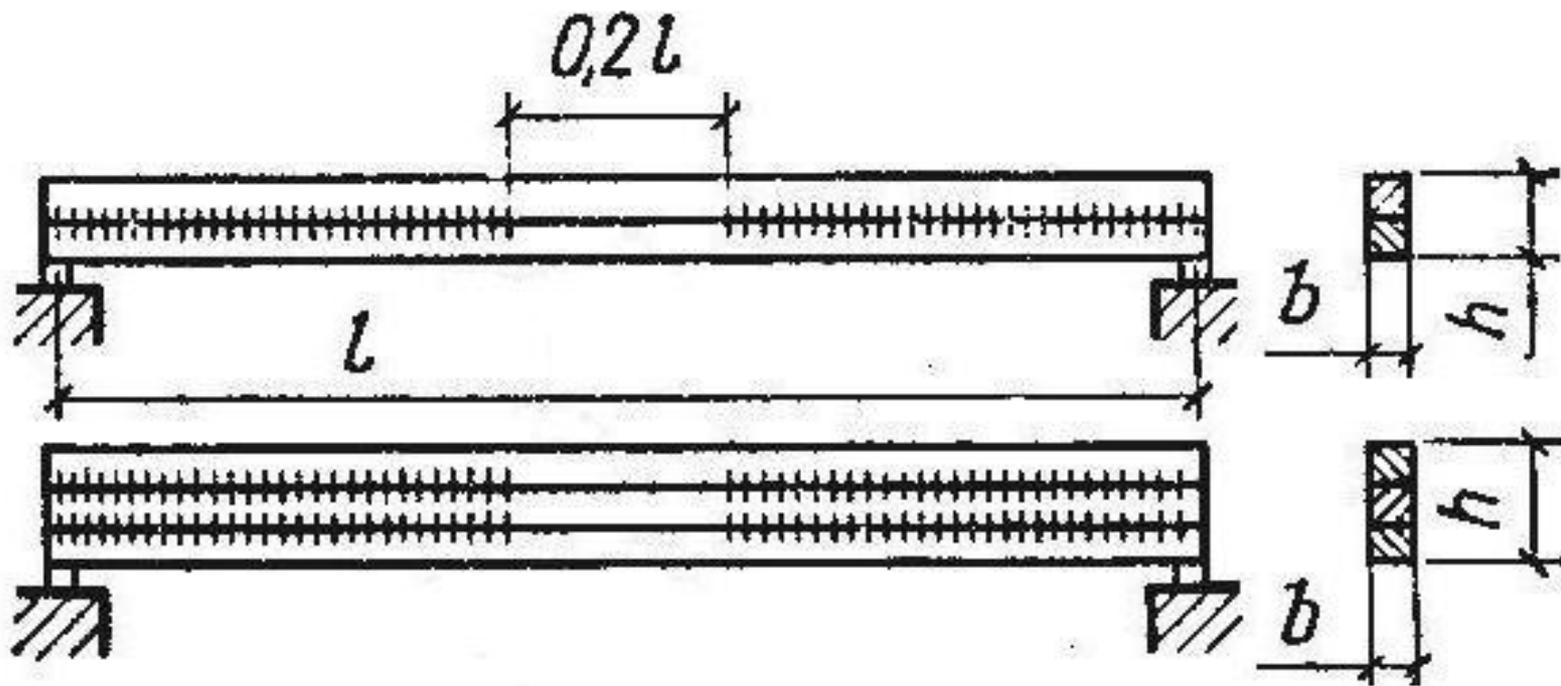
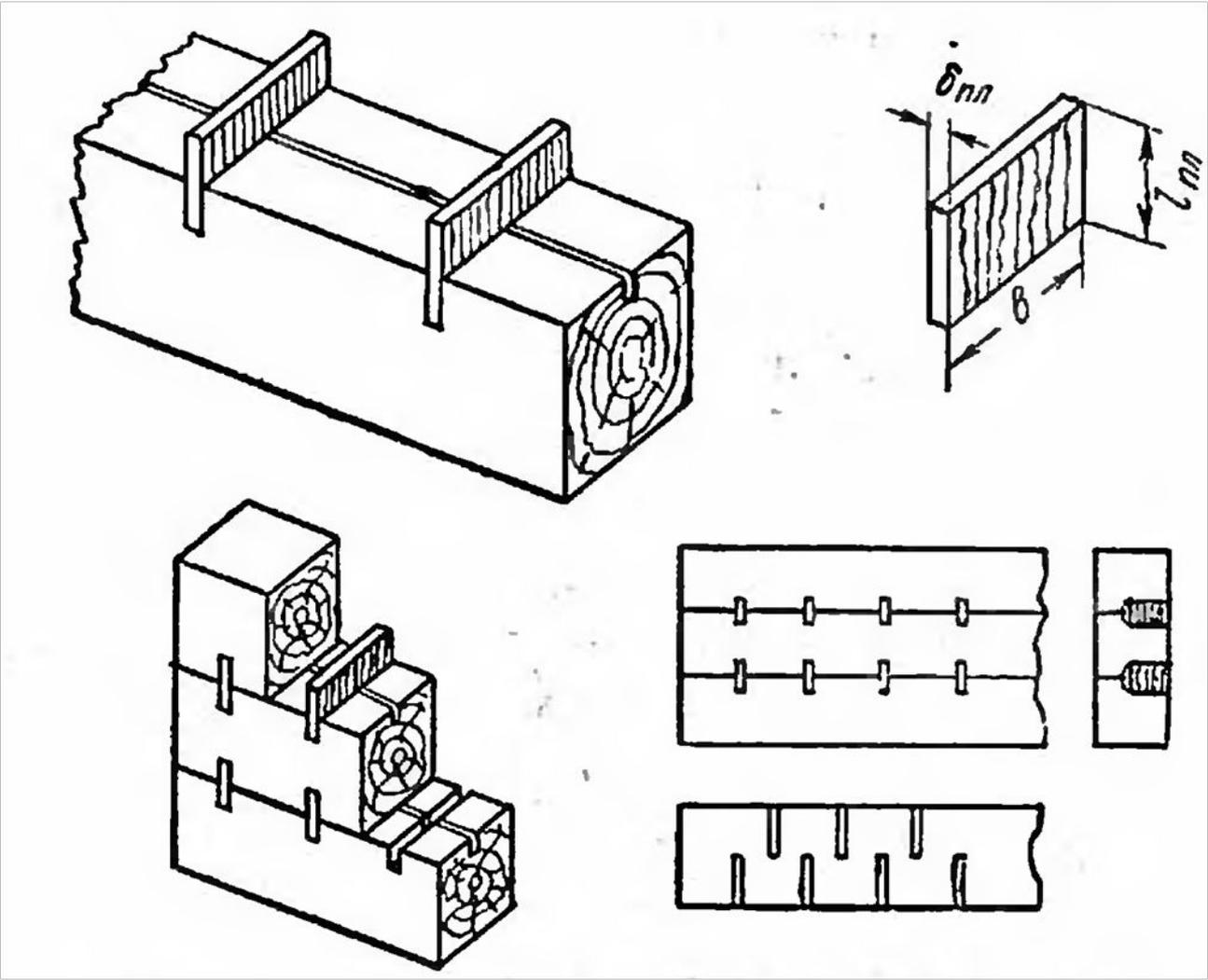
