate 6 are received within recesses 40 and 42 to effectively interlock the tooth point to the base 4 to resist twisting, turning or torsional forces applied to the working part 2 of the tooth assembly. In this connection, it will be observed that the tooth point is interlocked because of the undercut disposition of the recesses 40 and 42 with respect to the axis of the tooth point. Accordingly the tooth point can be inserted into and withdrawn from operative position with respect to the body 4 only in a direction parallel to the plane of the surface 38 of the wall 36. Any movement in a direction parallel to the axis of the tooth point causes a wedging effect between the overhanging parts of the plate 6 and the recesses, preventing such movement and causing a tightening of the tooth point in relation to its mounting.

In assembling the tooth point in the base, the securing portion of the point is inserted into the socket 26, the movement of the point being in a direction parallel to the plane of surface 38 and the overhanging parts of the plate 6 being in close approximation to surface 38 whereby said parts are received in recesses 40 and 42. After the tooth point has been inserted in position within the socket 26, the same is secured to the body 4 by a wedging pin 51 which may be driven into openings 50 and 52 of the side walls 30 and 28 of the body 4, and openings 54 and 56 in the side walls 14 and 16 of the housing 10, all of which openings are in substantial registry with one another when the point is inserted in operative position as indicated.

In constructing the embodiment shown in Figures 1 to 3 inclusive, the plate 6 and housing 10 may be of metal having like or different characteristics, depending upon the selection to meet the requirements of the job for which built. For example, applicant contemplates fabricating the plate 6 of tool steel of special hardness so that the tip or point will retain its sharpness over an extended period of time and will effectively withstand abrasion and wear from the digging operation, while the housing 10 may be made of a tough metal, as for example, cast manganese steel. Any other compositions of the metal elements of this digging tooth may be provided for the elements in the construction of this assembled tooth.

As an alternative construction, an embodiment has been disclosed in Figures 4 and 5 of the drawings incorporating the principles of construction of the present invention, the same conforming in a good many respects to the embodiment shown in Figures 1 to 3 inclusive.

In this embodiment the assembly comprises a tooth point 60 connected or secured in association with a tooth body 62, this tooth point 60 being one of a plurality disposed along the forward edge of an excavating implement 64 formed with a plurality of said tooth bodies 62. In the illustrative example, the adjacent tooth bodies 62 are connected by the intervening webs, such as 66 and 68, to provide a strong and reinforced excavating implement wherein the forward edge is adapted to assist in the cutting or digging operation.

The tooth point 60 comprises a working tip 70 in the form of a plate provided with a chisel cutting point 72, this plate member 70 being secured to a housing 74 providing a point body adapted to be secured to the tooth body, as hereinafter more fully disclosed. This housing 74 is formed with side walls 76 and 78 connected together adjacent the forward end thereof by the angularly disposed wall 80, said walls being in abutting relation to the plate 70 which is slightly greater in width to overhang said side walls 76 and 78 to provide a joint for receiving weld material 82 extending around the housing and being adapted to effectively secure the working point 70 thereto. The abutting edges of the walls 76, 78 and 80 may be disposed so that the plate forming the working tip can be positioned at any desired angle to the axis of the tooth, and as shown in the drawings, the plane of the top surface of said plate is a substantial continuation of the top surface of the tooth body 62. Furthermore, the housing wall 80 may be disposed at any degree of angularity with the axis of the tooth to meet specific digging requirements, and as shown in the drawings, the under surface of wall 80 is a substantial continuation of the lower surface 84 of the tooth body 62.

The walls 76 and 78 adjacent the end of plate 70 are disposed inwardly to form the wall sections 86 and 88 connected together by means of a wall section 90 forming a continuation of the connecting wall 80, these walls forming a securing portion for the point substantially U-shaped in cross section. The securing portion, as shown in Figures 4 and 5, is tapered in a vertical and

a horizontal plane and is adapted to be received by a socket 92 formed in the tooth body 62. The tooth point is secured in the socket 92 as by means of a key 94 received in substantially aligned openings 96 and 98 formed in the top and lower walls of the body 62, respectively, and an aperture or opening 100 formed in the connecting wall section 90, this key 94 having extended bearing relation with the securing means through the medium of an upstanding wall 102 extending between wall sections 86 and 88 and disposed vertically and made a part of the wall section 90. This extended bearing relation between the key 94 and wall 102 serves to more effectively hold the point in place during digging operations and tends to resist working, twisting or other unauthorized movement of said tooth point in the tooth body, which would cause a loosening between the parts instrumental in causing excessive wear between the assembled parts of the tooth.

As in the illustrative embodiment of Figures 1 to 3, the tooth point is of assembled construction including the working tip of plate formation secured to a box-like housing 74 forming the body of the tooth. Because of this assembled construction the plate and housing may be formed of metal having like or different characteristics and, as in the previous embodiment, the plate may be of tool steel and the housing of cast manganese steel.

