BRUSHES of INCREASED LENGTH

Brushes with increased length for useful brush wear are termed "long brushes"*. These long brushes result in an improved coefficient of utilisation thus minimising machine outage time for brush replacement, which is particularly important for large machines on continuous duty.

Such brushes do however present problems due to their increase in weight, which, if not accounted for, could lead to mechanical instability.

When long brushes are used there is need to pay greater attention to the following :

– concentricity of commutator (or ring) and perfect condition of its surface,

– rigidity of the brush holders'box,

– adequate length and accuracy of brush box walls, avoiding instability and tilt,

– a well balanced force applied to the top of the brush, sensibly constant and well directed.

– a pressure system offering minimum inertia and/or a pressure system between brush and finger affording adequate vibration damping.

From the above two points of practical importance arise :

1. – It is not recommended that short brushes be replaced by long brushes in a short box for the following reasons :

– Insufficient length of brush box wall to adequately guide the brush,

– a change in the direction of the applied force to the top of the brush may follow, which could lead to instability or even brush jamming in its box *(Fig. 1)*.

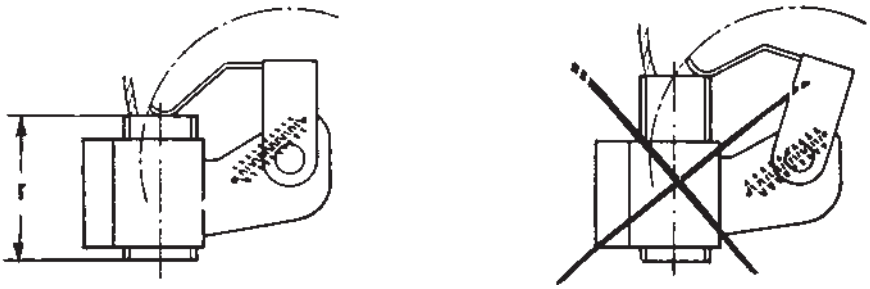

Fig. 1

* In practice, the term "long brush" is applied to a brush whose length " r " exceeds 50 mm (2"), having a useful wear length of 35 mm.
The longest brushes presently manufactured are up to 115 mm long giving an effective wear depth of 85 mm.

2. – On the same way it is not recommended that short brushes and brush holders be replaced by long brushes in long brush holders (even carefully) in following cases :

– insufficient rigidity of support points due to increased weight of brushes/brush holders.

– excessive friction between brush and commutator (or ring) due either to the properties of the brush or unusual operating conditions of machines (prolonged no load operation, corrosive atmospheres, etc.) (See Technical Note STA AE 16-7 E).

By the way, please, note that mechanical stability can be improved by inclining the brush on the commutator : backward 7° to 15° inclination for trailing brushes and forward 20° to 30° inclination for reaction brushes.

Such brushes are of particular interest for unidirectional machines.

Please, also note that the brush holder with self-recoiling spring with its high box walls and its simple, robust and precise pressure system generally meets the requirements of brushes of increased length.

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