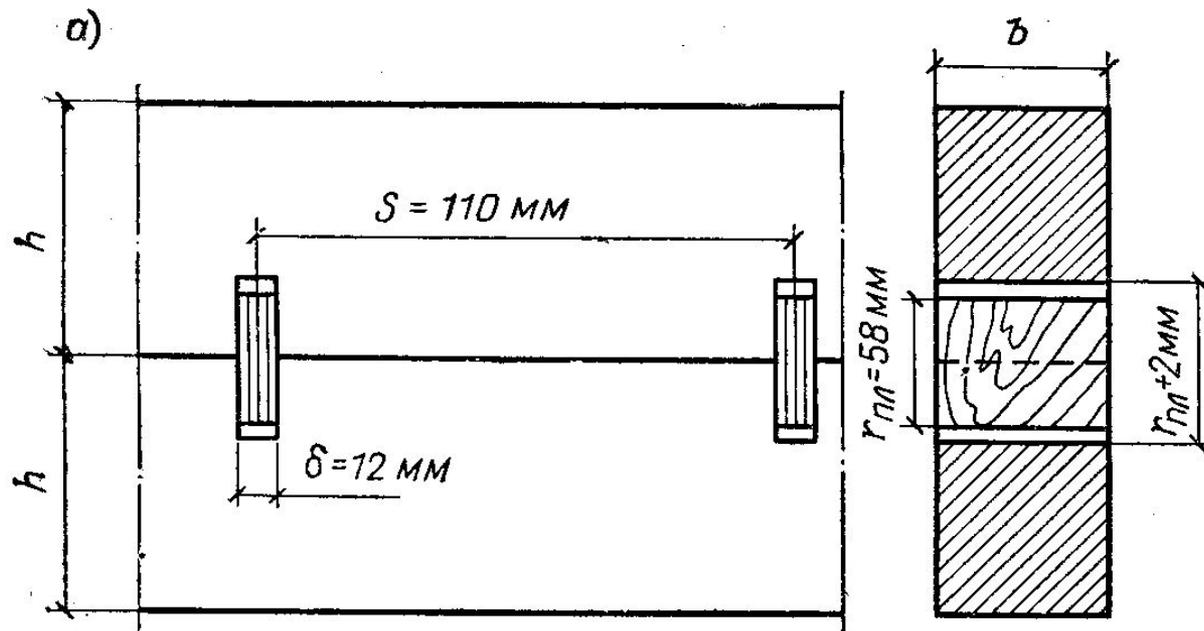


