SI/Note DL/68-14
15.8.1968

APERTURES IN THE BOOSTER

C. Bovet

Once the vacuum chamber aperture has been carefully designed for the bending magnet (see SI/Mi DL/68-17) and the reviewed version of the chamber on Fig. 3), the required aperture in the other elements of the lattice could be calculated.

The aim is to have all the apertures at points ① , ② , ④ , ⑤ , ⑥ , ⑦ , ⑧ larger or equal to that in point ③ i.e. in the bending magnet (see Fig. 1)

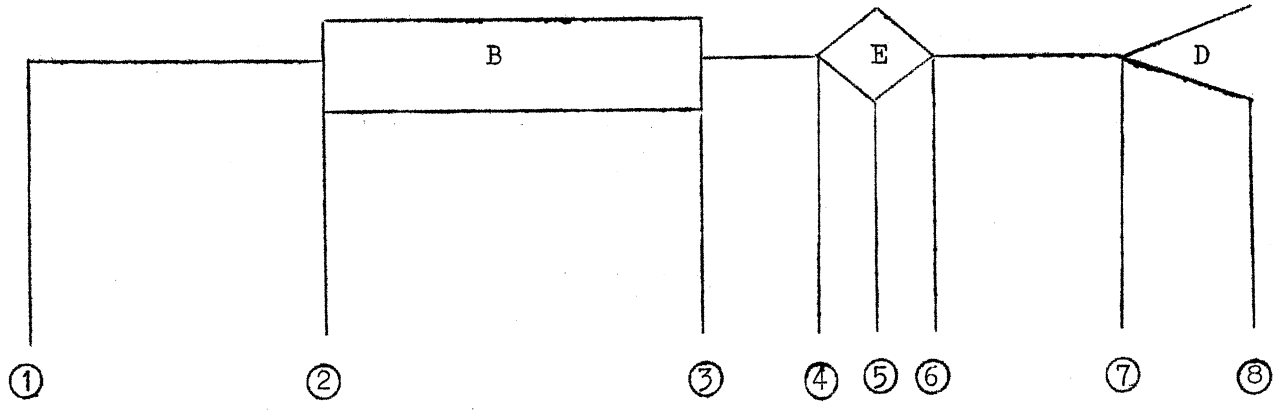


Fig. 1 - Different locations of the lattice

The principle of the calculation is that each point P_3 of the aperture in the bending magnet limits the possible betatron ampli-

tudes to a maximum value E^{*} (see Fig. 2)

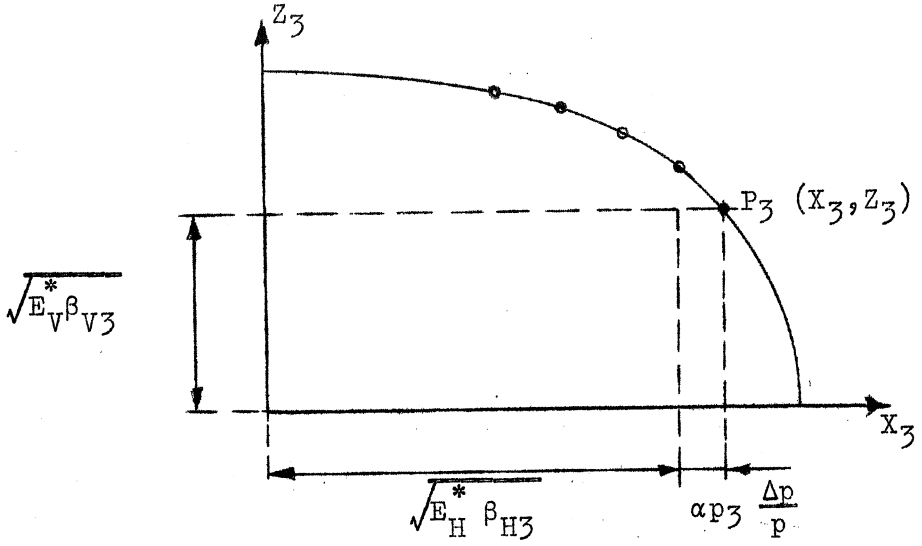


Fig. 2 - Aperture at location ③

E^{*} includes the normal emittance of the beam and the amplitude of the closed orbit.

