

پہلا

# Practical examples of noise control techniques

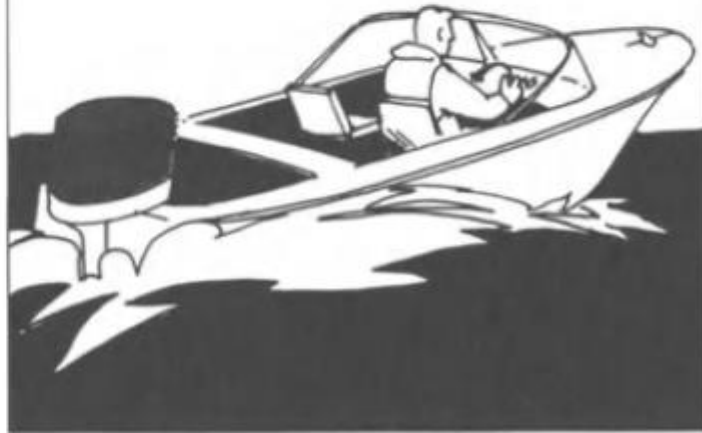
روح الہ حاجی زادہ

# Slow repetitions give low frequencies, fast repetitions give high frequencies

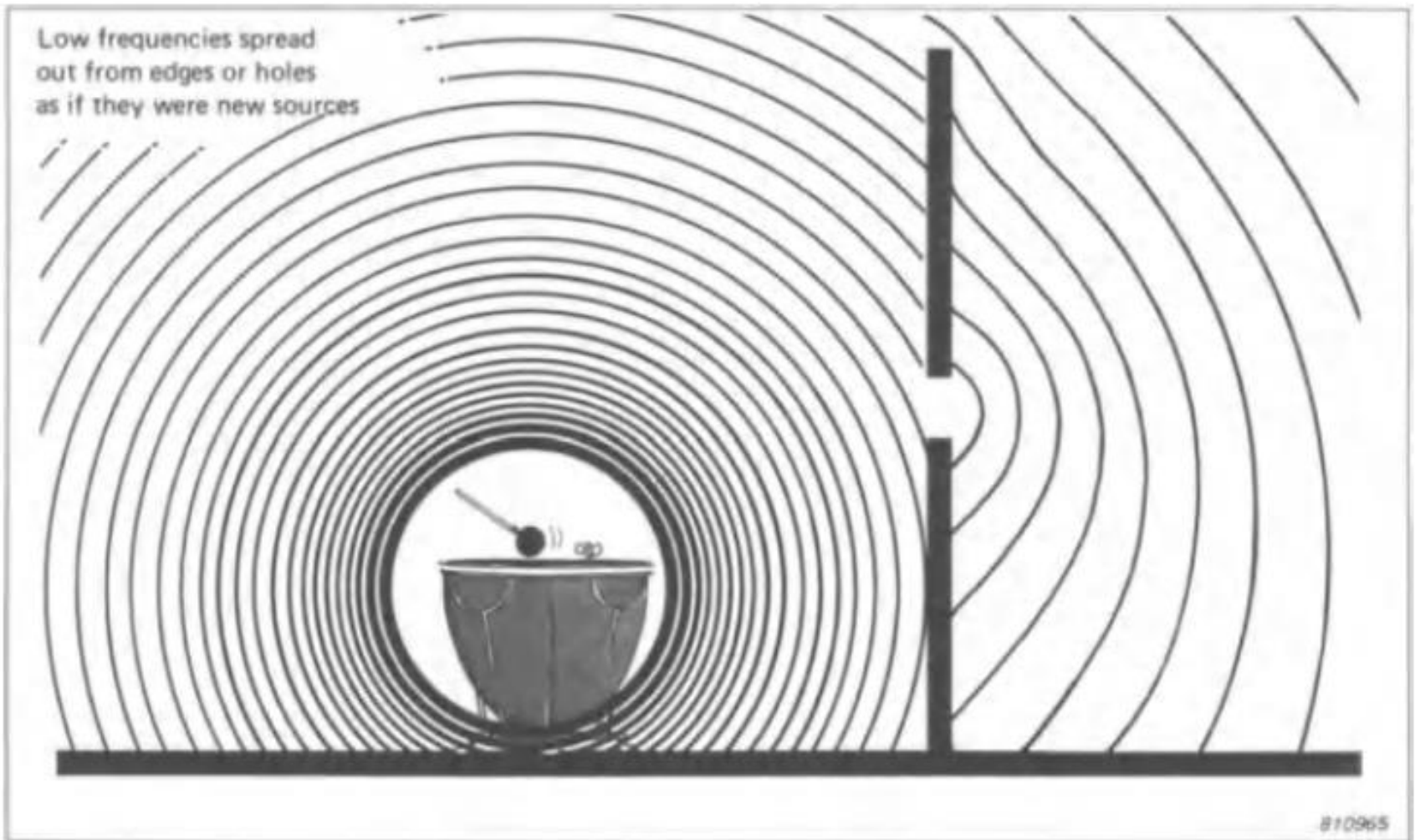
The distinctly separate beats of a low revving oil engine produce low frequency noise



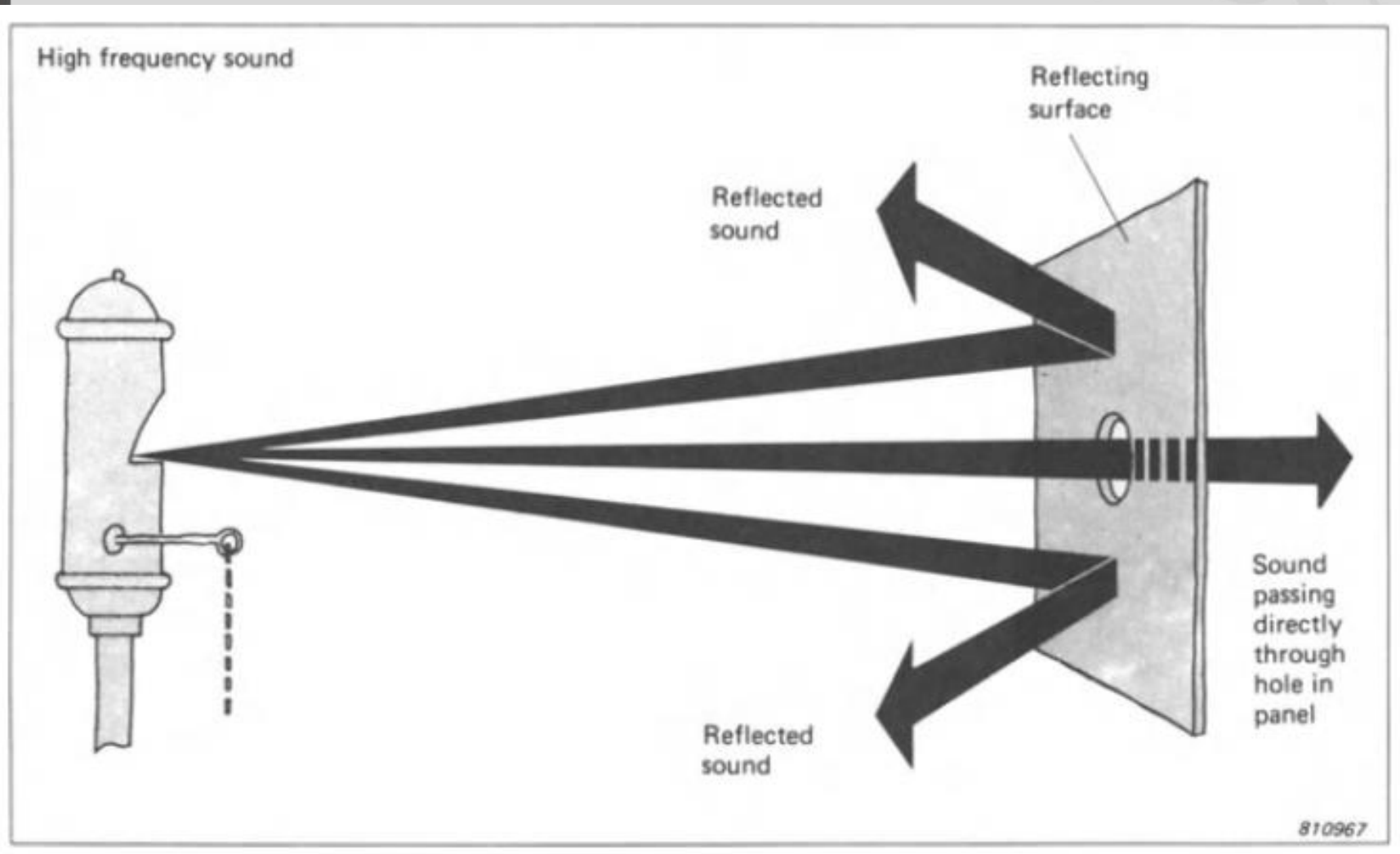
The outboard motors rapidly repeated firing gives predominantly high frequencies



# Low frequency sound bends round obstacles and through openings



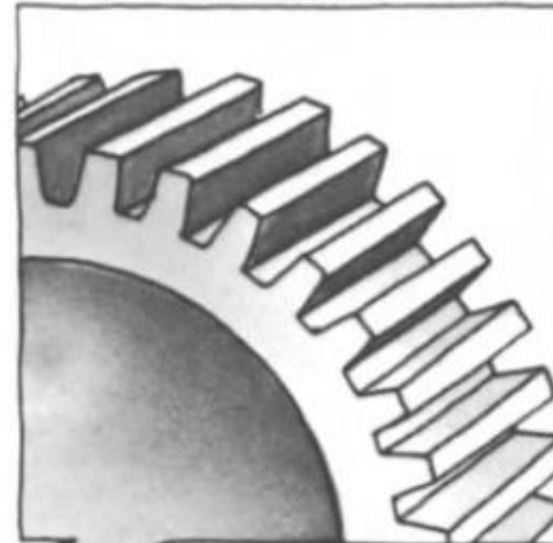
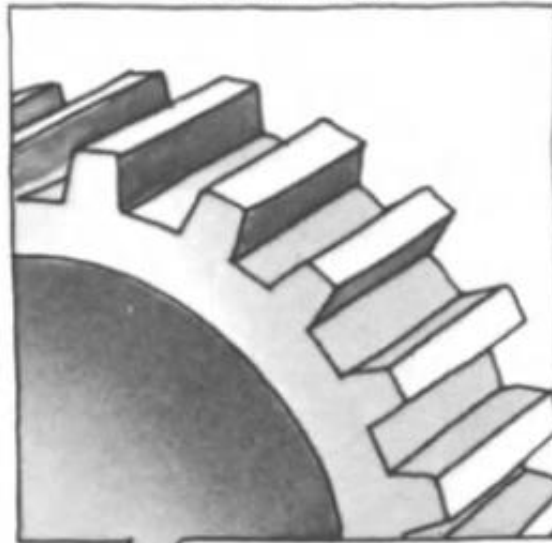
# High frequency sound is highly directional and easy to reflect



LOW FREQ.

HIGH FREQ.

NOISE  
LEVEL



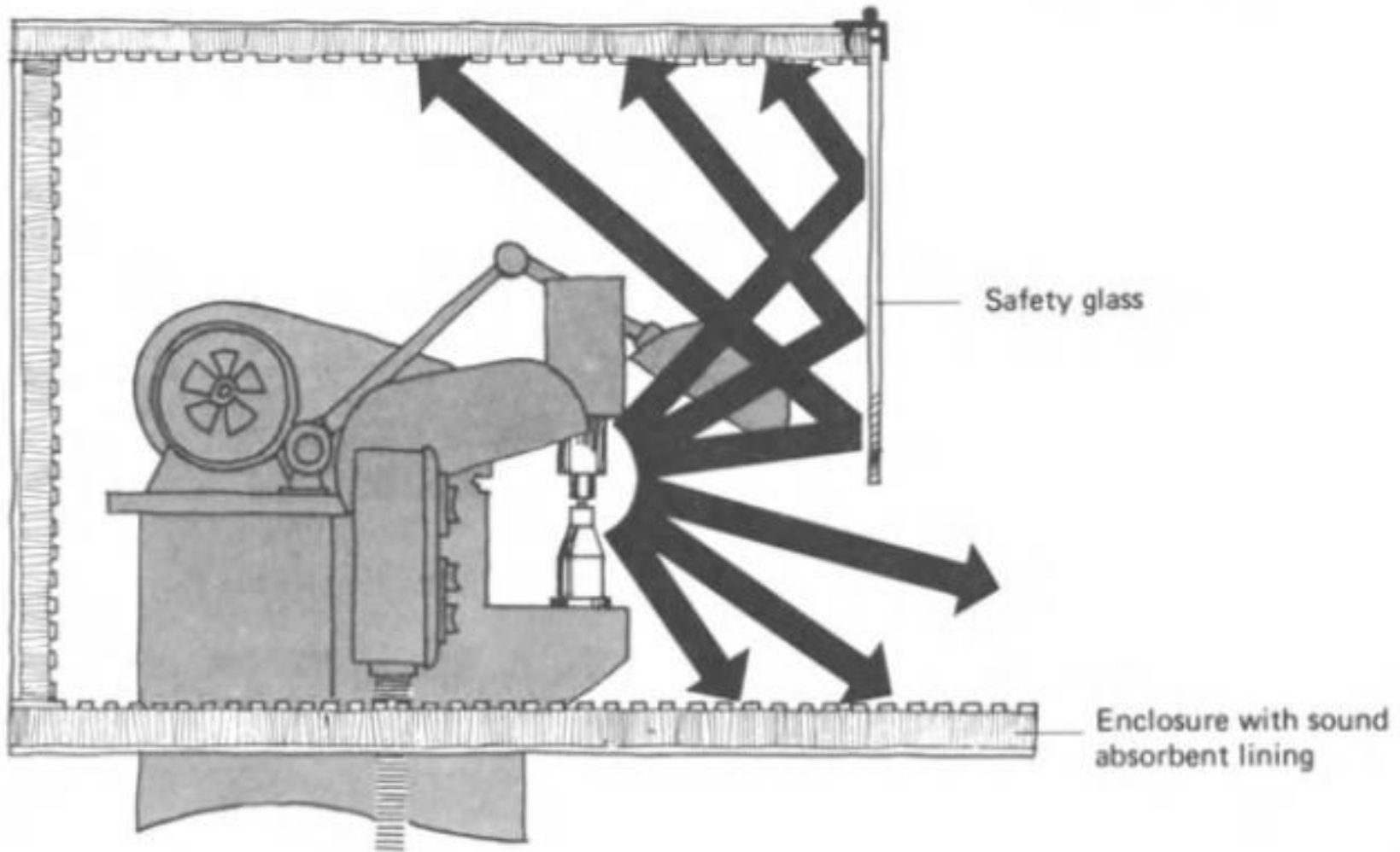
← →  
FREQUENCY



# چکش پانچ صدای با فرکانس بالا تولید می کند



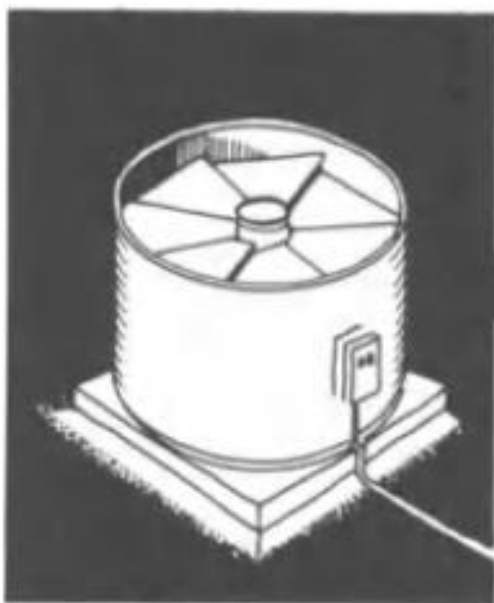
# حل



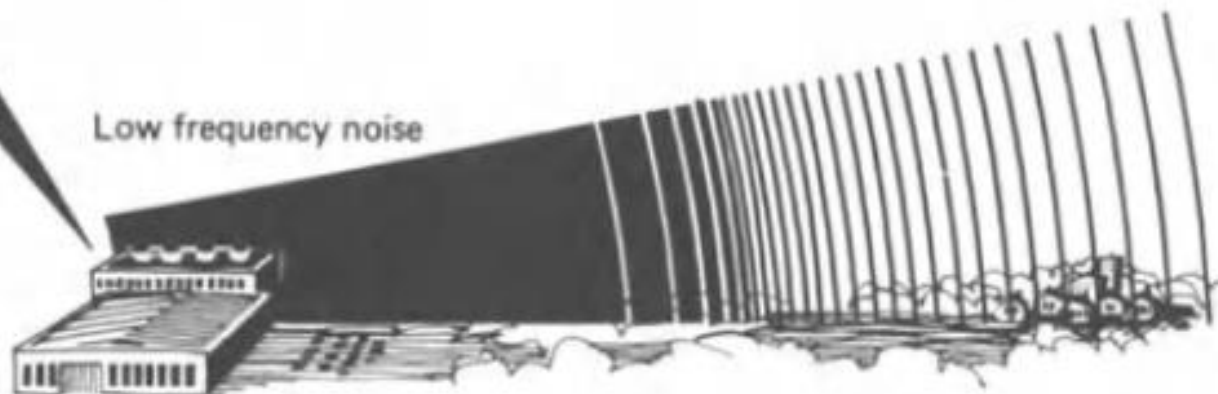


- **Close to the source high frequency noise annoys more than low frequency noise**