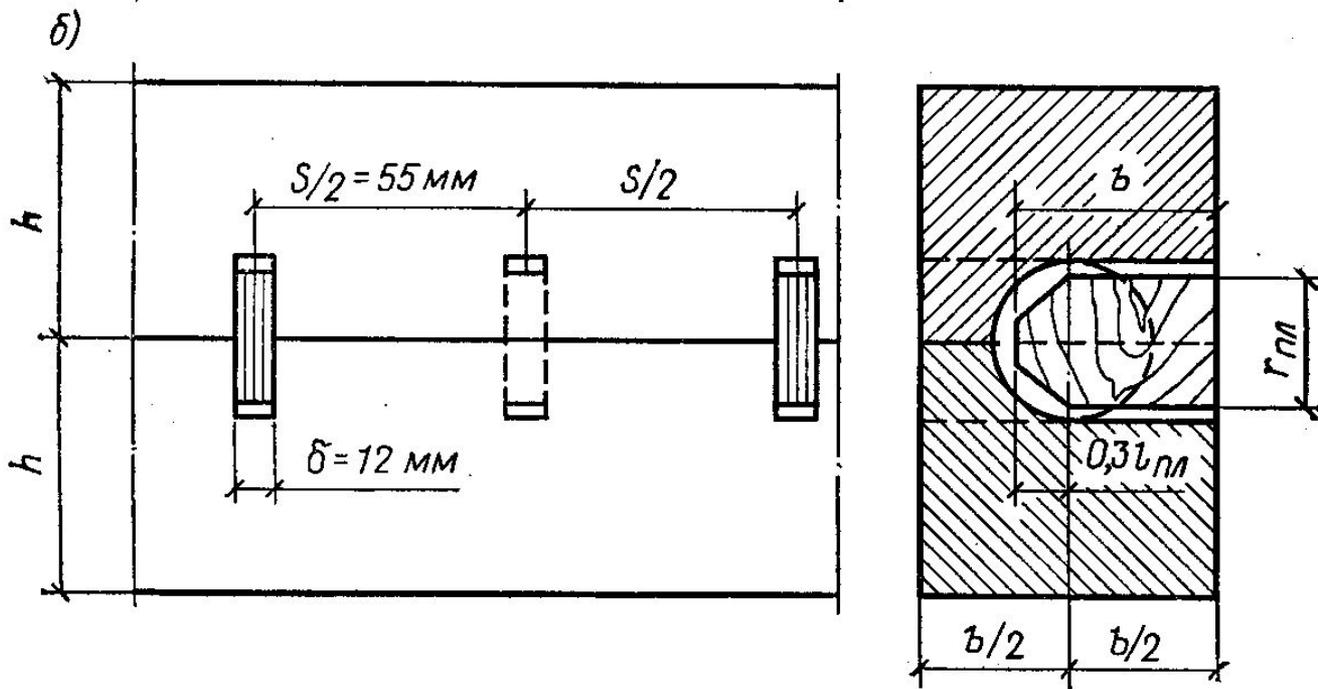
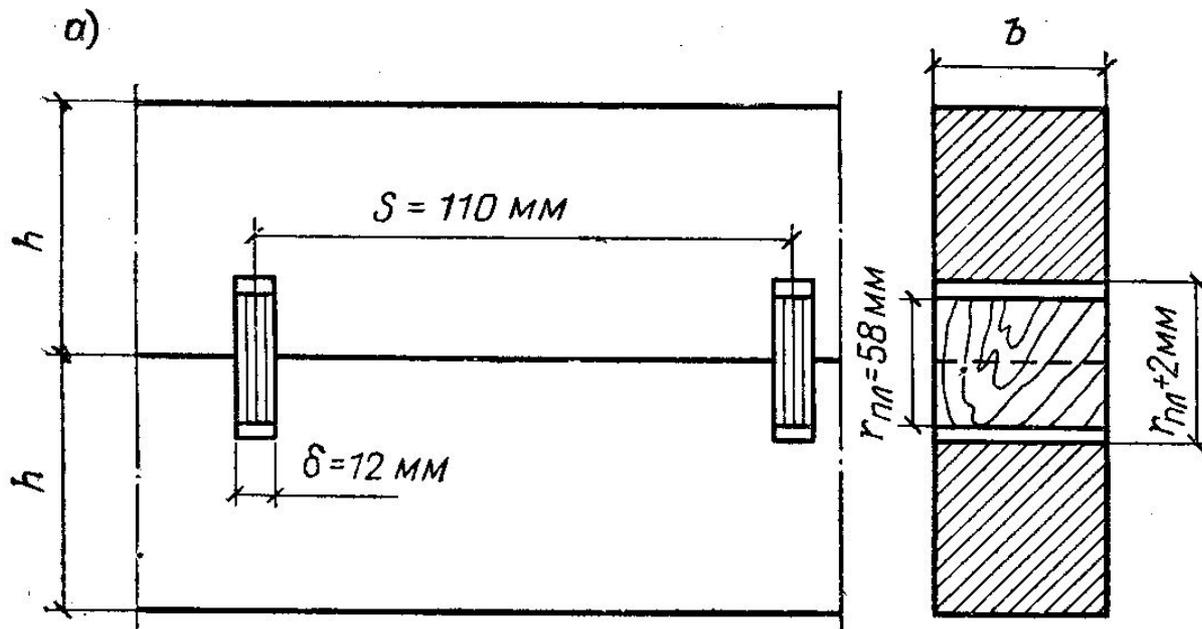
Балки составного сечения:  
конструкция и расчёт