At the location ① the point P_i corresponding to P_3 has the following coordinates:

$$X_i = \sqrt{E_H^{*} \beta_{Hi} / \beta_{H3}} + \alpha_{pi} \frac{\Delta p}{p}$$

$$Z_i = \sqrt{E_V^{*} \beta_{Vi} / \beta_{V3}} \ .$$

The calculation can be done for a series of points P_3 so as to describe the whole contour.

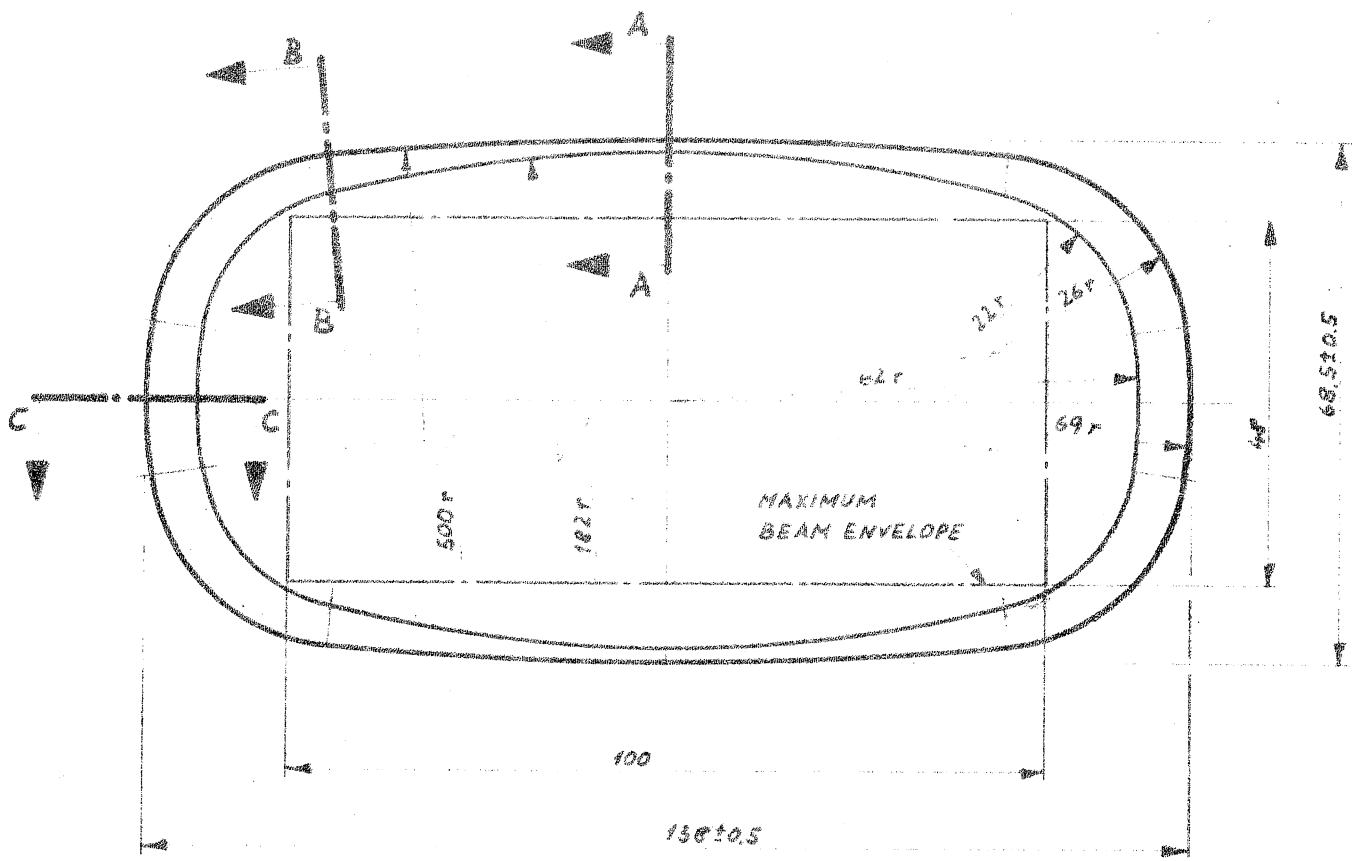
The complexity of the problem is increased by the fact that the machine will be used with different values of $4.1 < Q_H < 4.9$ and $4.1 < Q_V < 4.9$, which imply different functions $\beta(s)$ and $\alpha_p(s)$.