■ صدای با فرکانس پایین فن های صنعتی علت آزردهی در مناطق مسکونی است چرا؟

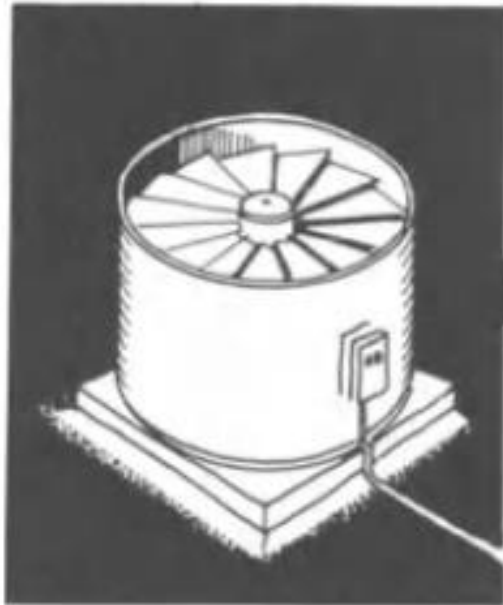


Fan with few blades

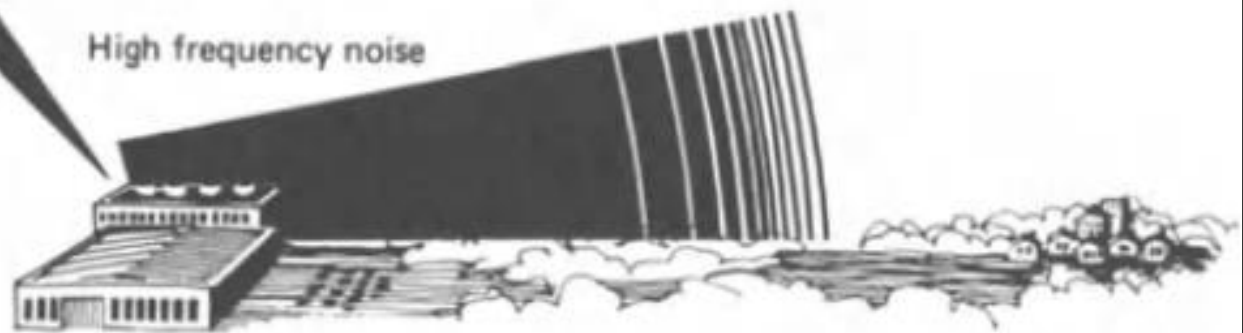


Residential area

# حل

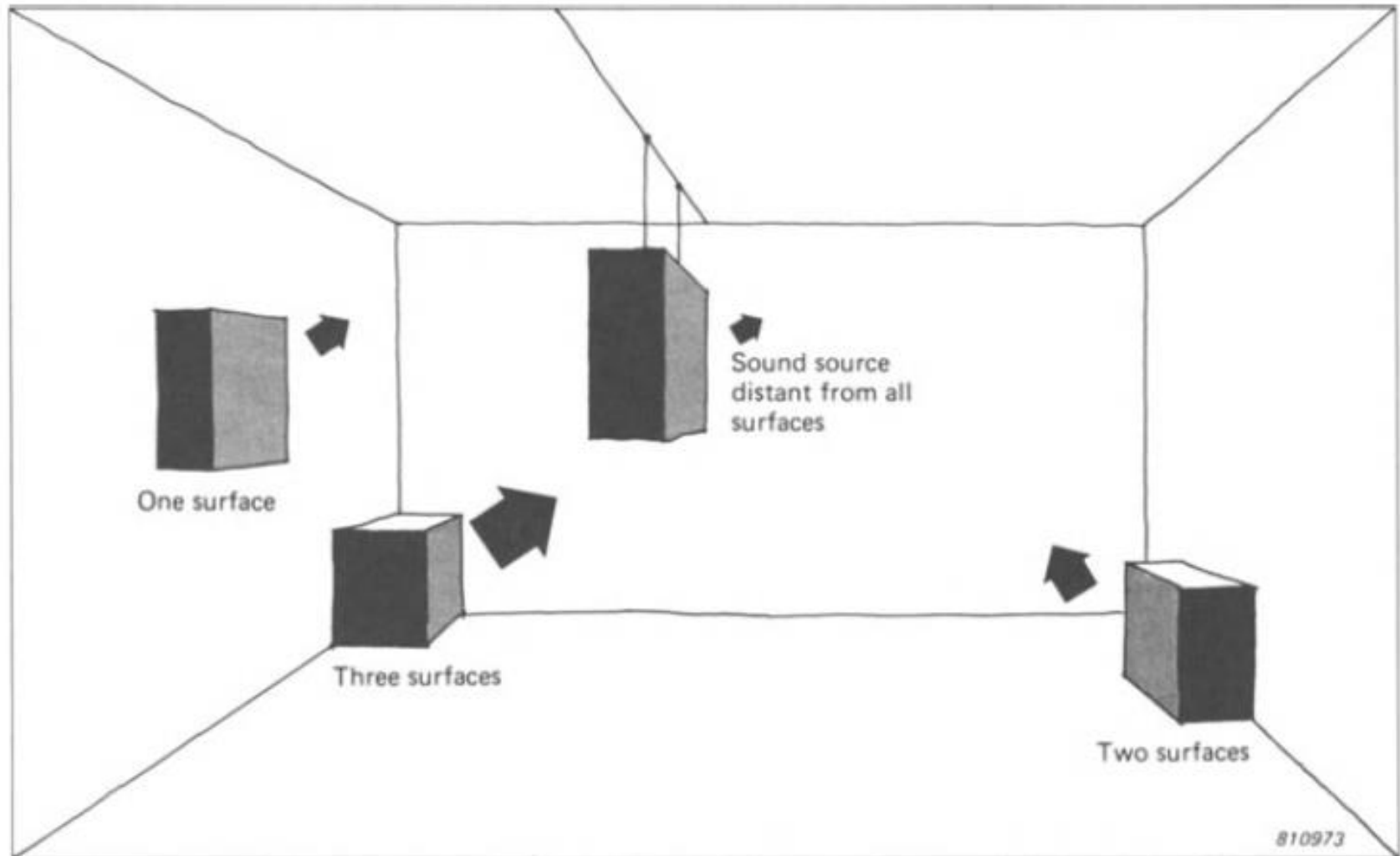


Fan with many blades



Residential area

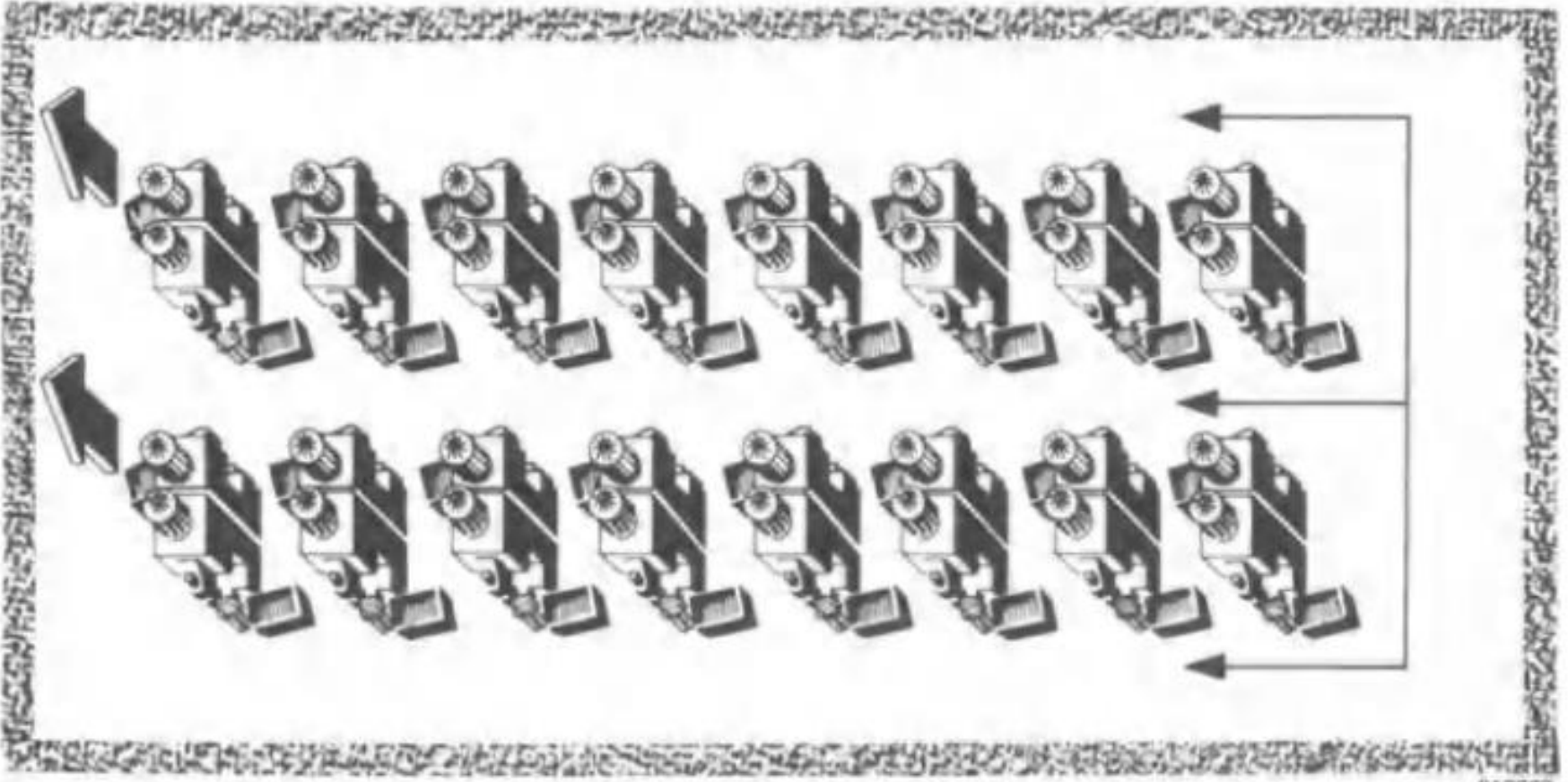
# Sound sources should be sited away from reflecting surfaces



# مشکل

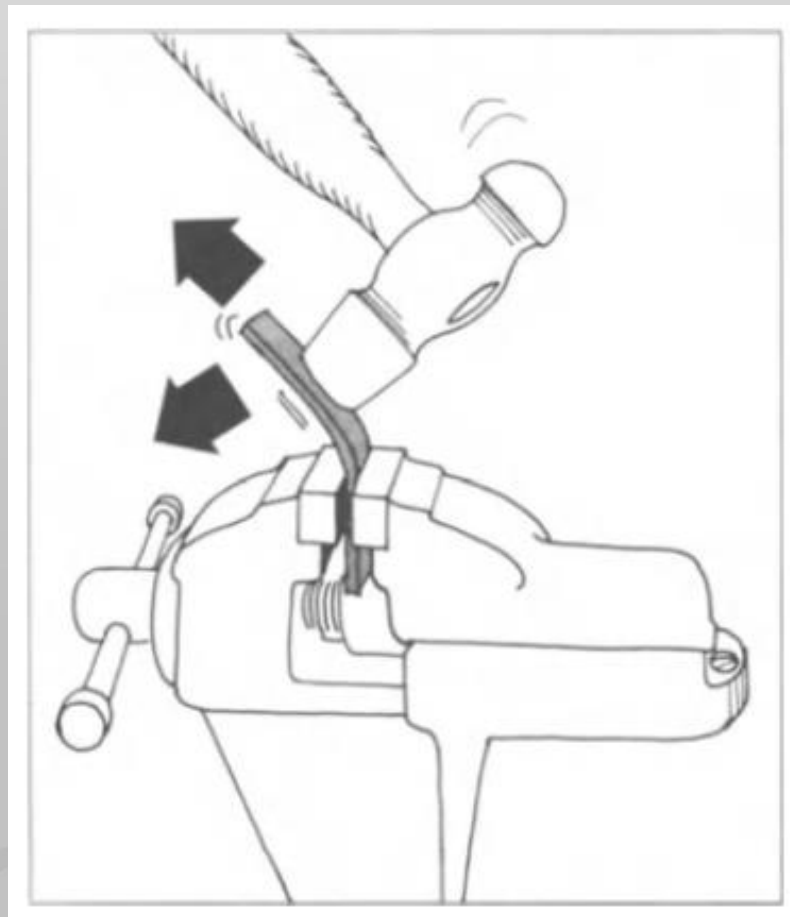


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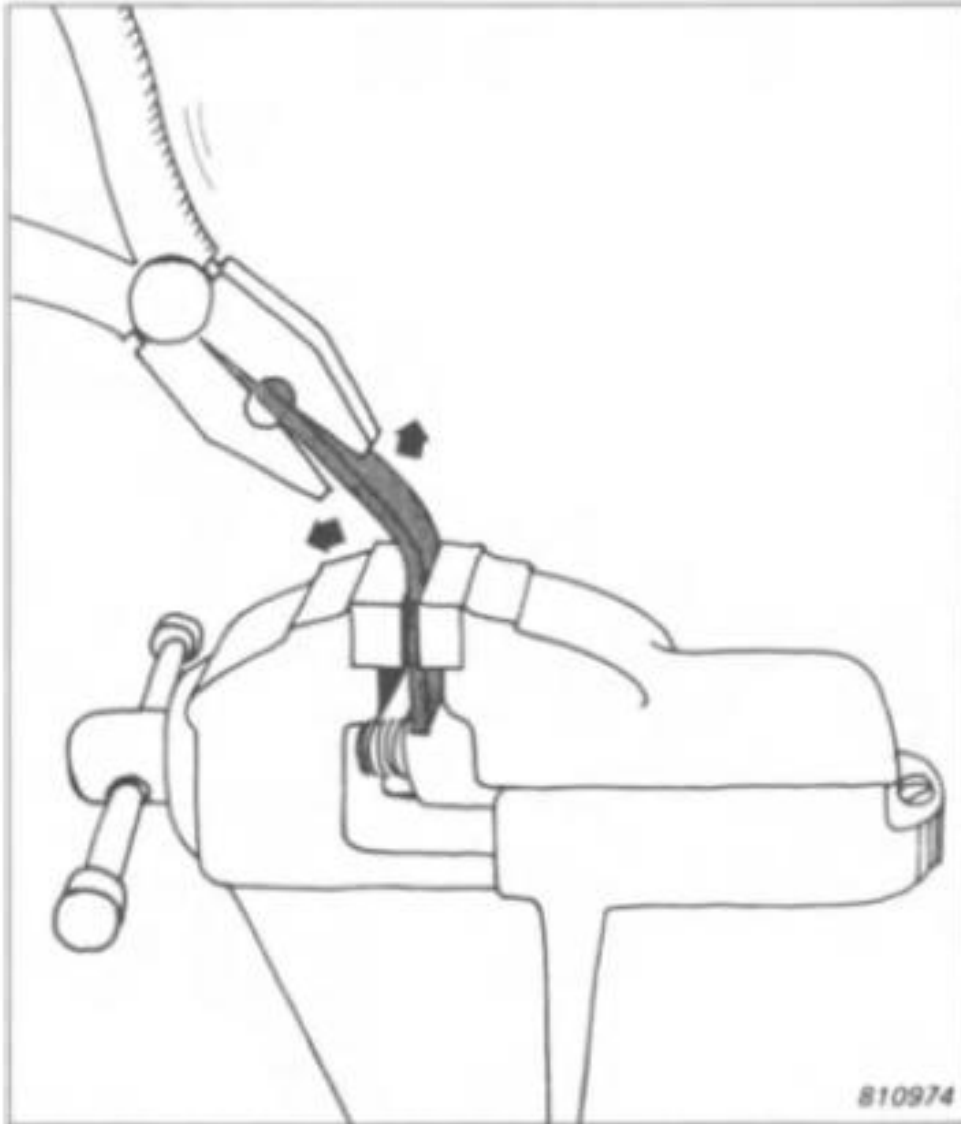




**Changes in force, pressure, or speed, lead to noise**

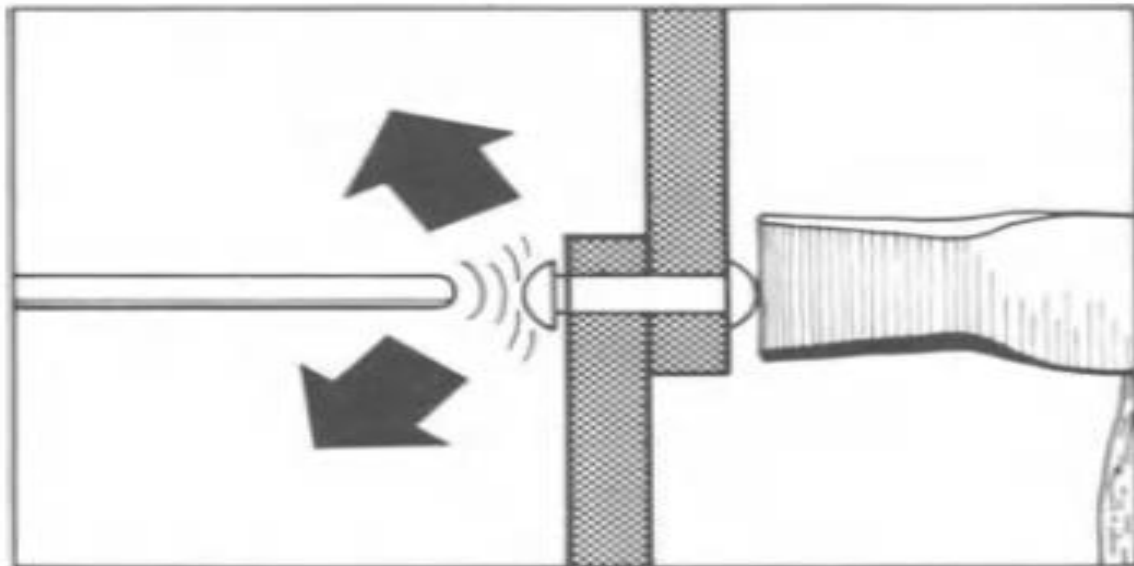
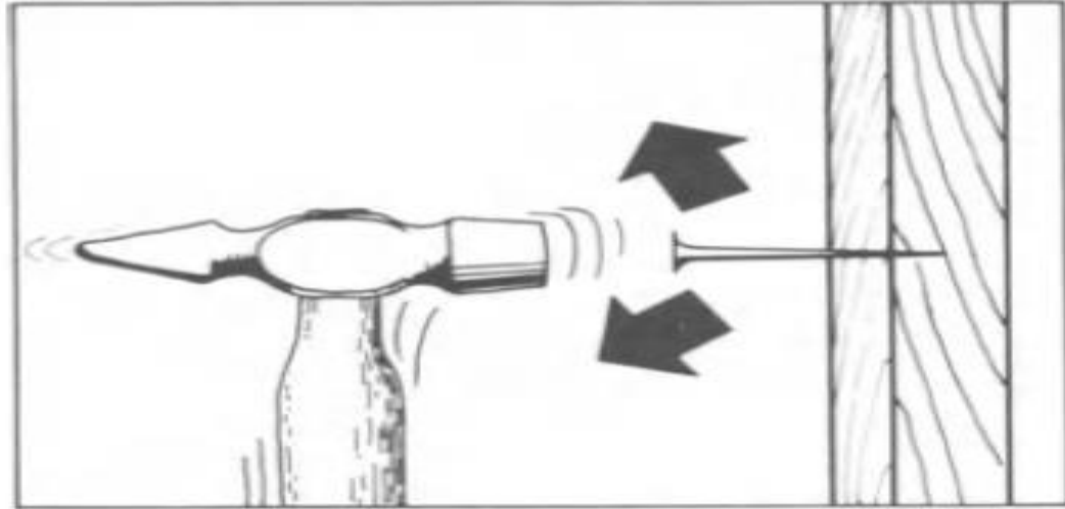


