Waved Springs and Membranes

Waved springs may be useful where

- The available space is restricted axially,
- High spring forces and small deflections are required (as in compensating end play, taking up looseness, vibration damping, etc.),

HAUSSERMANN Wave Springs can be produced in any size. The number of waves depends on the specified compression and deflection. Three, four or six corrugations are popular. A hard spring for high compression and small deflections may have six corrugations, while a softer spring may have three of them.
The waves are provided by a thermal process under HAUSSERMANN Patent that imparts excellent spring endurance. The factors controlling spring performance, are interlinked by the equations

E	=	modulus of elasticity	N/mm^2
s	=	spring deflection	mm
t	=	thickness of spring	mm
b	=	annular width	mm
N	=	number of waves	
D_m	=	mean diameter	mm

$$\text{Spring force } F = \frac{E \cdot b \cdot s \cdot t^3 \cdot N^4}{1{,}94\ D_m^3} (N)$$

$$\text{Stress in spring } S = 1{,}2 \cdot \frac{E \cdot s \cdot t \cdot N^2}{D_m^2} (N/mm^2)$$

Membranes are flat discs that may also assume the shape of an initially flat disc spring. To extend the deflection, finger shaped levers may be provided; note Fig. 20. The load-deflection curve is always progressive.

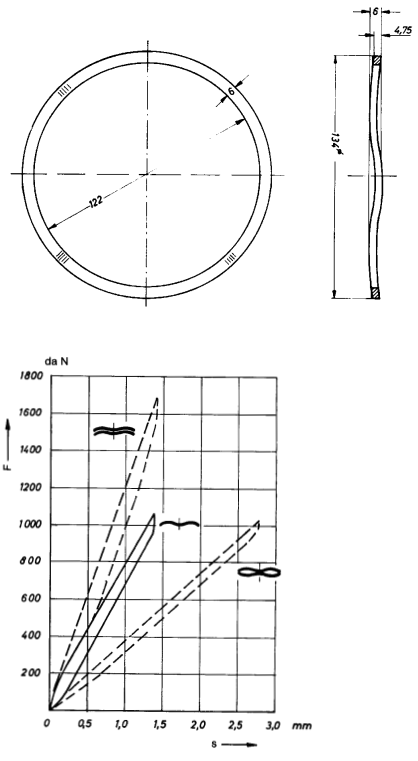

Fig. 19: Waved spring, and load-deflection characteristics of different spring combinations

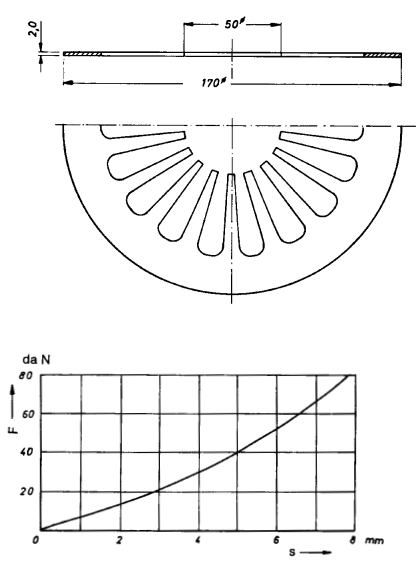

Fig. 20: Membrane with internal fingers, and load-deflection characteristic