In both of the embodiments herein described, the particular construction lends itself admirably to manufacturing tooth points at relatively less cost than other previously known constructions. Furthermore, the arrangement is such that the points may be readily removed from their mountings for replacement or repair. Furthermore, the formation of the tooth point with a housing member which forms a support for the working tip and also provides a securing means for the point results in a construction whereby the point is securely and effectively held in working position and effectively resists stresses and strains causing a working of the point with respect to its mounting. This is a particularly desirable feature of construction and is brought about by providing the securing means of substantially U-shaped construction having upstanding walls and a connecting web or wall therebetween, this formation cooperating effectively with the securing key to prevent such working of the point with respect to its mounting. Furthermore, with respect to the embodiment of Figures 1 to 3 inclusive, additional elements have been provided to interlock the assembled tooth in relation to its mounting, all of which features alone and cumulatively characterize the present assembly as being desirable from the standpoint of long life and efficient operation during its use, the construction embodying the plate member as a working tip having the further advantage of retaining at all times a relatively thin sharp edge for all digging performances.

While I have herein described and upon the drawings shown illustrative embodiments of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. In combination, a tooth body provided with a socket, a point comprising a working tip in the form of a plate member, a housing comprising spaced walls secured to said plate member, said housing having a box-like part formed as a continuation of said walls disposed to the rear of said plate member and within said socket and providing a securing means for said point, and means cooperating with said body and securing means for connecting said point to said body.

2. In combination, a tooth body provided with a socket, a point comprising a working tip in the form of a plate member, a housing comprising spaced walls secured to said plate member, said housing having a box-like part formed as a continuation of said housing, said part being of substantially U-shaped construction comprising spaced walls interconnected by a wall extending therebetween and being disposed to the rear of said plate member and within said socket and providing a securing means for said point, and means cooperating with said body and securing means for connecting said point to said body.

3. A tooth point for excavating implements, comprising a working tip in the form of a plate member, a housing comprising spaced walls forming the body of said point, said housing having a box-like part formed as a continuation of said walls and extending beyond the body to provide securing means for said point, said plate and body having operative association only through the edge abutment of said walls with said plate, said plate member overhanging the walls of said housing, and a weld joint provided between said walls and the overhanging parts of said plate member to secure said plate and housing together.

4. A tooth point for excavating implements, comprising a working tip in the form of a plate member, a housing comprising spaced walls forming the body of said point, said housing having a box-like portion formed as a continuation of said walls and of substantially U-shaped construction comprising said extended walls interconnected by a wall extending therebetween and extending beyond said plate member to provide securing means therefor, said plate and body having operative association only through the edge abutment of said walls with said plate, said plate member overhanging the walls of said housing, and a weld joint provided between said walls and the overhanging parts of said plate member to secure said plate and housing together.

5. In combination, a tooth body provided with a socket, a tooth point comprising a tip in the form of a plate member, a housing having side walls secured at their forward part to said plate member and extending at their rear beyond said plate member to form with a connecting wall a securing portion adapted to be received in said socket, said tooth body and said housing having registering apertures, and a key fitting in said apertures for holding said point in association with said body.

6. In combination, a tooth body provided with a socket, a tooth point comprising a tip in the form of a plate member, a housing secured to said plate member and having a securing portion received in said socket, said plate adjacent its rear end laterally overhanging said housing, and recesses disposed in said body and laterally of said socket adapted to receive said overhanging plate, and means for securing said point to said body.

7. In combination, a tooth body provided with a socket, recesses disposed in said body and laterally of said socket, a tooth point of box-like construction comprising spaced walls, said point hav-

ing a working tip and a securing portion formed as a continuation of said walls and adapted to be received in said socket, said point having lateral projections received in said recesses, and means for securing said point to said body.

8. In combination, a tooth body provided with a socket, recesses disposed in said body laterally of said socket and being inclined in respect to the axis of said socket, a tooth point having a working tip and a body of box-like construction comprising spaced walls provided with a securing portion formed as a continuation of said walls and adapted to be received in said socket, said point adjacent said securing portion having lateral projections inclined with respect to the axis of said point and adapted to be received in said recesses for interlocking said point and said body, and means for securing said point to said body.

9. In combination, a tooth body provided with a socket defined in part by inclined opposed wall surfaces, recesses adjacent one of said surfaces and extending substantially in parallel relation thereto, a tooth point of box-like construction having spaced walls and having a portion formed as a continuation of said walls adapted to be received in said socket, said tooth point having lateral projections adapted to be received in said recesses, and means for securing said point to said body.

10. In combination, a tooth body provided with a socket defined in part by inclined opposed wall surfaces, recesses adjacent one of said surfaces and extending substantially in parallel relation thereto, a tooth point comprising a working tip in the form of a plate member, a housing forming the body of said point and having a portion disposed in said socket, said plate having laterally disposed parts adapted to be received in said recesses, and means for securing said point to said body.

11. In combination, a tooth body having a socket, a tooth point comprising a working tip in the form of a plate member, a housing secured to said plate member and providing a securing portion for said point adapted to be received in said socket, said securing portion and said body having openings in substantial registry, and said securing portion having a transverse web disposed adjacent the opening therein, and a key disposed in said openings for securing said point to said body.

12. In combination, a tooth body having a socket, a tooth point comprising a working tip in the form of a plate member, a housing secured to said plate member and providing a securing portion for said point adapted to be received in said socket, said securing portion having side walls and a connecting wall therebetween, said body and said connecting wall having openings in substantial registry, said securing portion having a wall disposed between said first-named walls adjacent the opening in said connecting wall, and a key disposed in said openings for securing said point to said body.

13. A tooth point for excavating implements, comprising a working tip in the form of a plate member, a housing secured to said plate member and extending beyond the same to provide a securing portion therefor, said securing portion having opposite side walls and an apertured connecting wall therebetween, and a wall extending between said side walls adjacent the opening of said connecting wall.

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