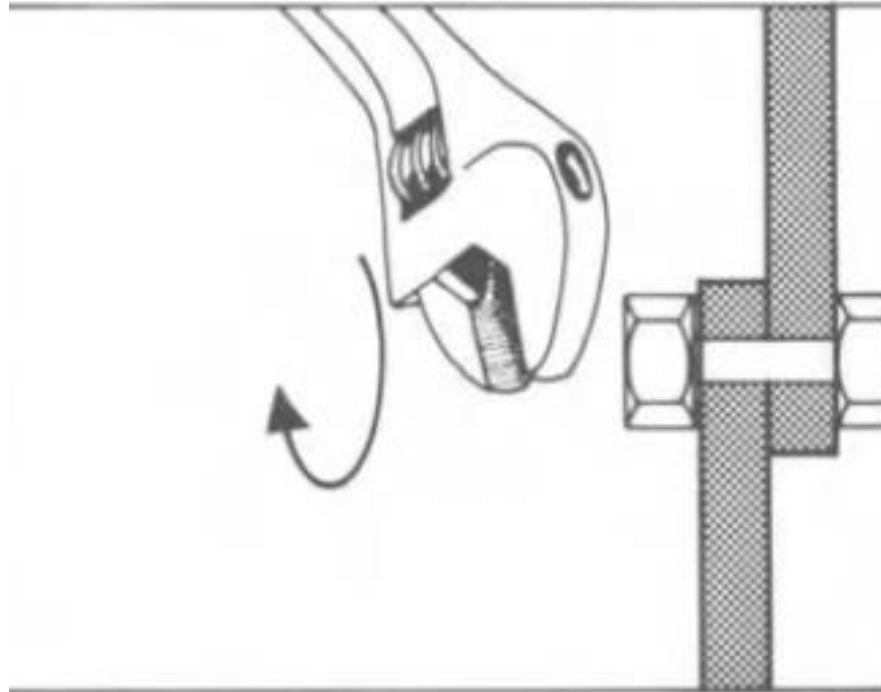
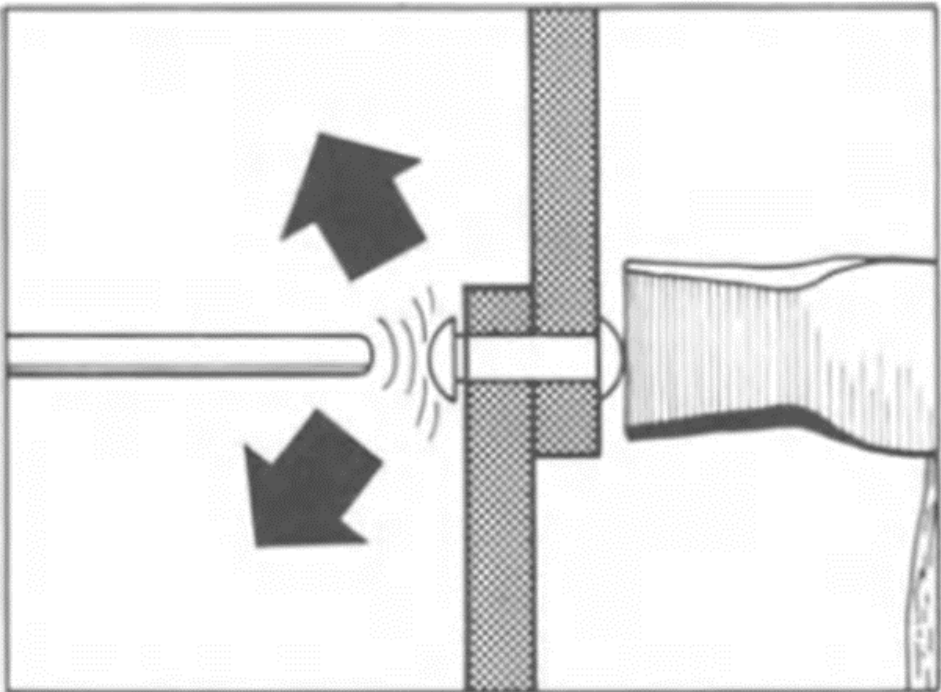
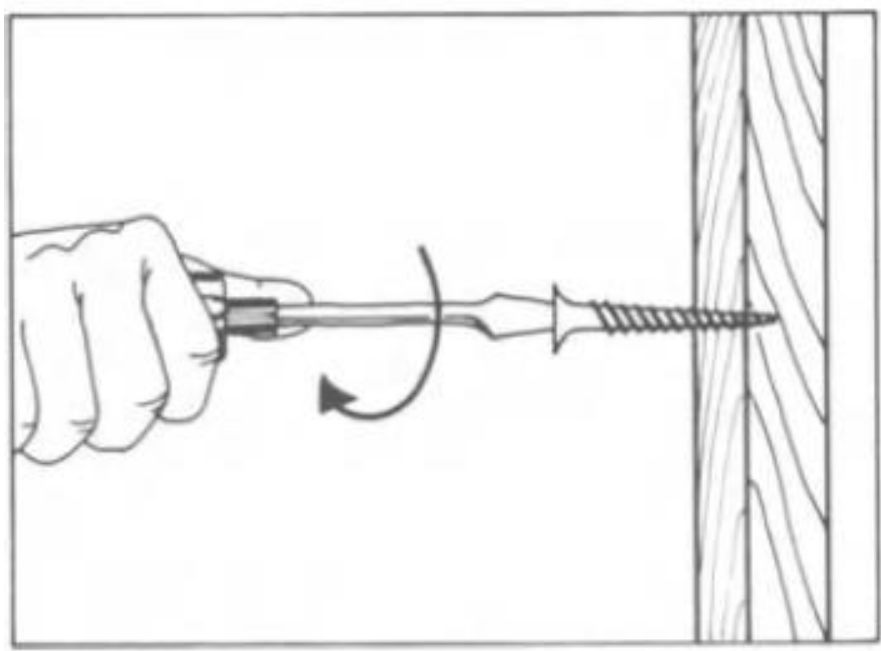
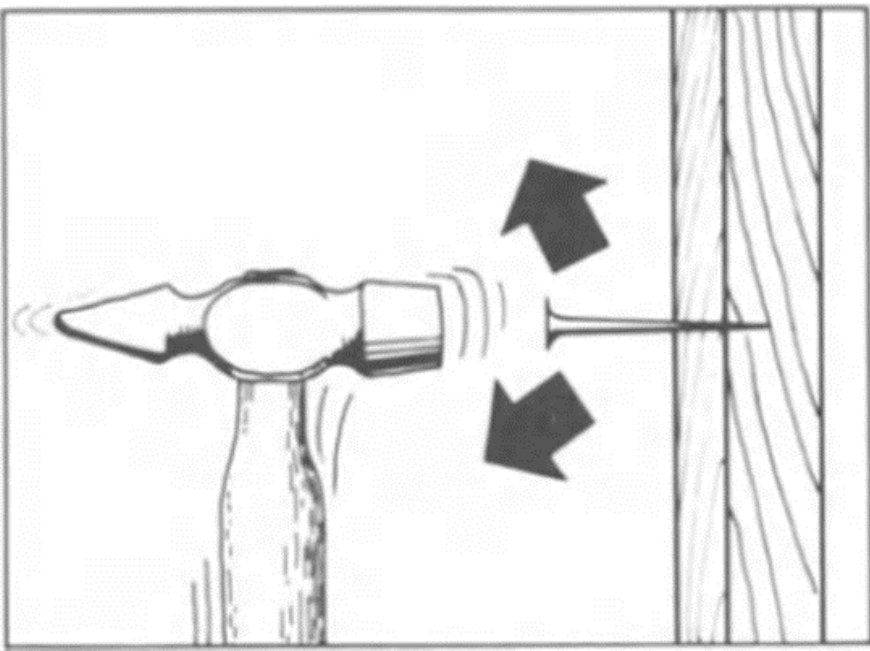
# حل



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# مشکل

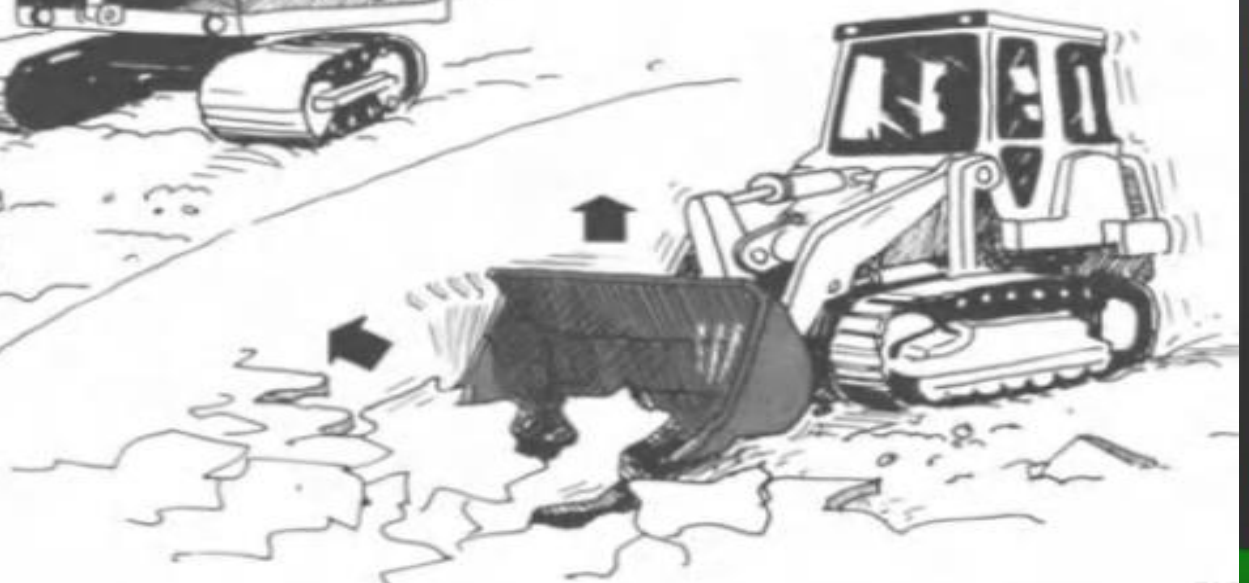
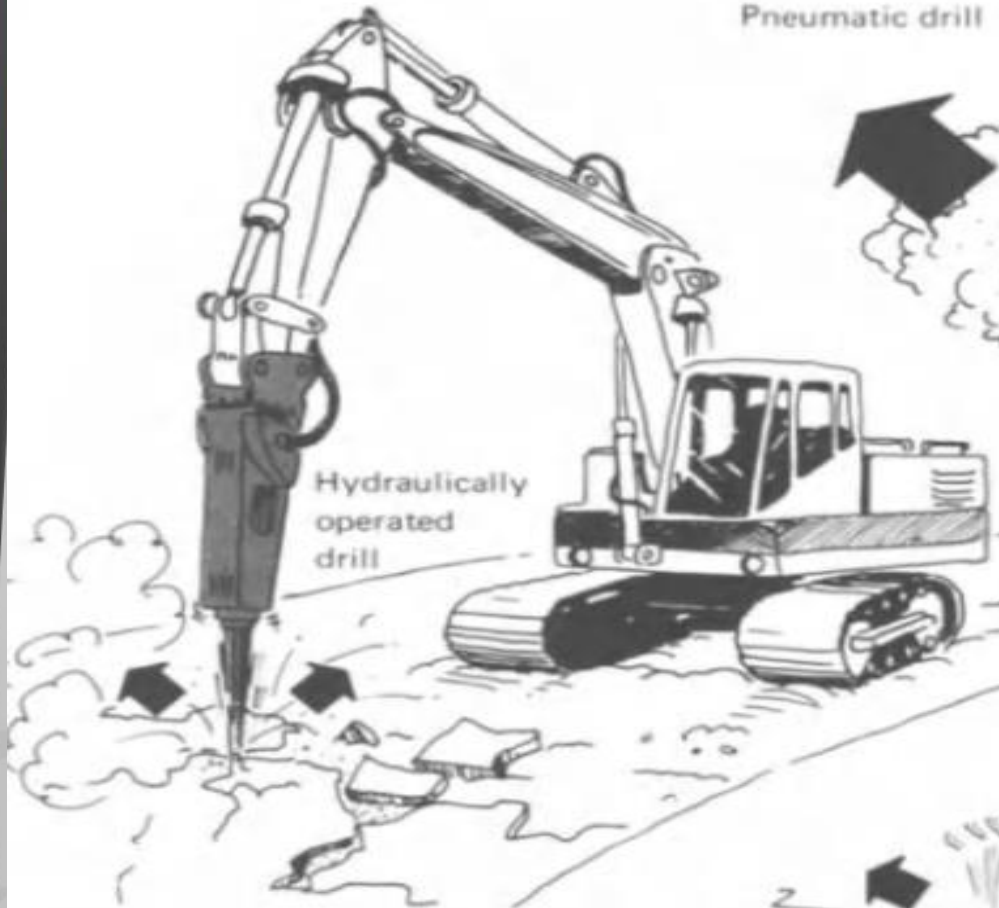