# Балки на пластинчатых нагелях (балки Деревягина)









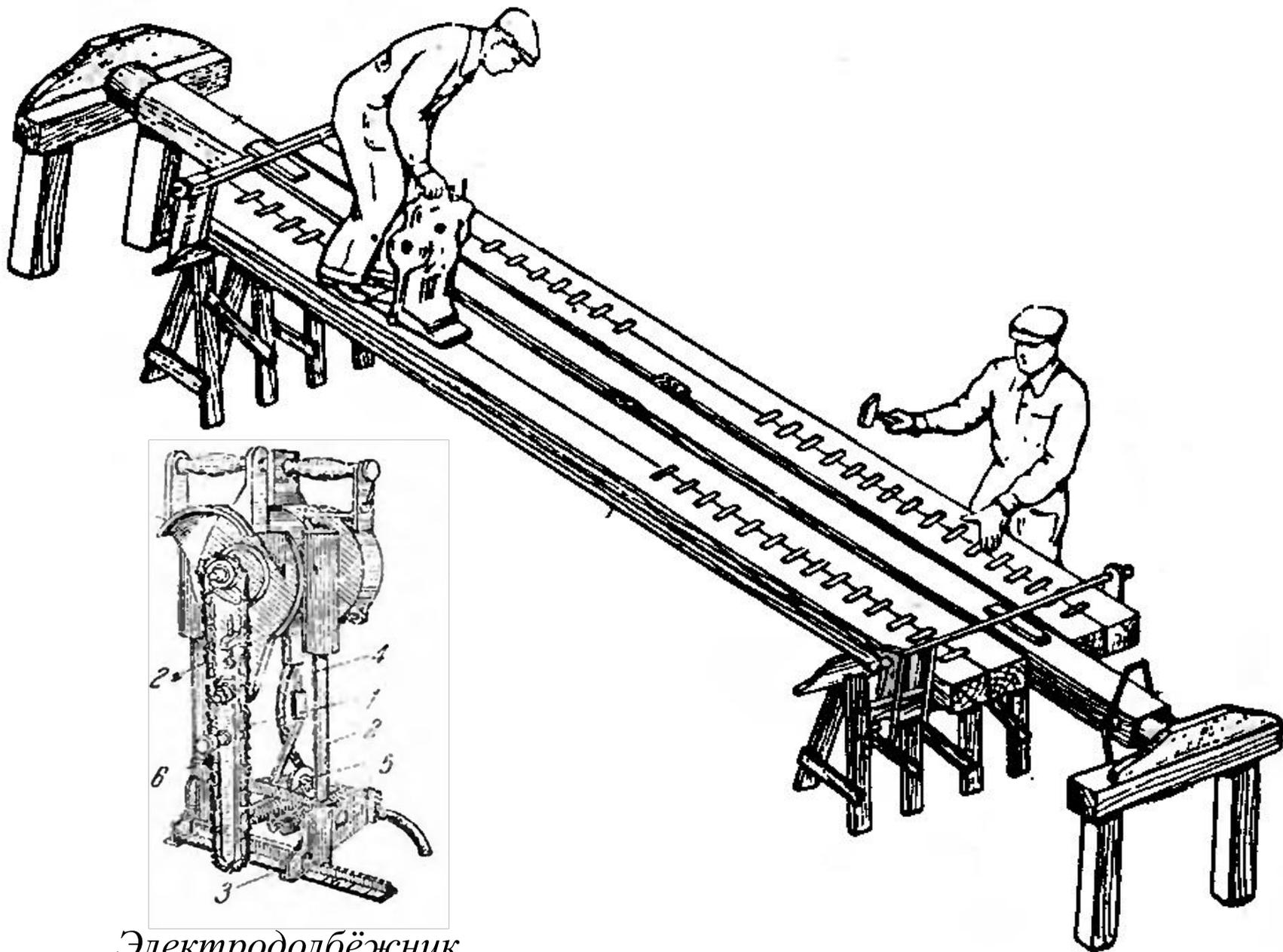
## Несущая способность дубового нагеля

– из условия смятия  $T' = 14 r_{nl} b$

– из условия изгиба  $T'' = 63 \delta_{nl} b$

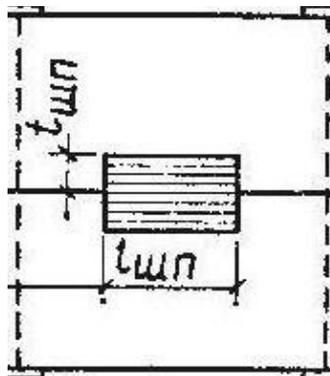
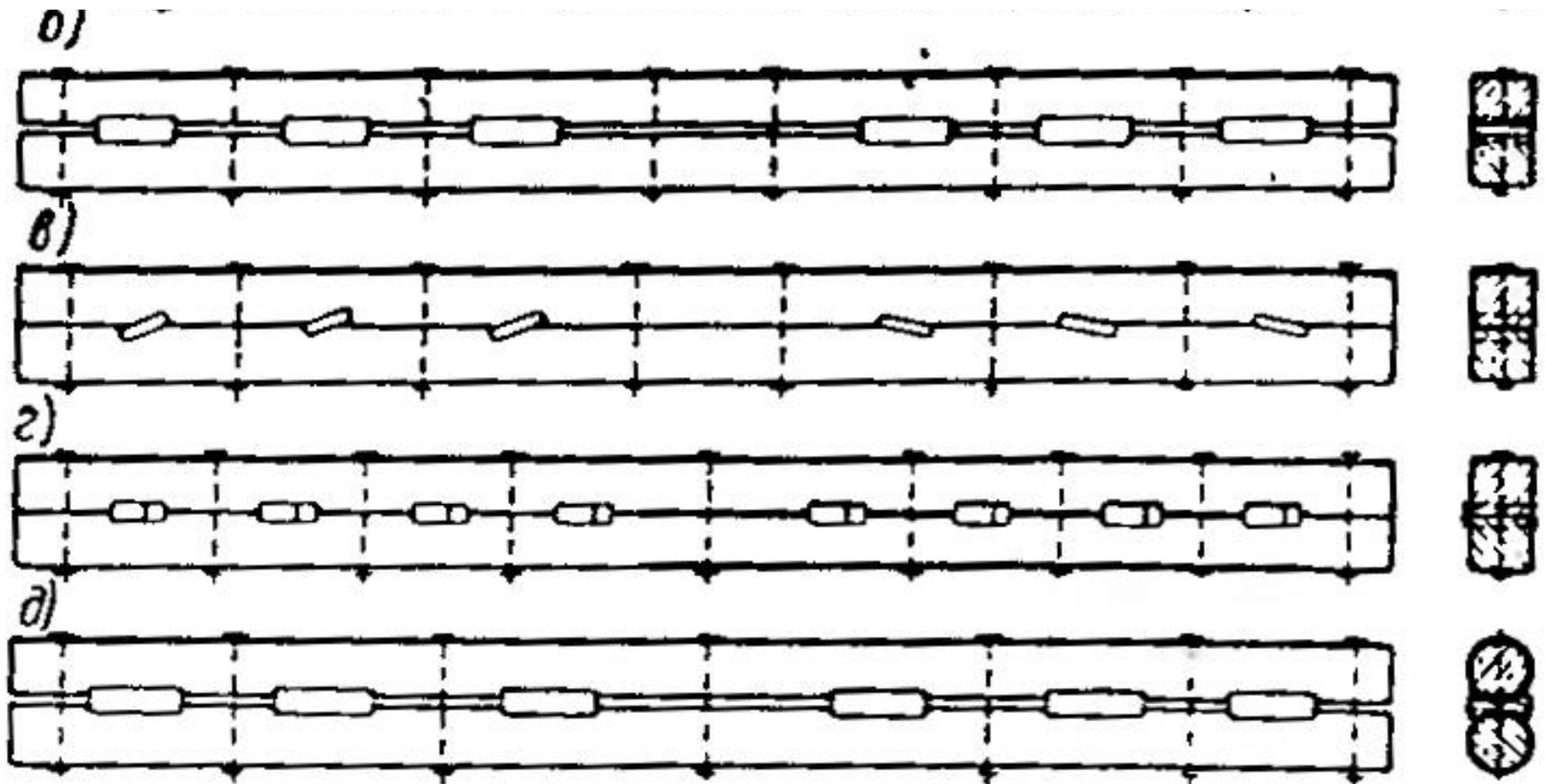
## Несущая способность берёзового нагеля