No simple argument can be made to select the Q's for which the largest aperture is required. The graph plotter has therefore been used to draw the 16 curves corresponding to the combinations of the Q's given the values 4.1, 4.3, 4.7, 4.9 (see Figs 4,5,6,7).

Distribution

SI Scientific and Technical Staff

Fig. 3



ALTERATION 'B' : REDRAWN WITH DIFFERENT DIMENSIONS: 138 WAS 140; 68,5 WAS 69; 69 r WAS 70 r; 62 r WAS 63 r; 22 r WAS 22,6 r; 182 r WAS 187,5 r.

Nombre de pièces			Designation	Pos.	Matière	Poids	Observations
III	II	I					

Mod.	Date	Nom	Tolérances générales
A			de à ±
B			de à ±
C			de à ±

Ensemble | S. Ensemble

Etat des surfaces selon VSM 10320
Rugosité en μ" VSM
Abréviations VSM 10319

Dessiné	8.8.1968	Zanuel
Controlé		
Vu		

Remplace
Remplacé par
Réduction

Echelle 1:1

VACUUM CHAMBER
68,5 × 138 ℄ 1,5 × 7.0

CERN ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE - GENÈVE

SI.60002.3.B

Dossier No | Dossier No | Dossier No

3 2 1

Fig.4

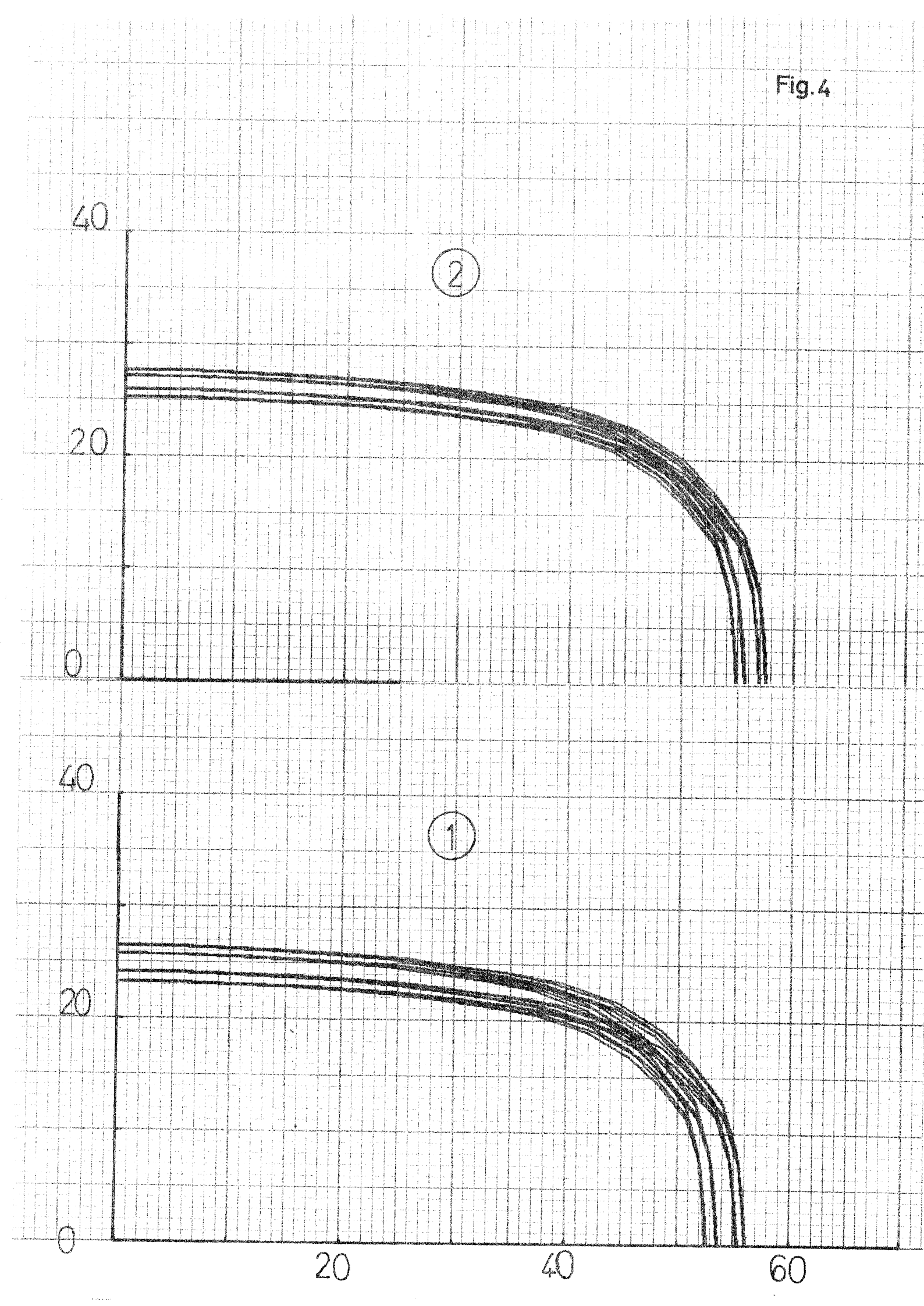


Fig. 5

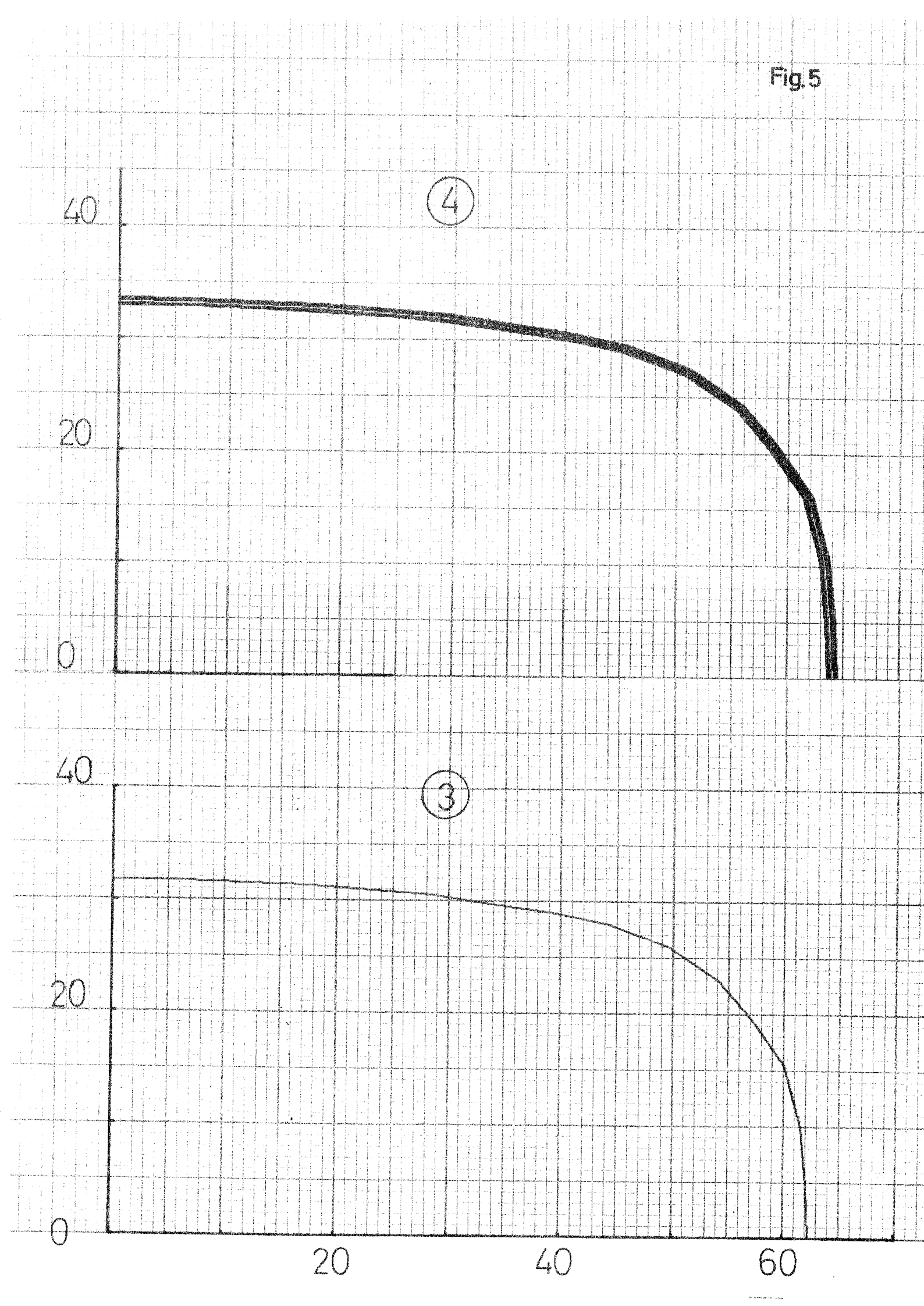


Fig.6

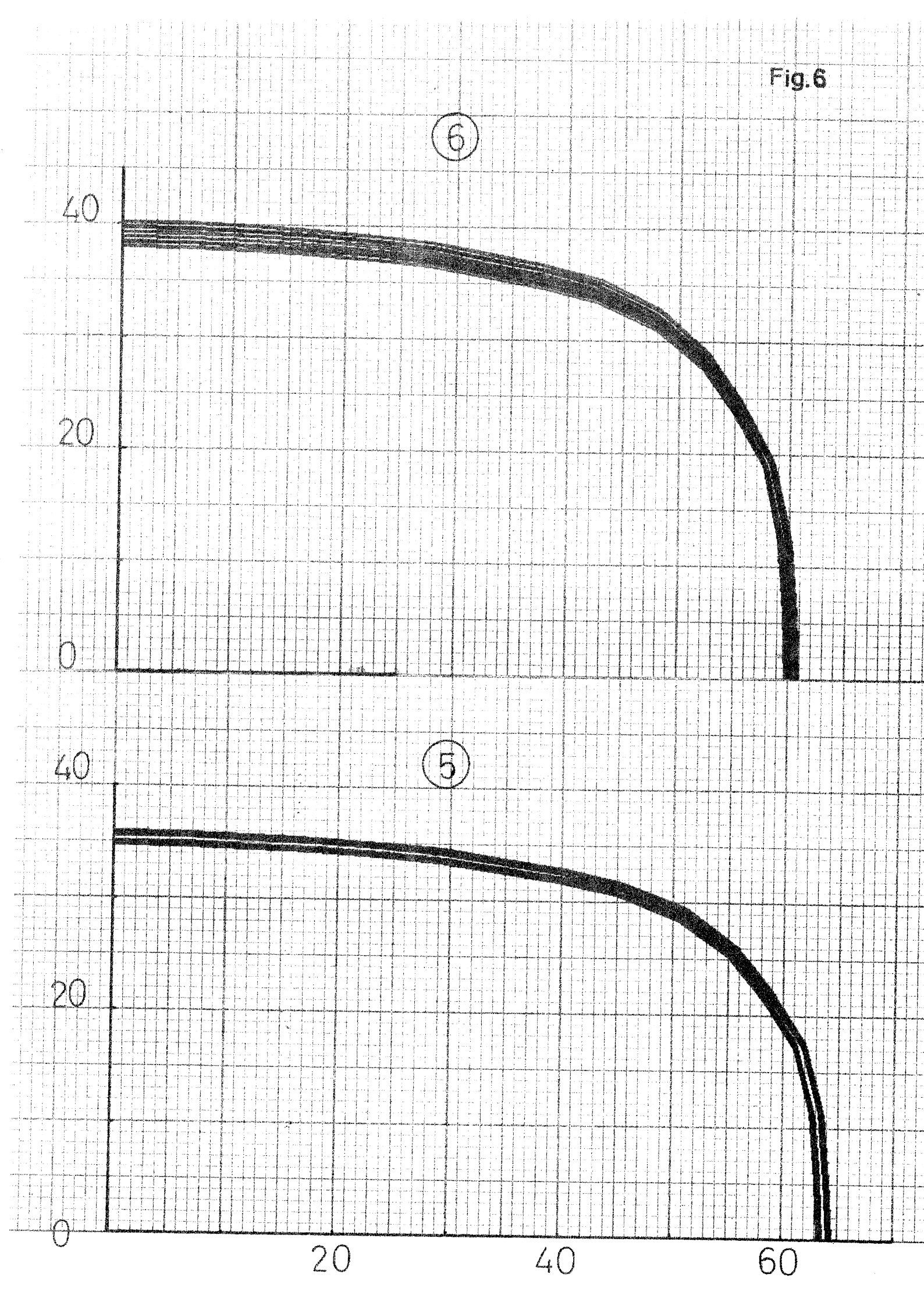


Fig.7