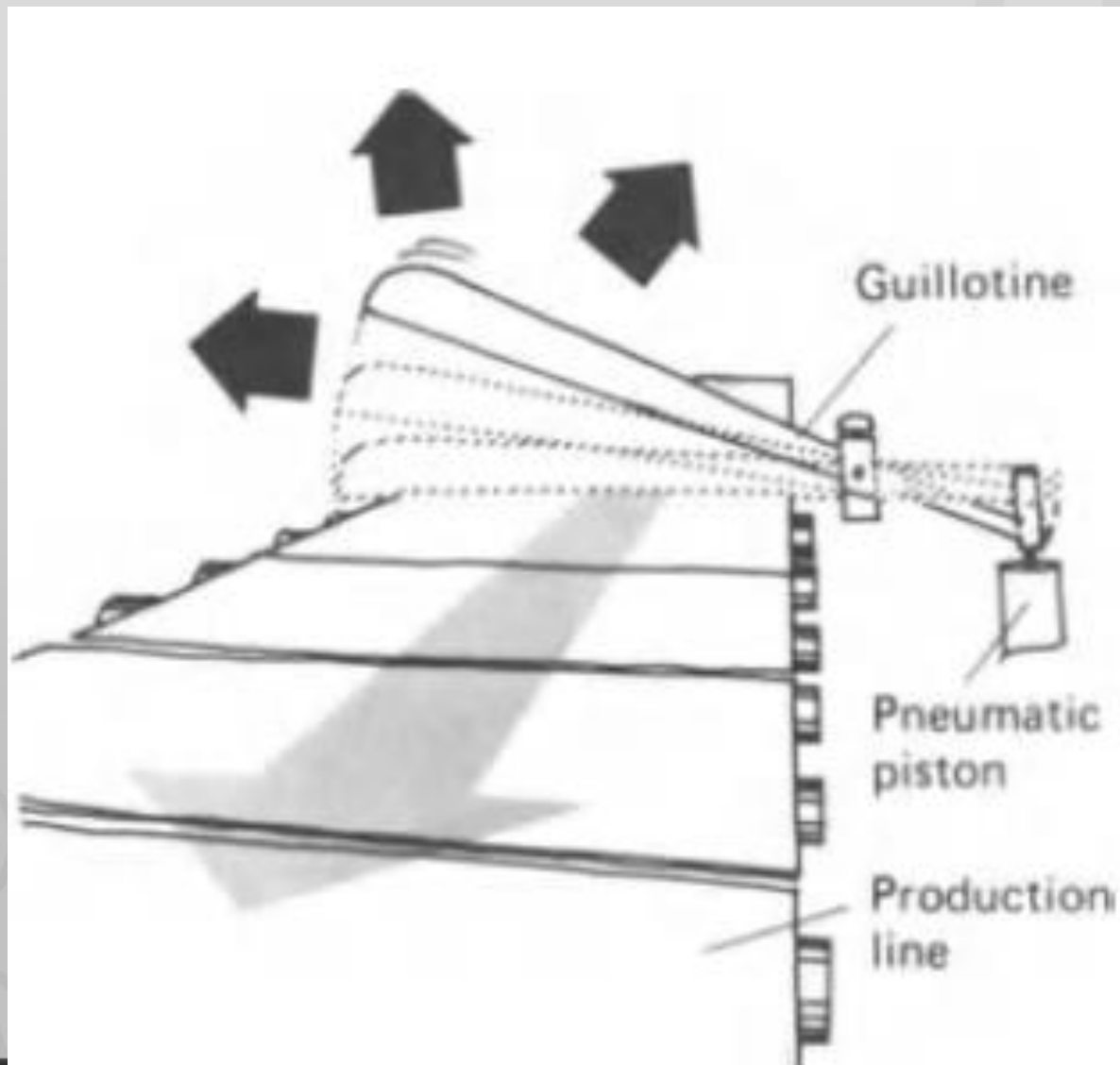
Pneumatic drill



Hydraulically operated drill

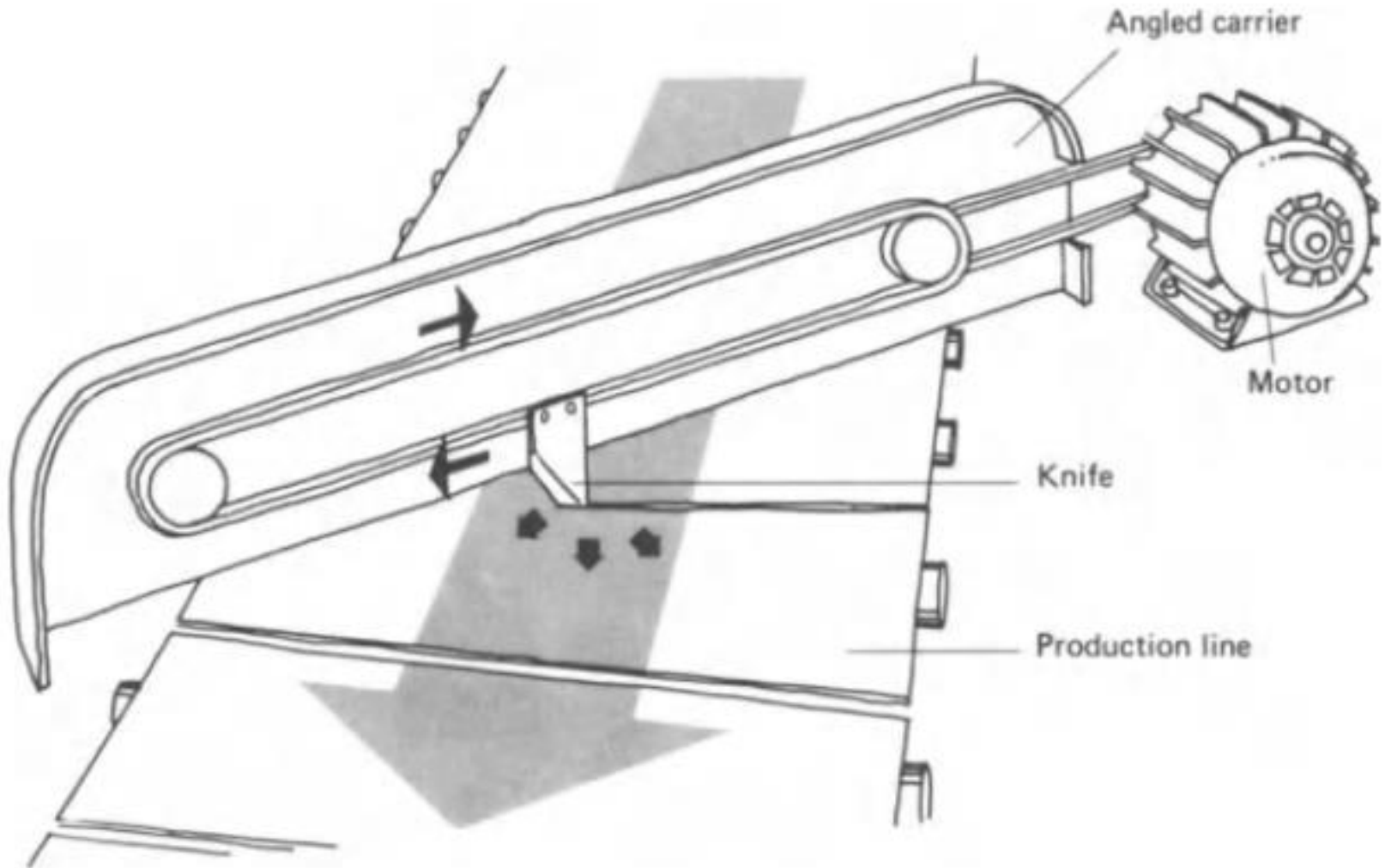


# کارتن را به صورت ضربه ای برش می دهد

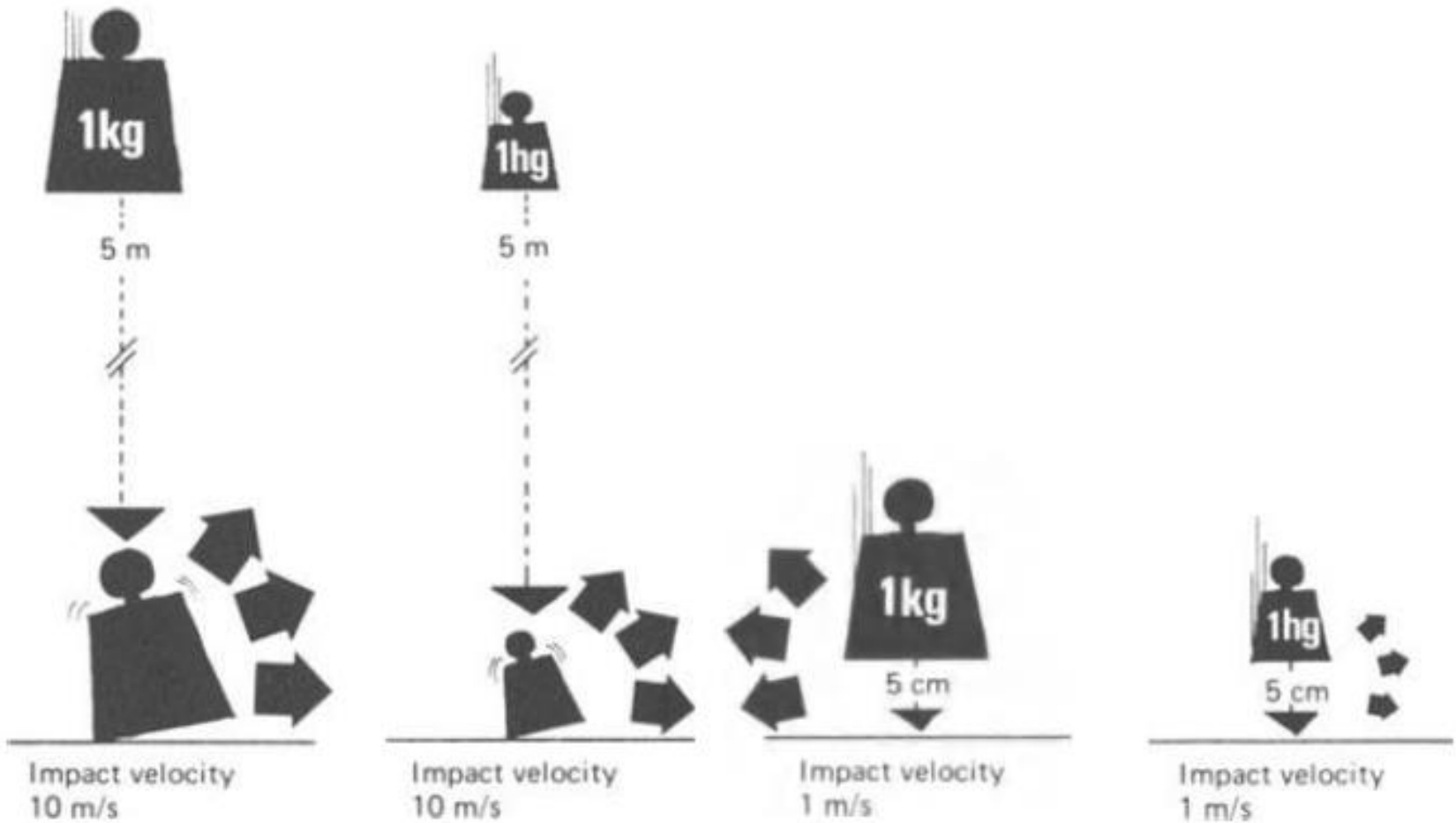




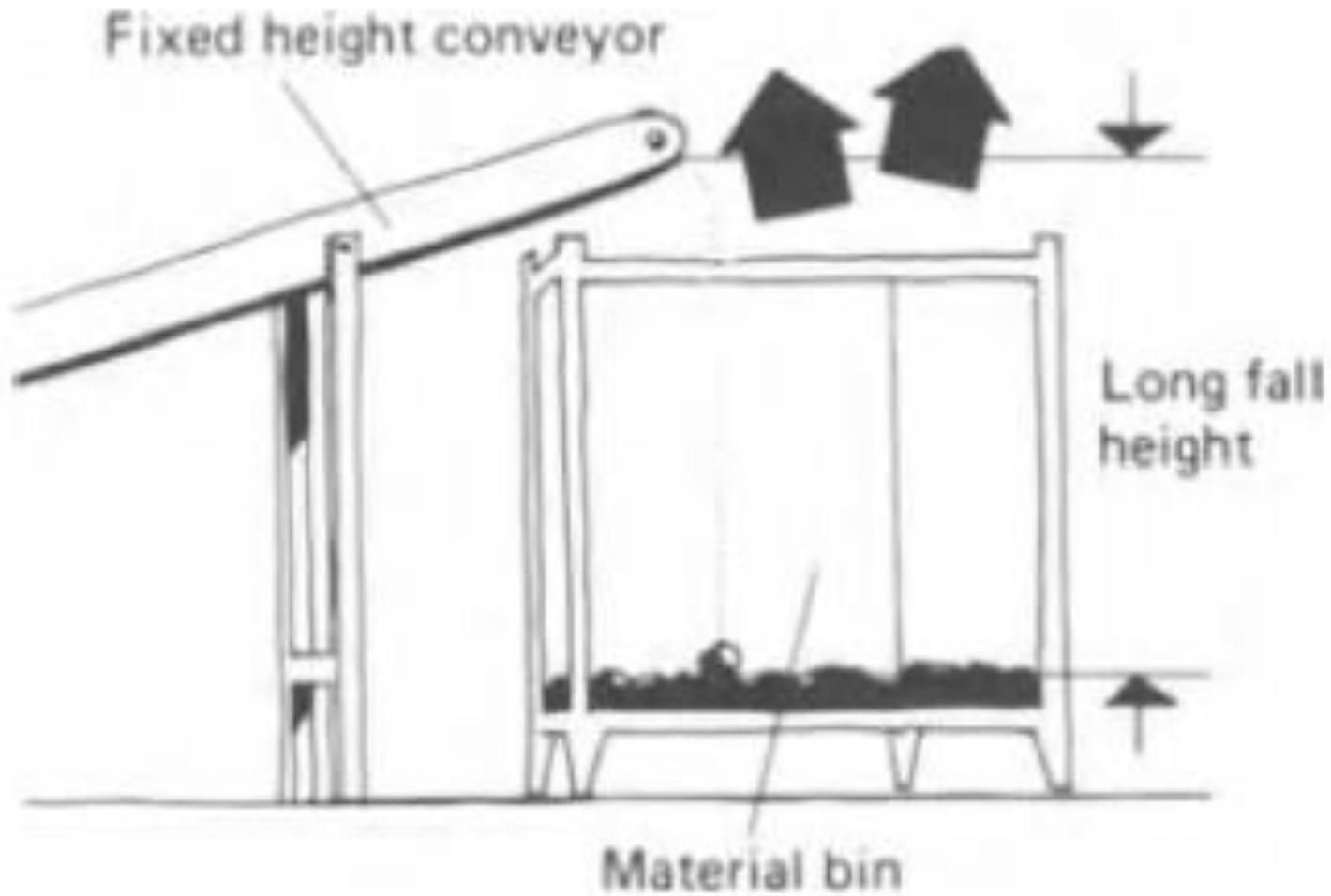
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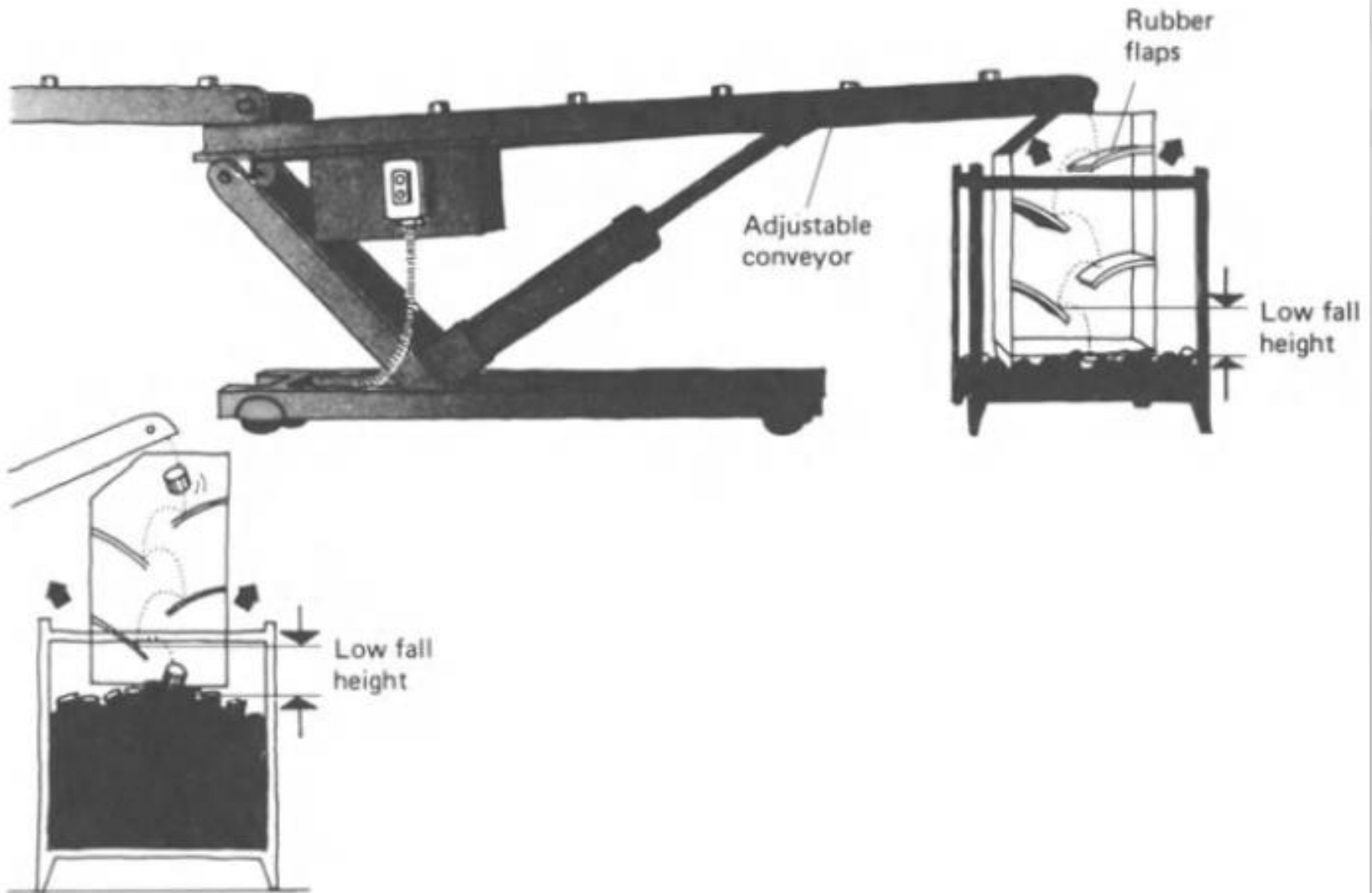
# Low mass and low fall heights give least sound