$$T_{бер} = 0,8T_{дуб}$$



*Электродолбёжник*

# Балки на шпонках

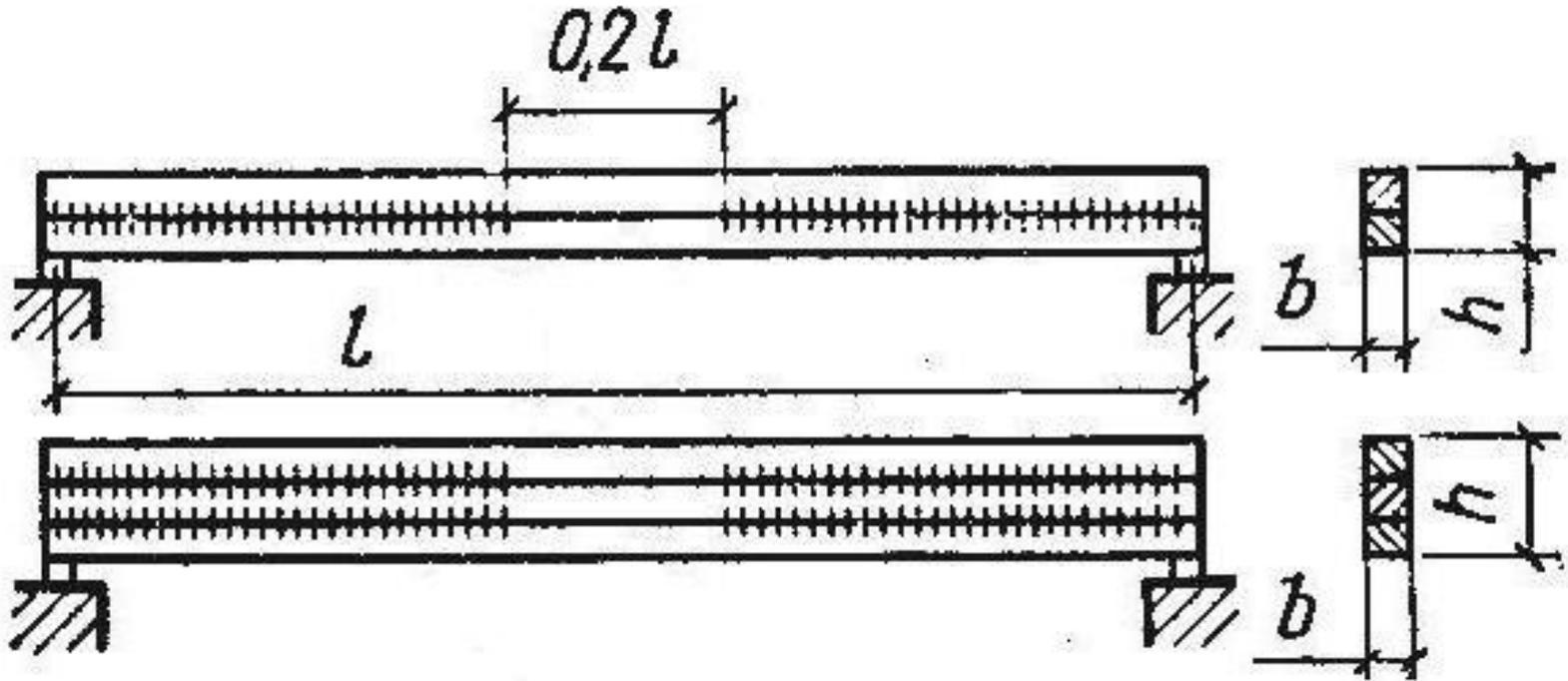


$$20 \text{ мм} \leq t_{шп} \leq \frac{1}{5} h_{бруса}$$

$$l_{шп} \geq 5t_{шп}$$