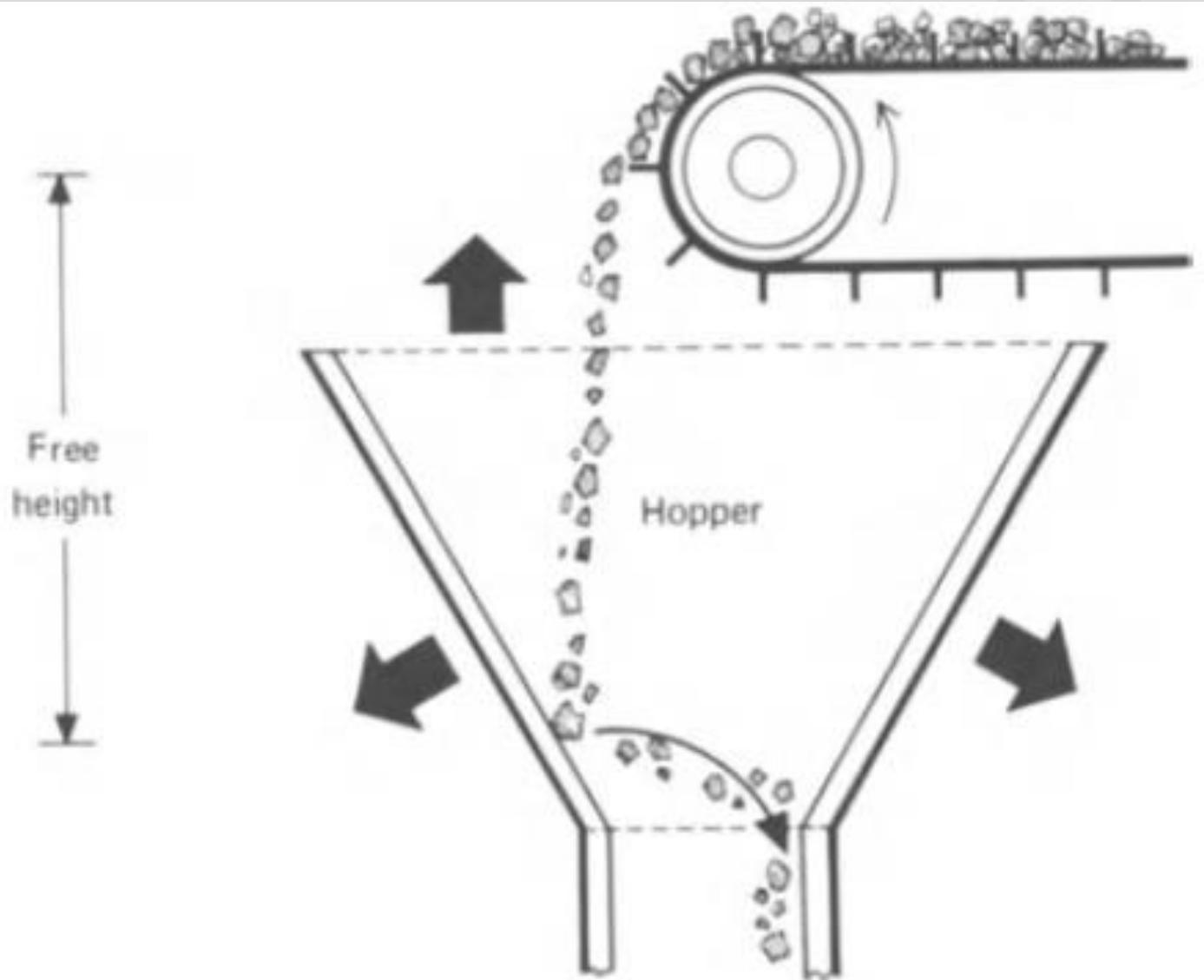
# مشکل



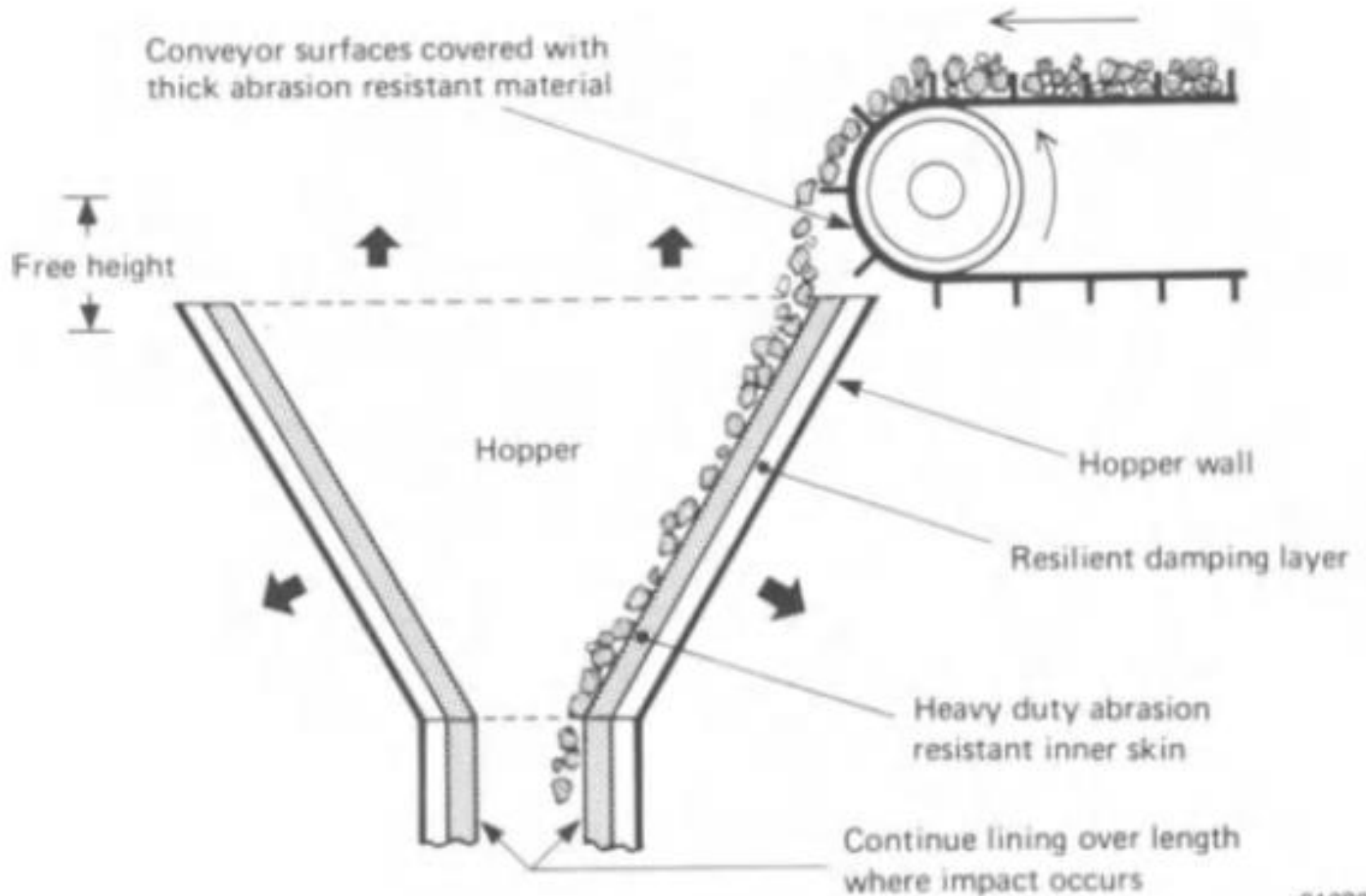
# حل



# مشکل



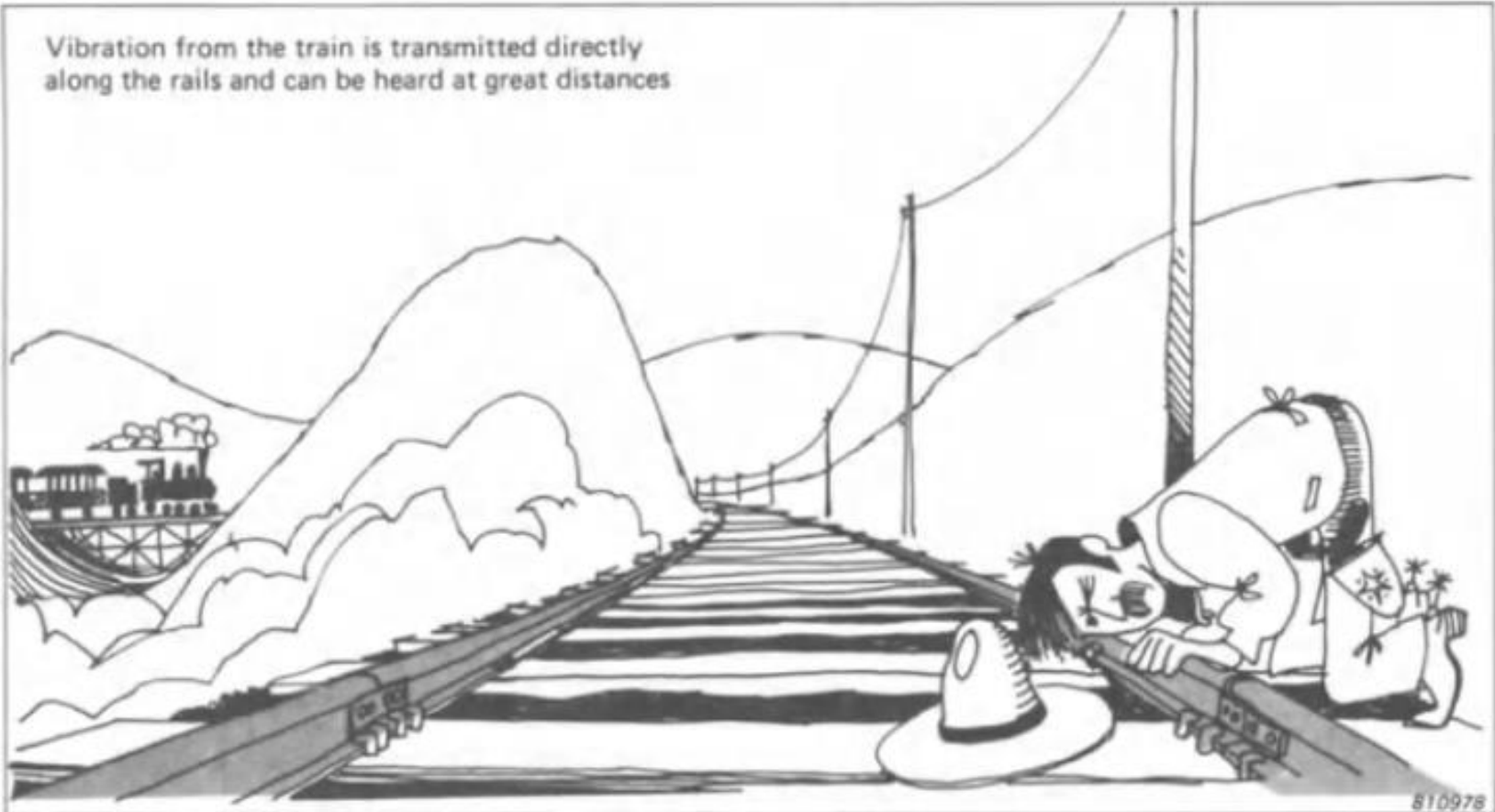
# حل





# Structure-borne sound travels long distances

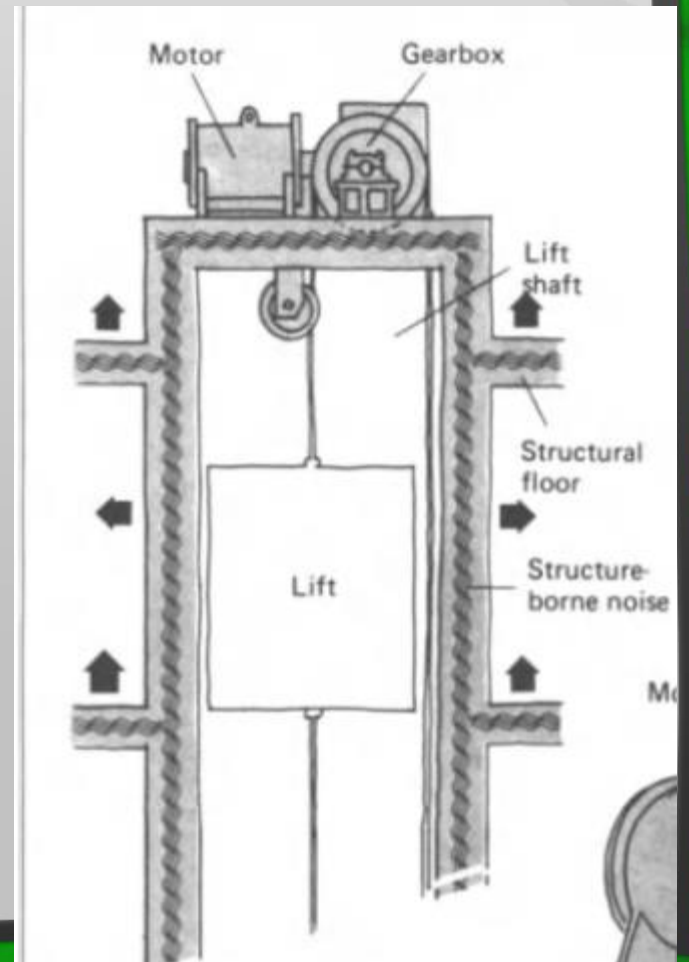
Vibration from the train is transmitted directly along the rails and can be heard at great distances



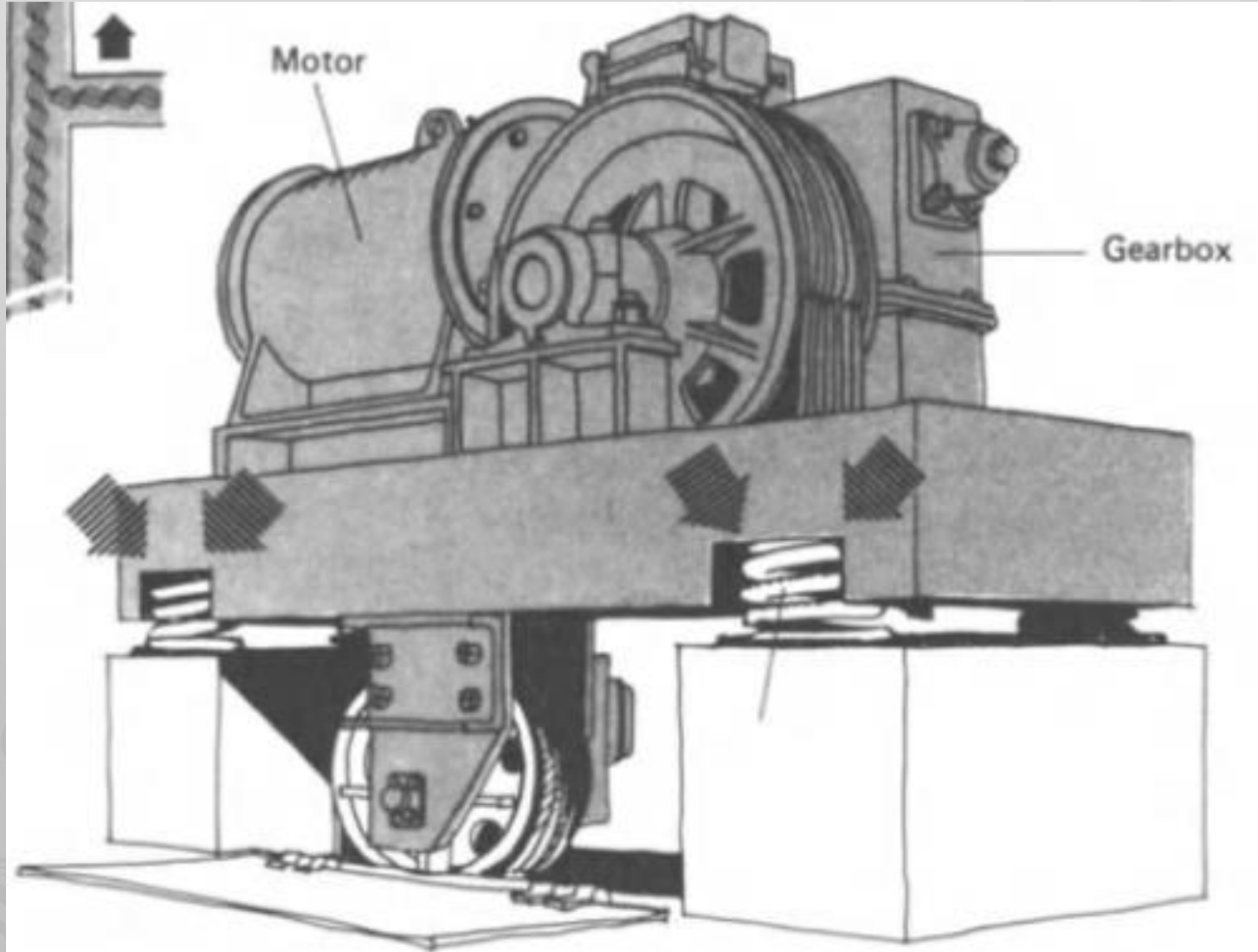
# مشکل

Vibration and stop/start shocks from an elevator can be heard throughout a building.

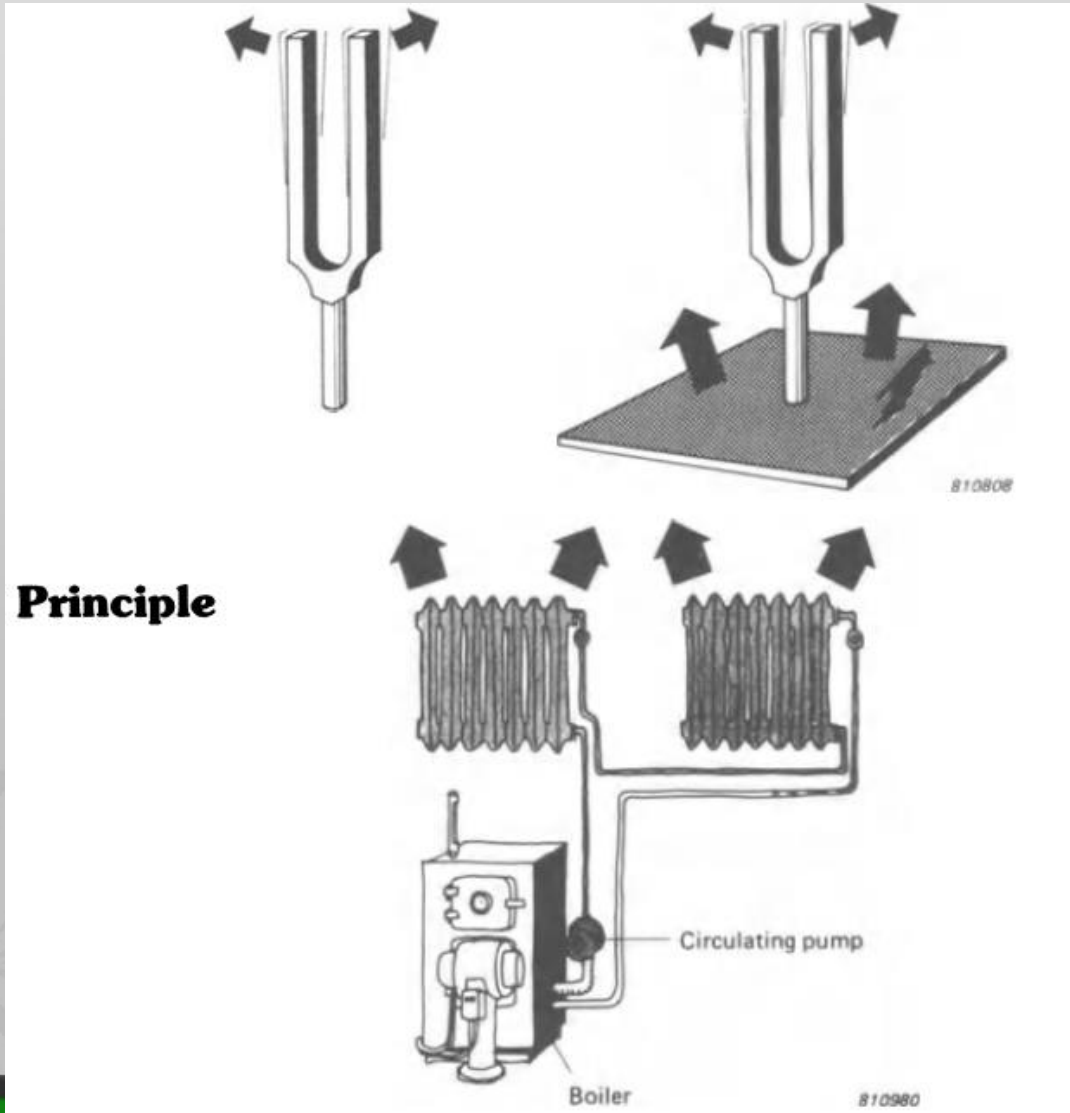
The sound is carried for large distances virtually unattenuated via the concrete slabs.



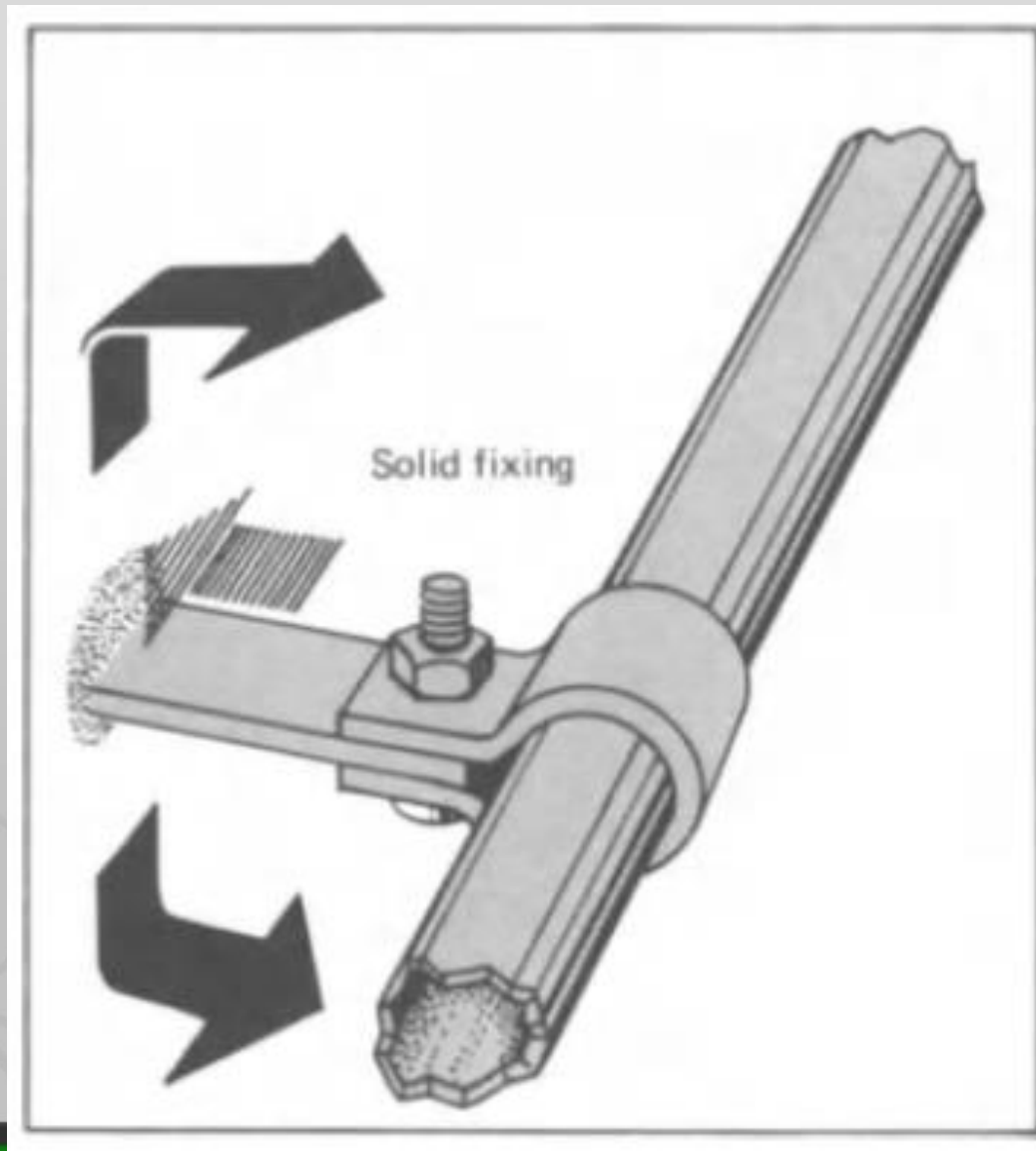
# حل



# Structure-borne vibration needs large areas to convert it to airborne sound

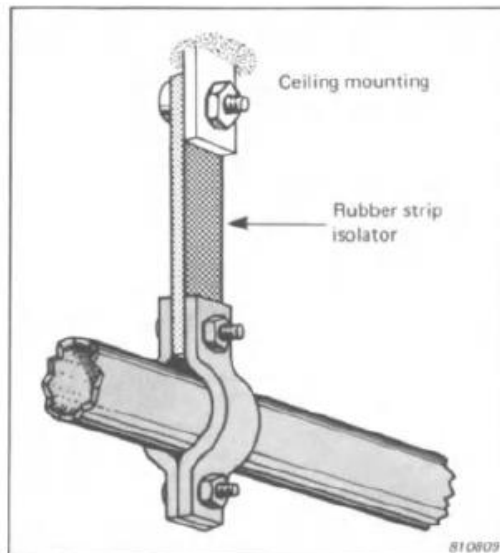
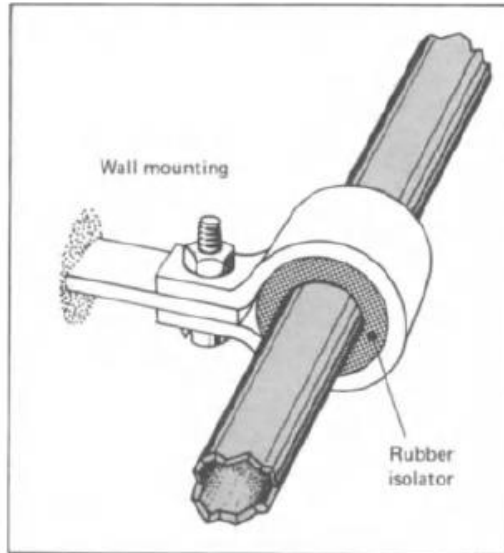
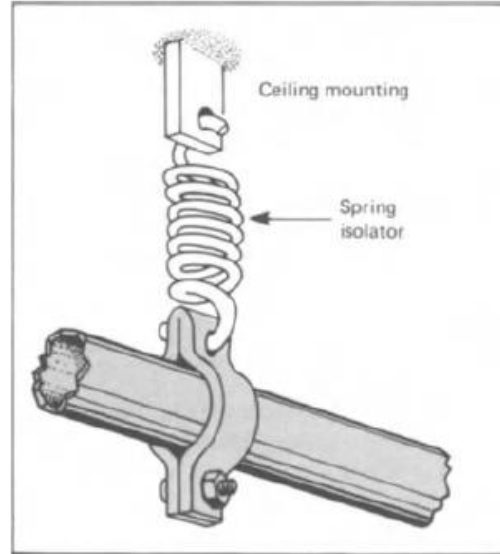
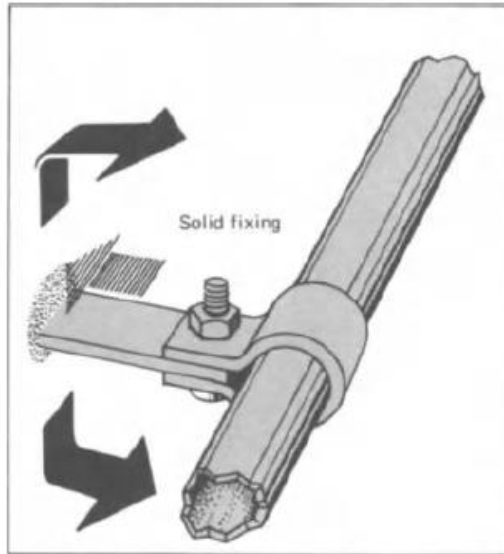


# مشکل



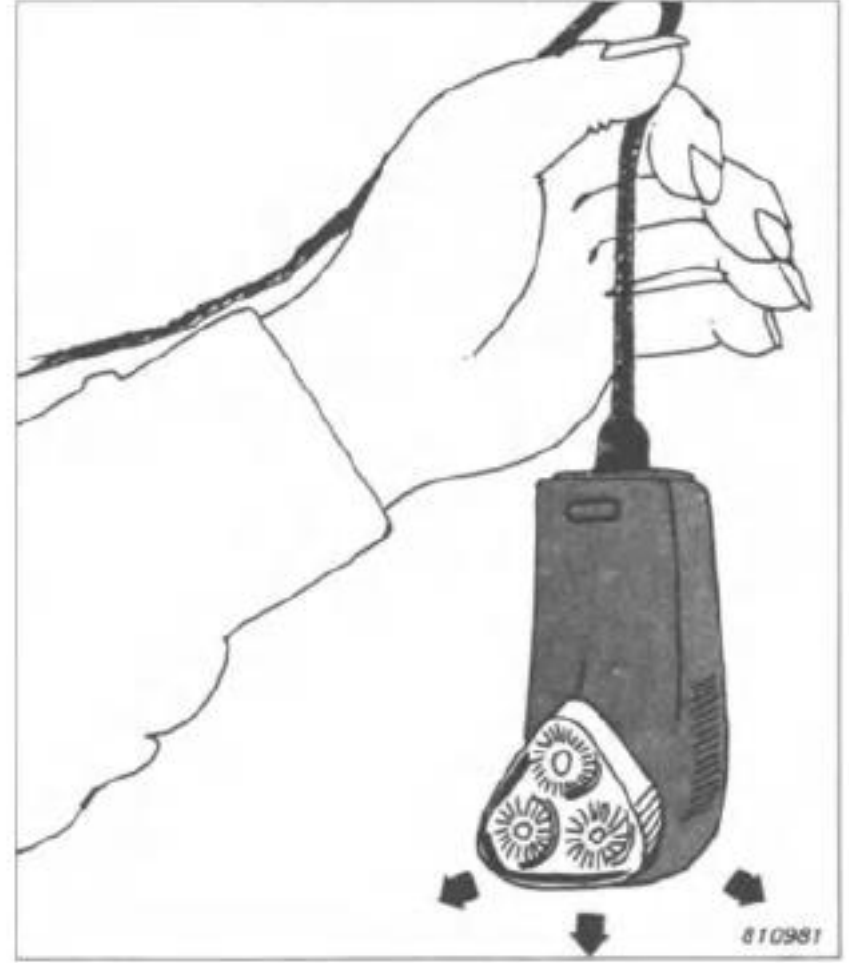
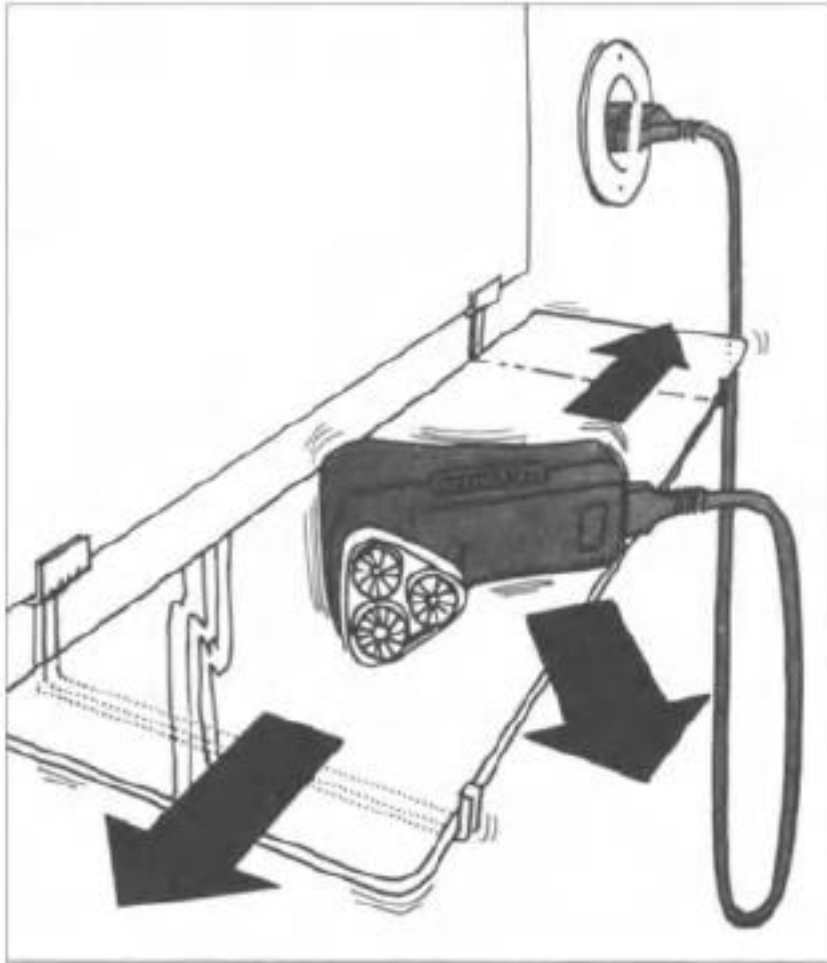