# Расчёт

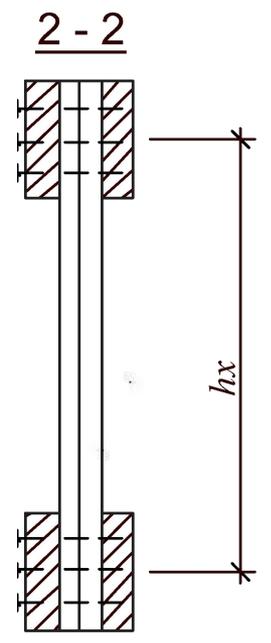
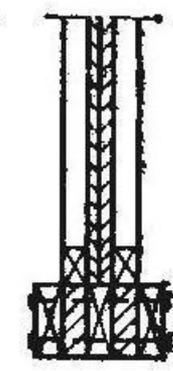
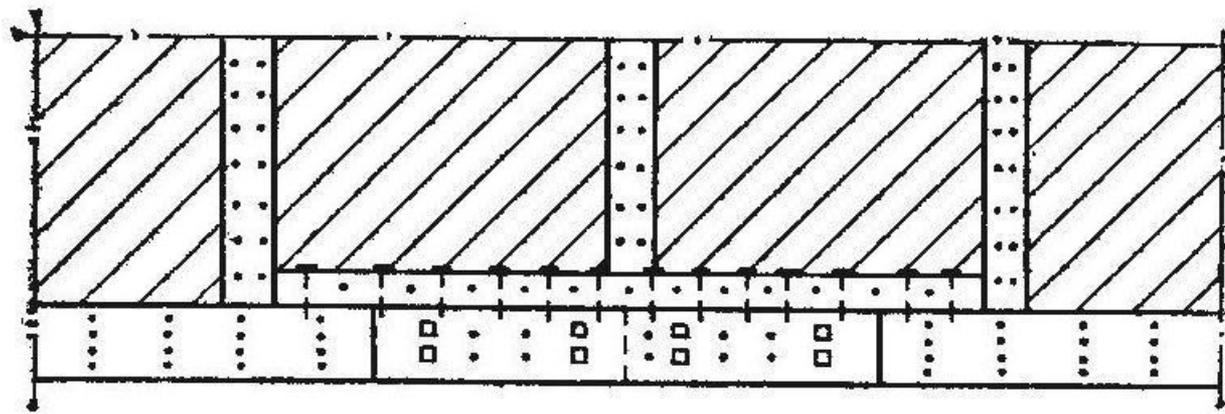
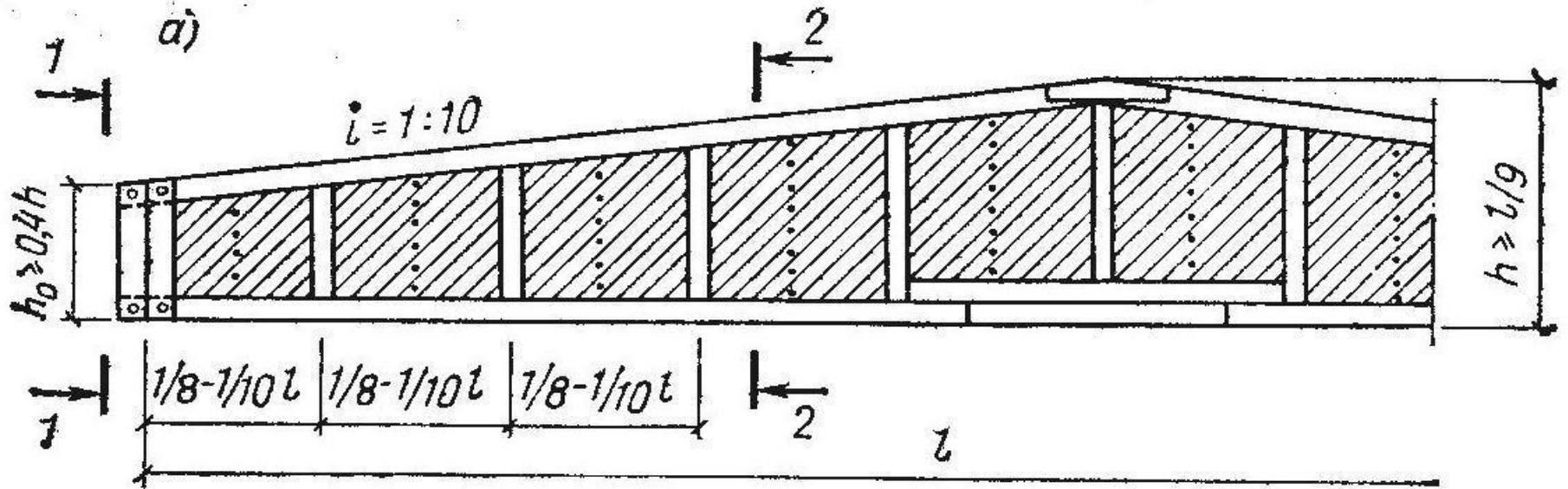
— по прочности  $\sigma = \frac{M}{W_{св}} \leq R_{нл}$