# حل

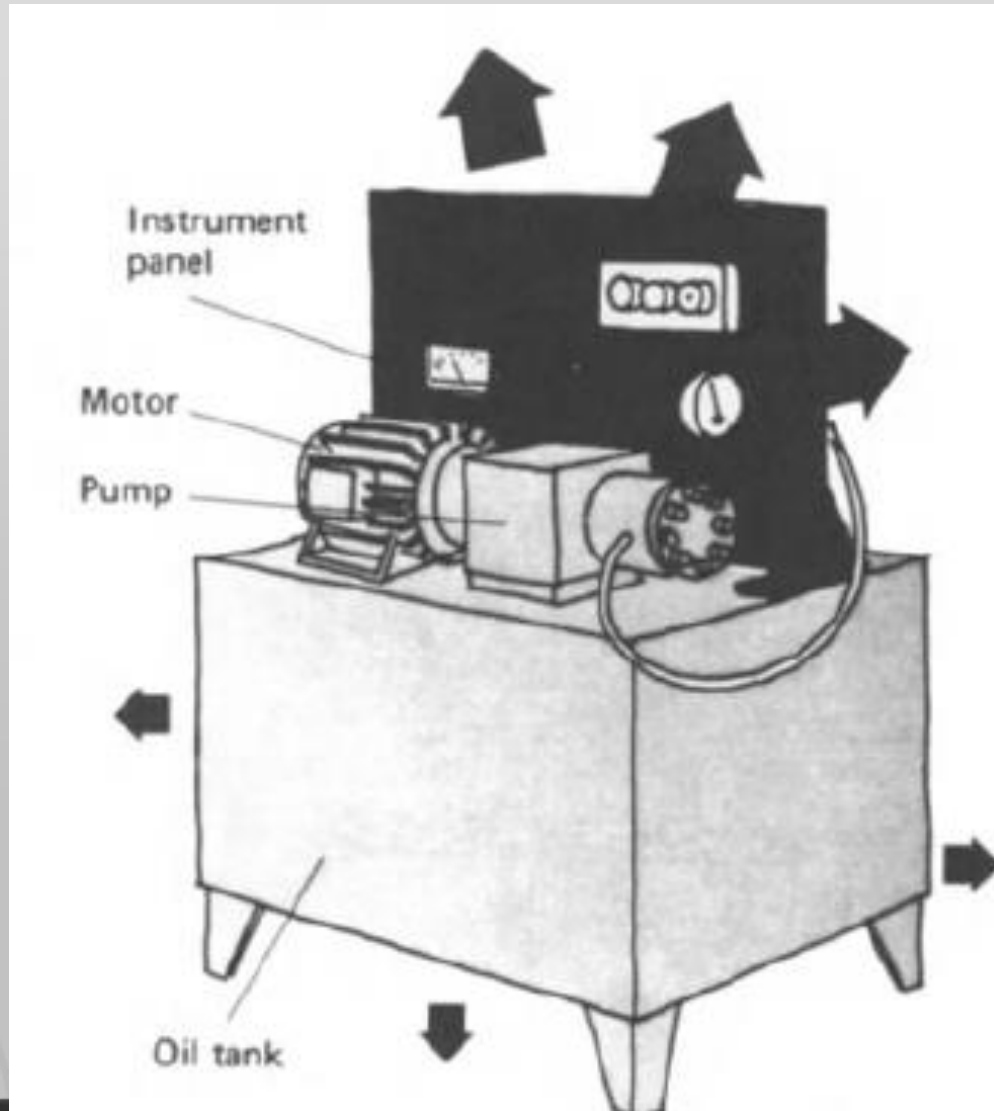




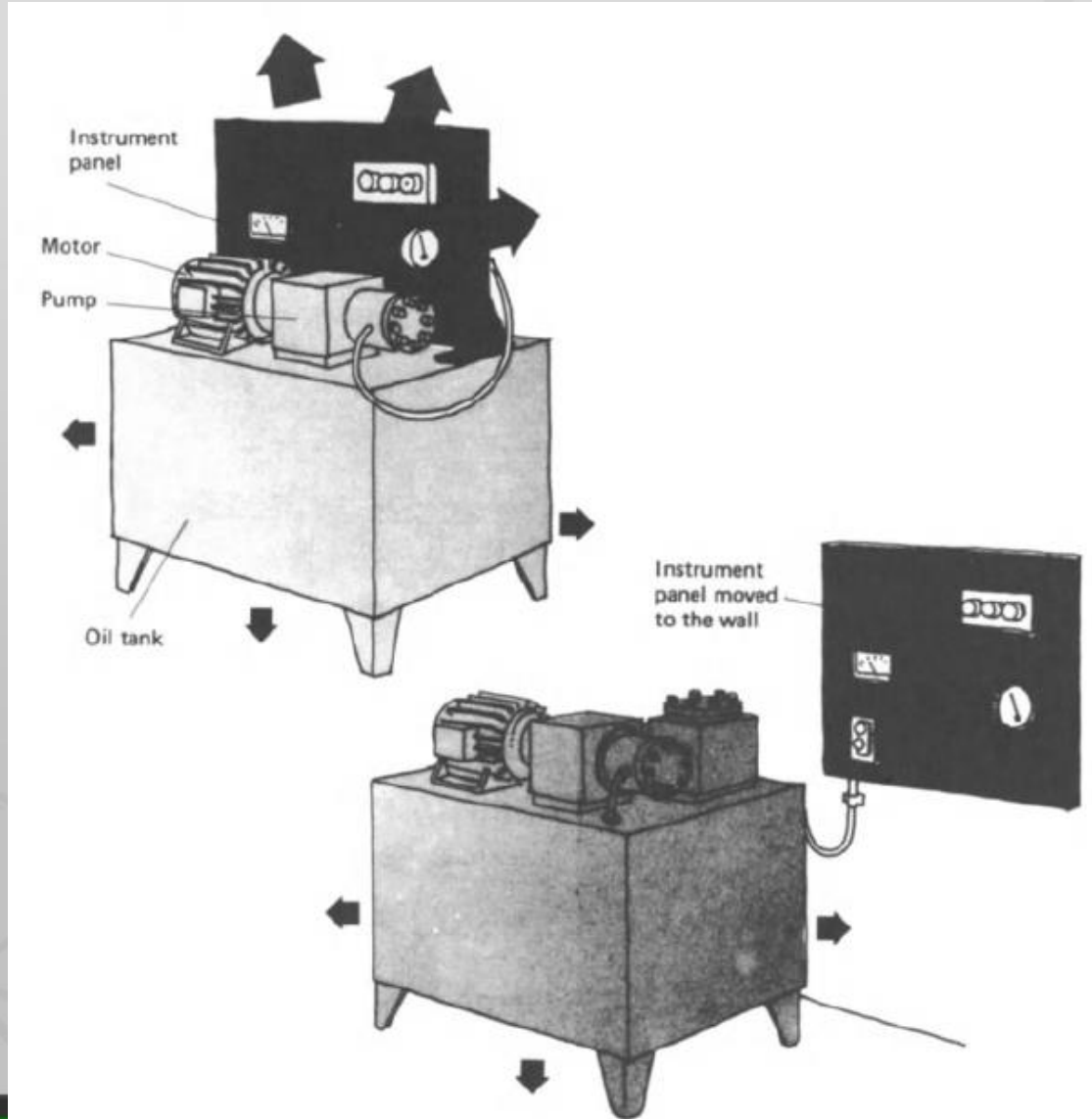
# Small vibrating objects radiate less noise than large



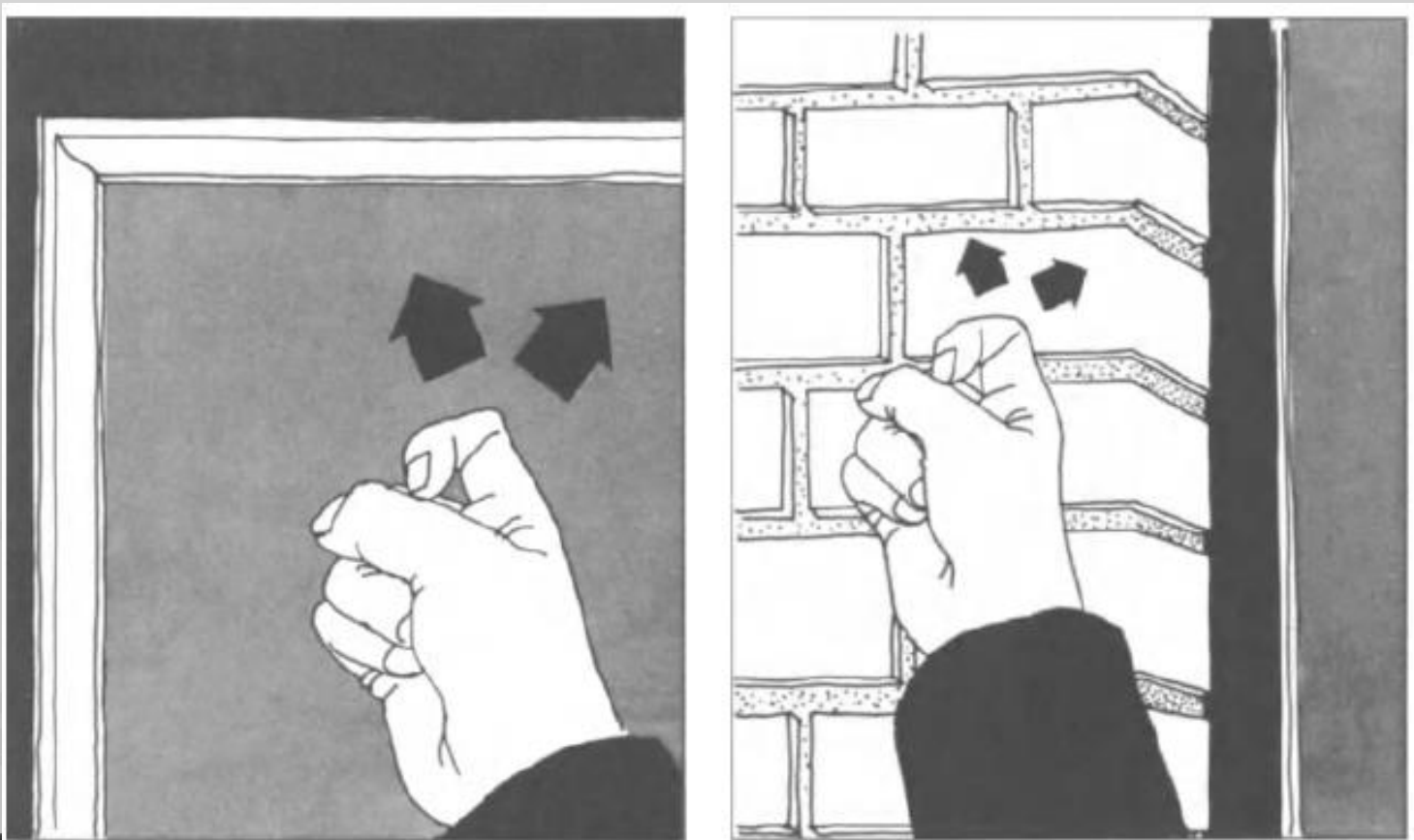
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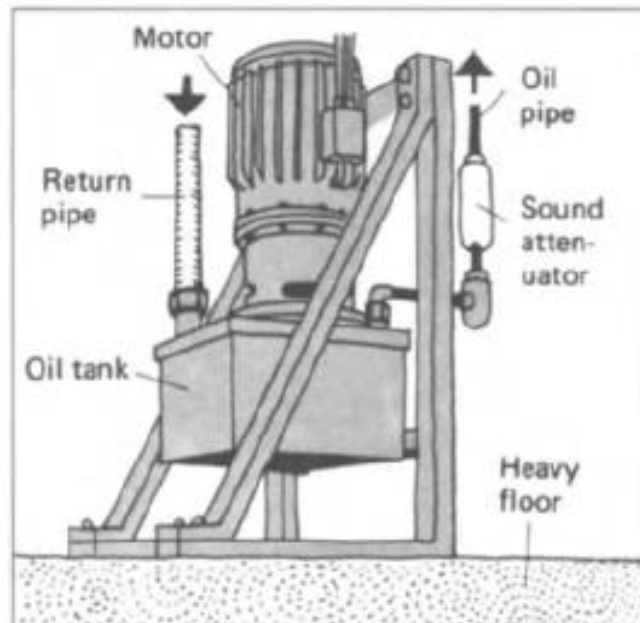
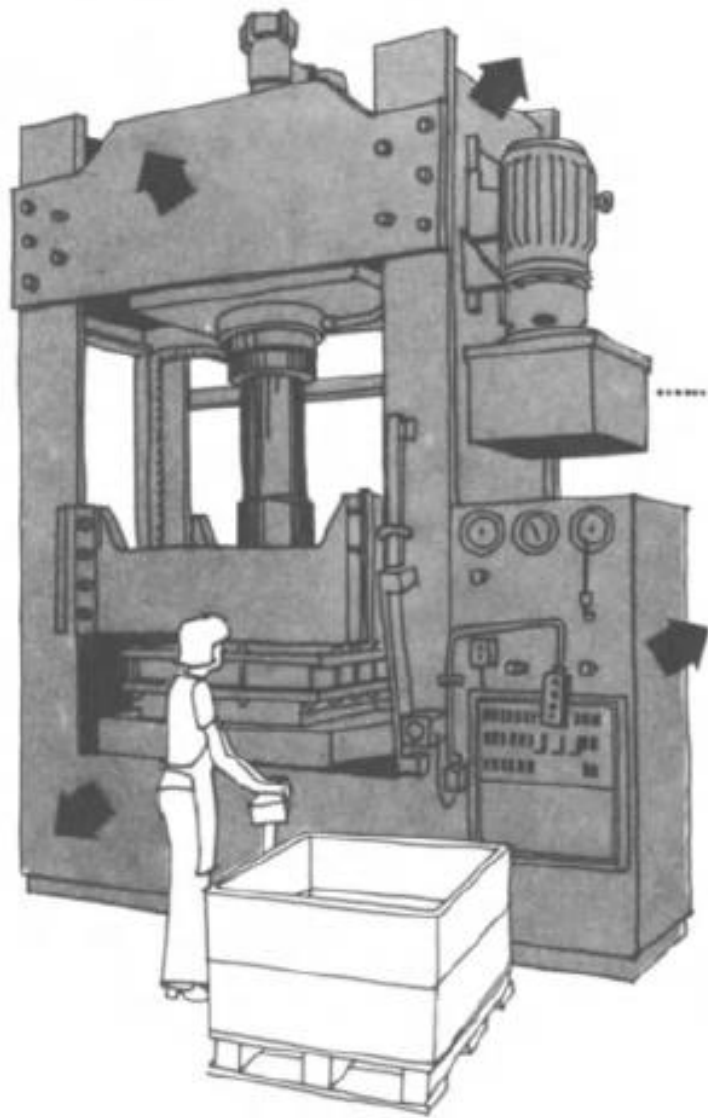


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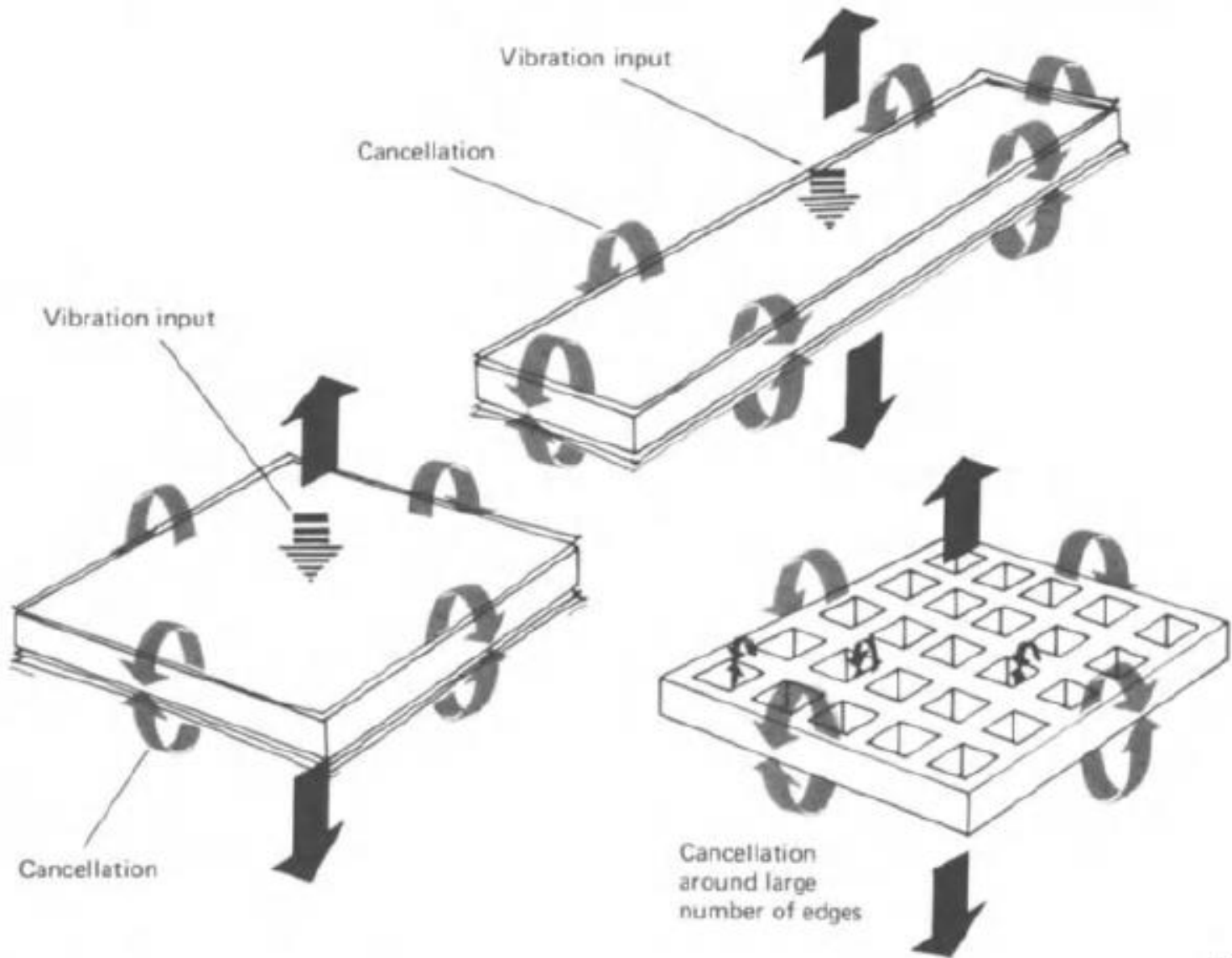


**Vibrating machinery or parts of machinery should be mounted on a heavy foundation wherever possible**

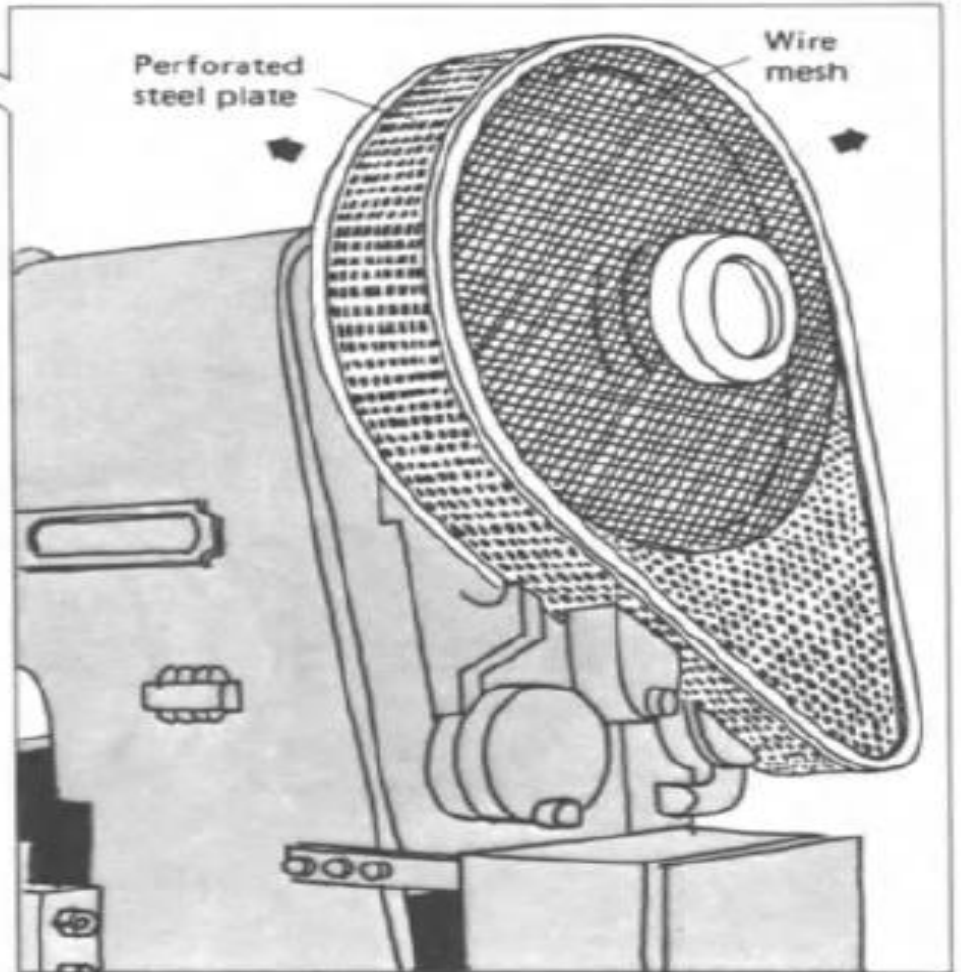
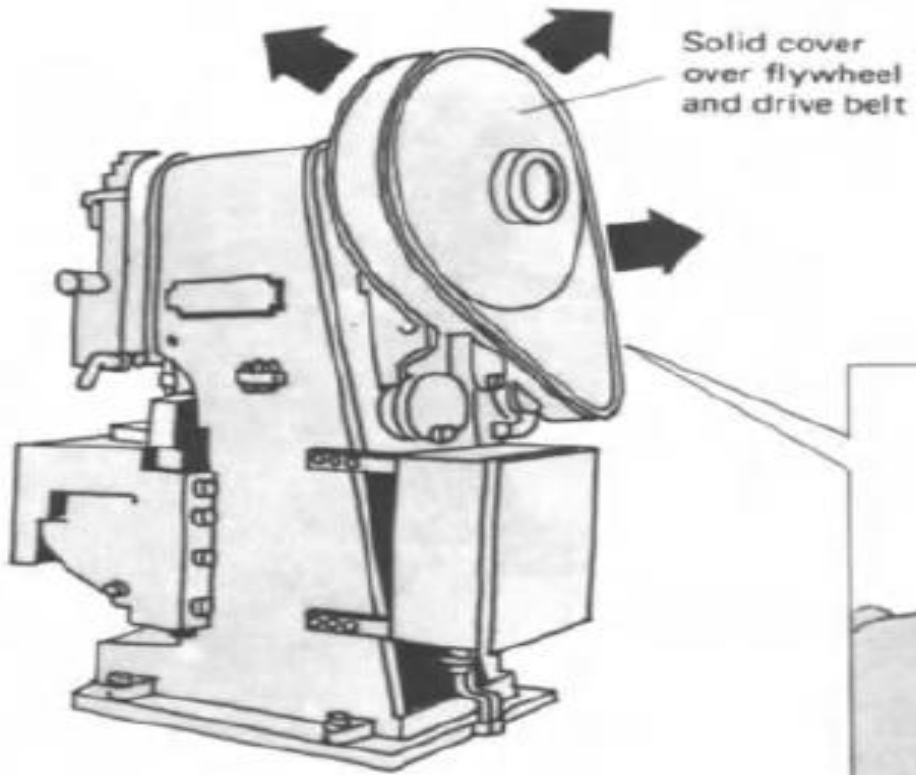