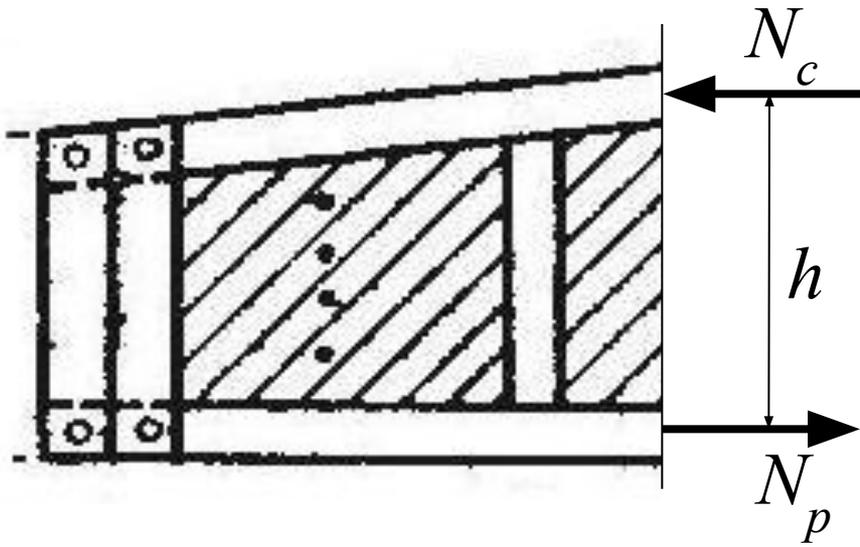


(при отсутствии связи  
в середине балки на  $0,2l$ )

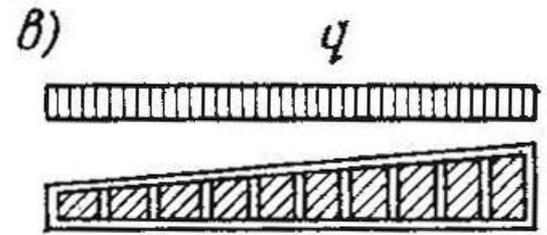
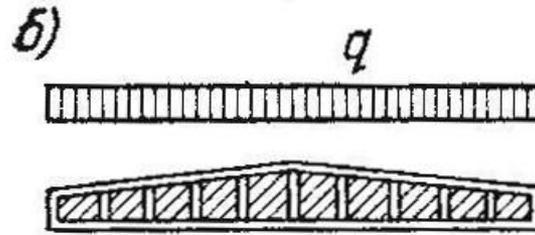
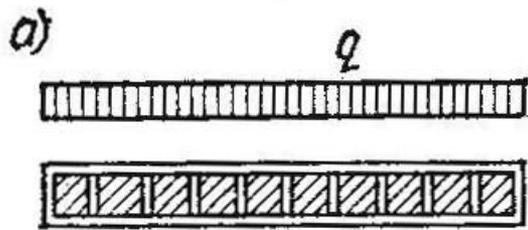
$$n_{св} = \frac{1,21710}{JT_{св}}$$

# Дощато-гвоздевые балки

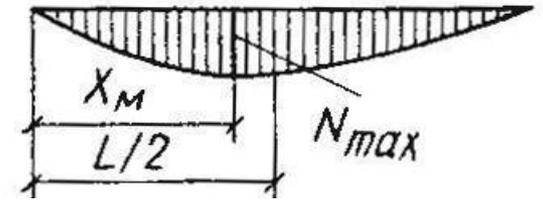
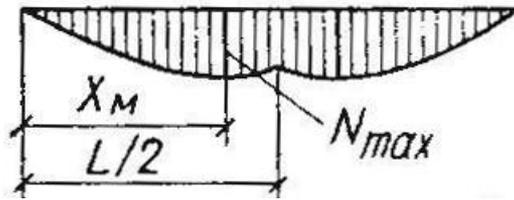
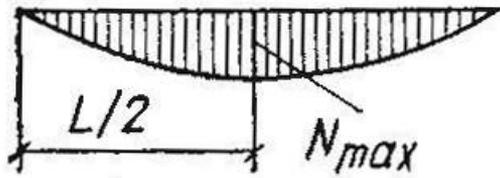




$$N_c = N_p = \frac{M}{h}$$

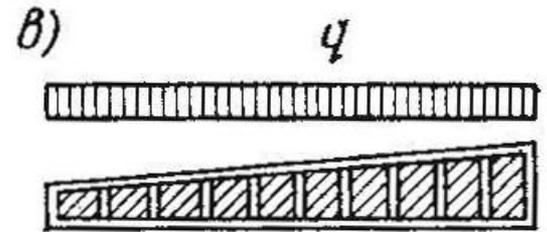
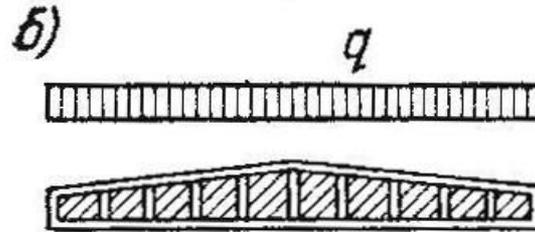
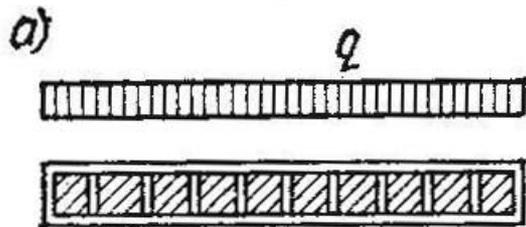


*Эпюры усилий N в поясах*

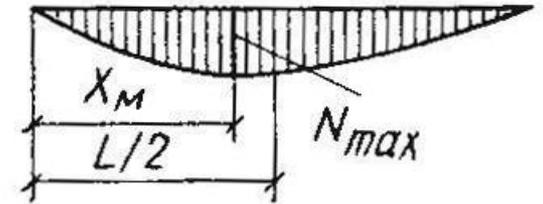
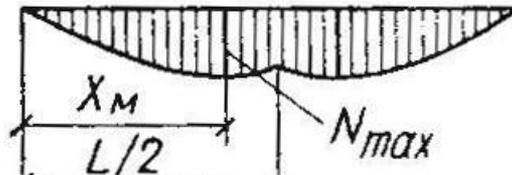
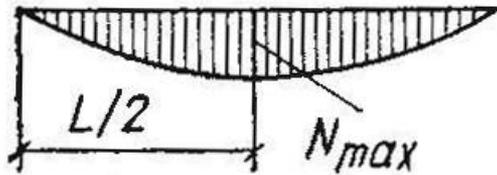


$$N_{\max} = \frac{M_x}{h_x}$$

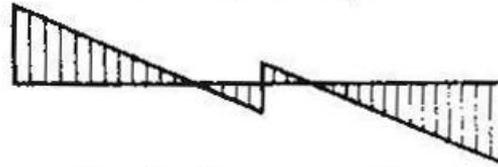
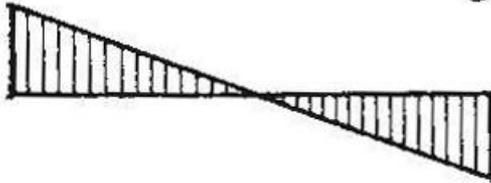
# Расчёт



Эпюры усилий  $N$  в поясах



Эпюры сдвигающих усилий  $T$



Зоны гвоздевого забоя



$$N_p = N_c = \frac{M_x}{h_x}$$

$$\sigma_p = \frac{N_p}{0,8 A_{бр}} \leq R_p$$

$$\sigma_c = \frac{N_c}{\varphi A_{расч}} \leq R_c$$