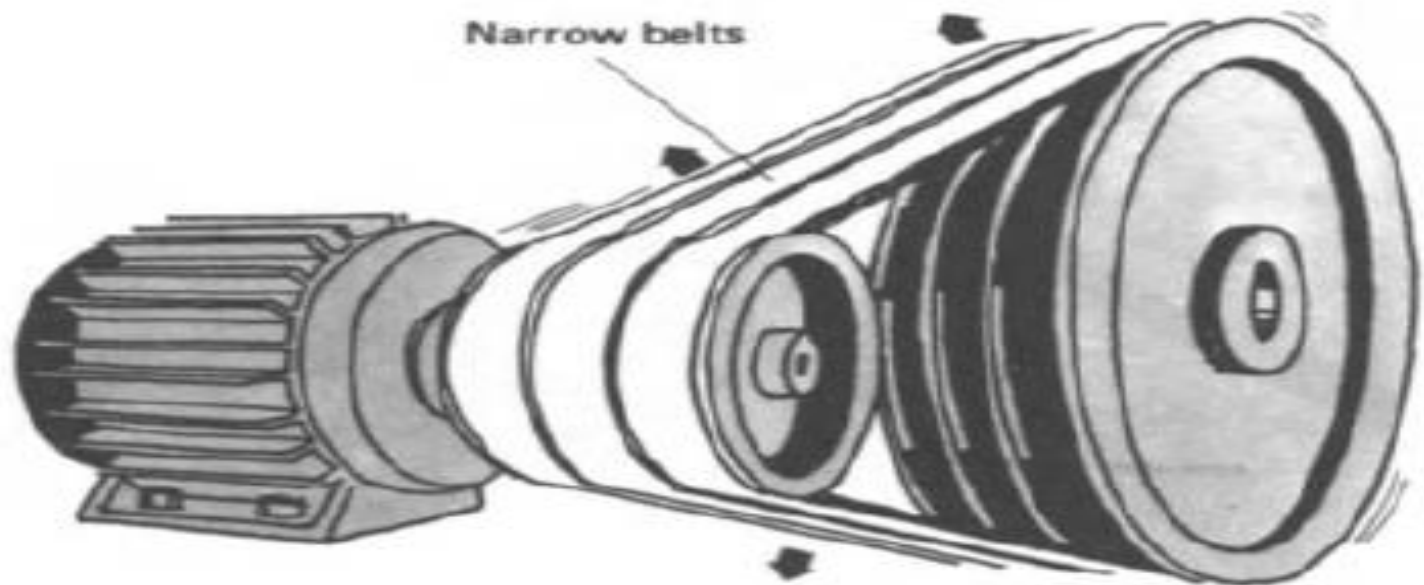
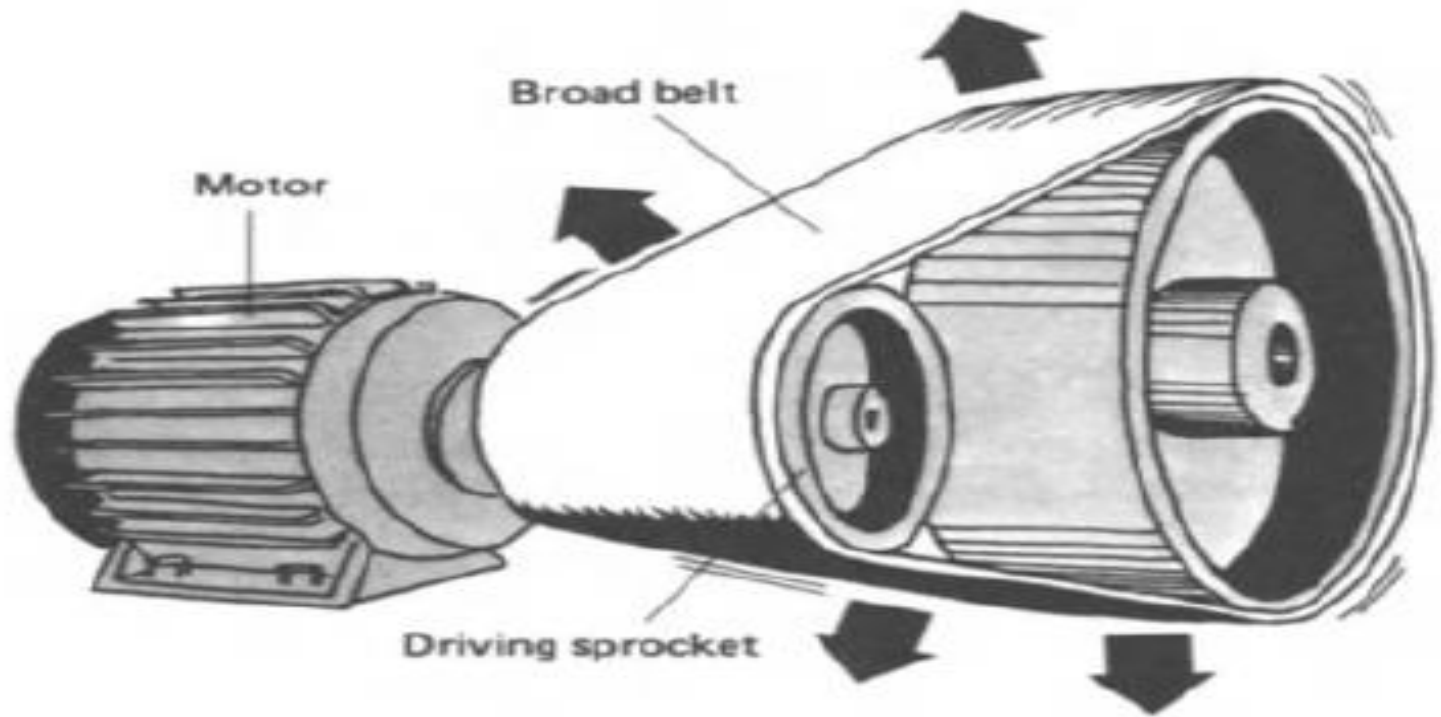


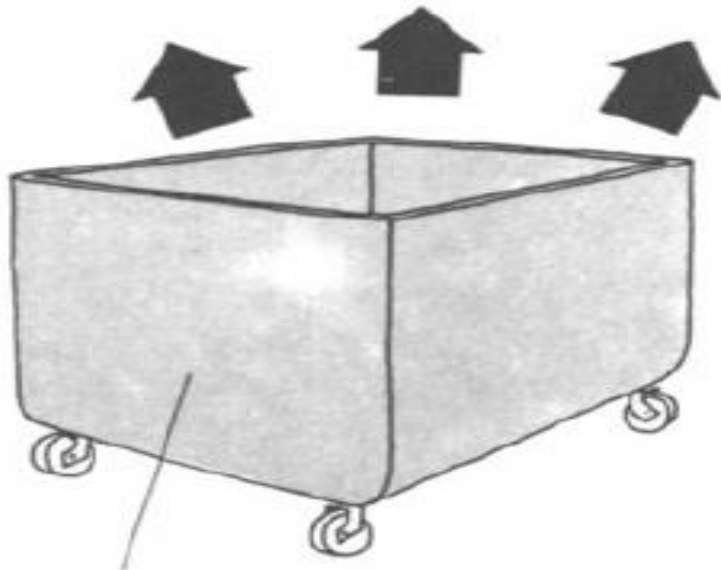




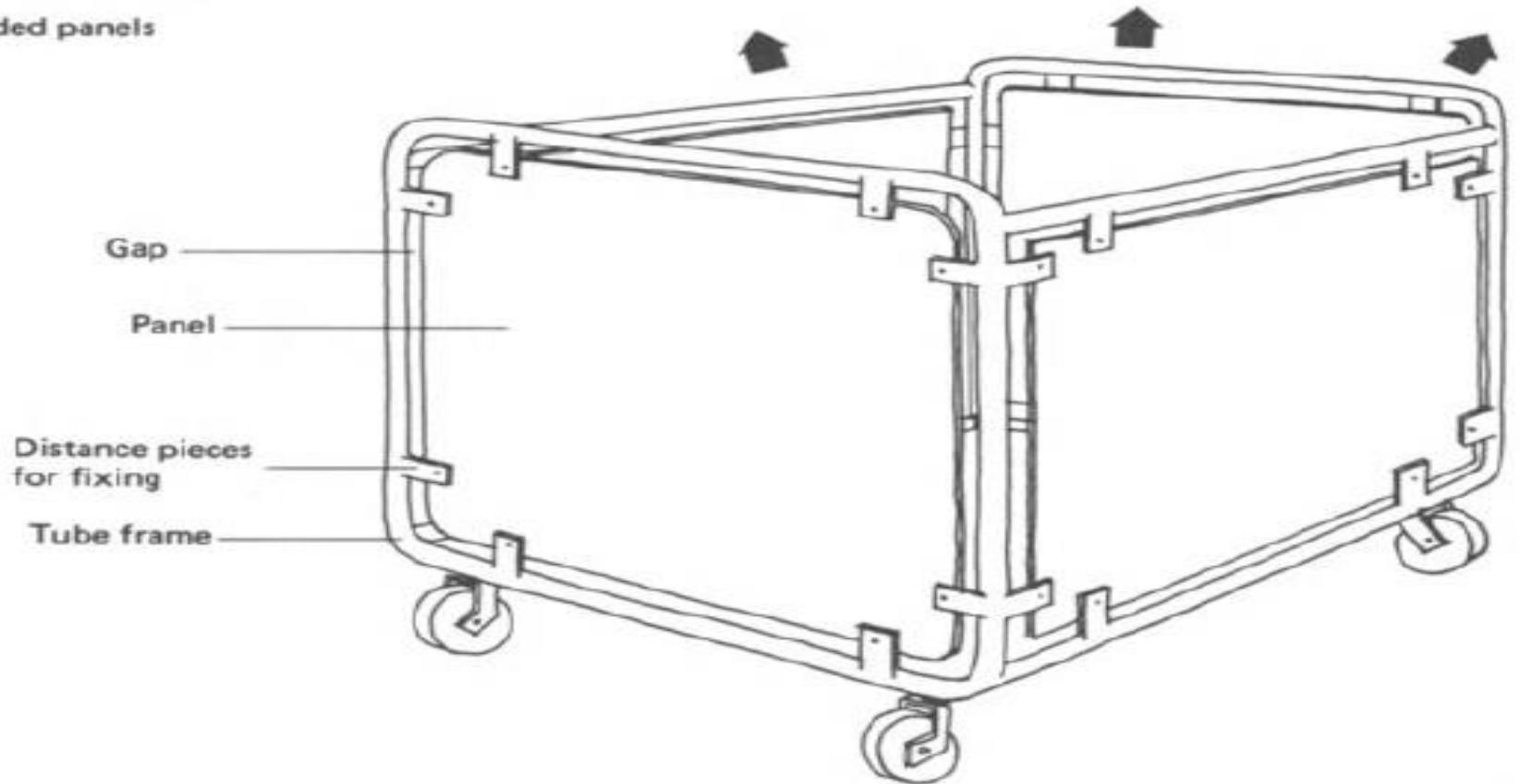




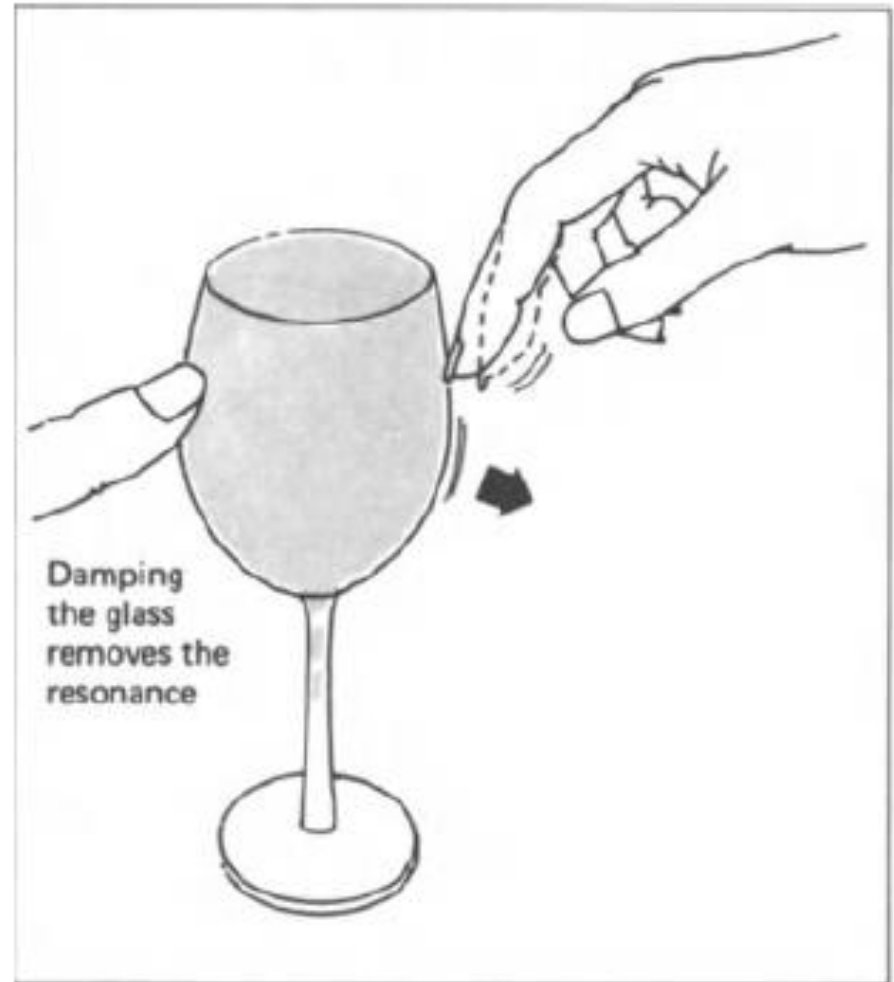
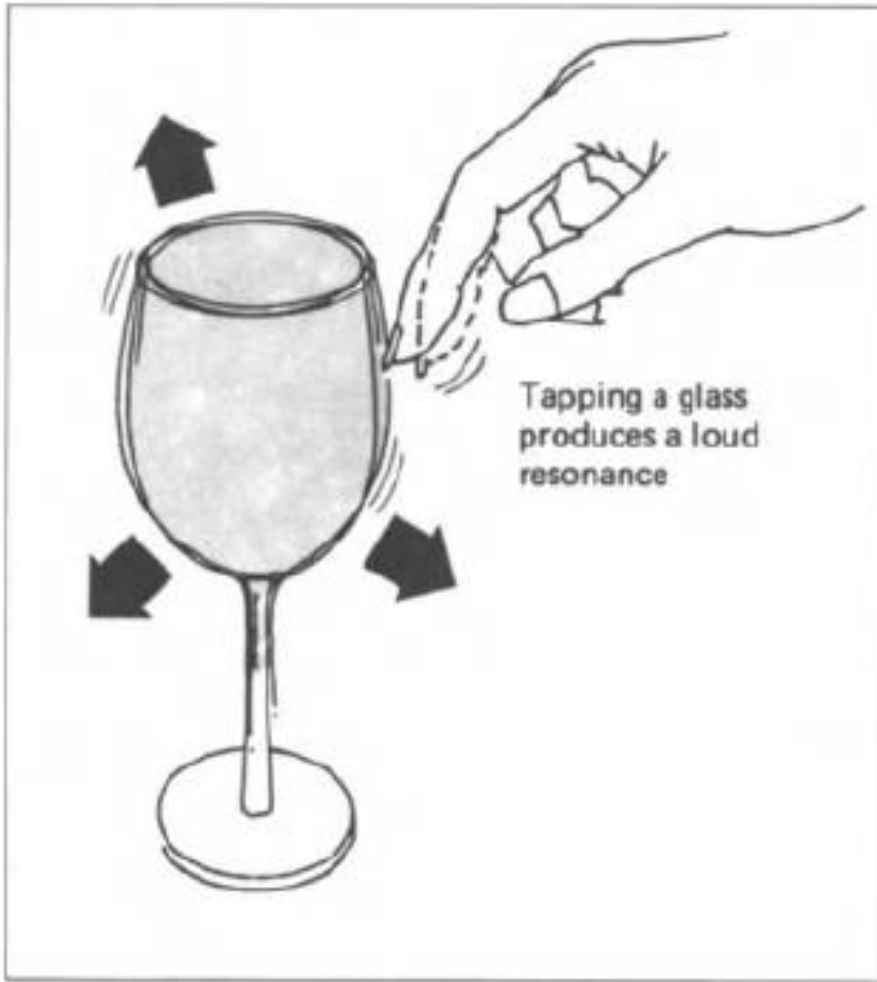


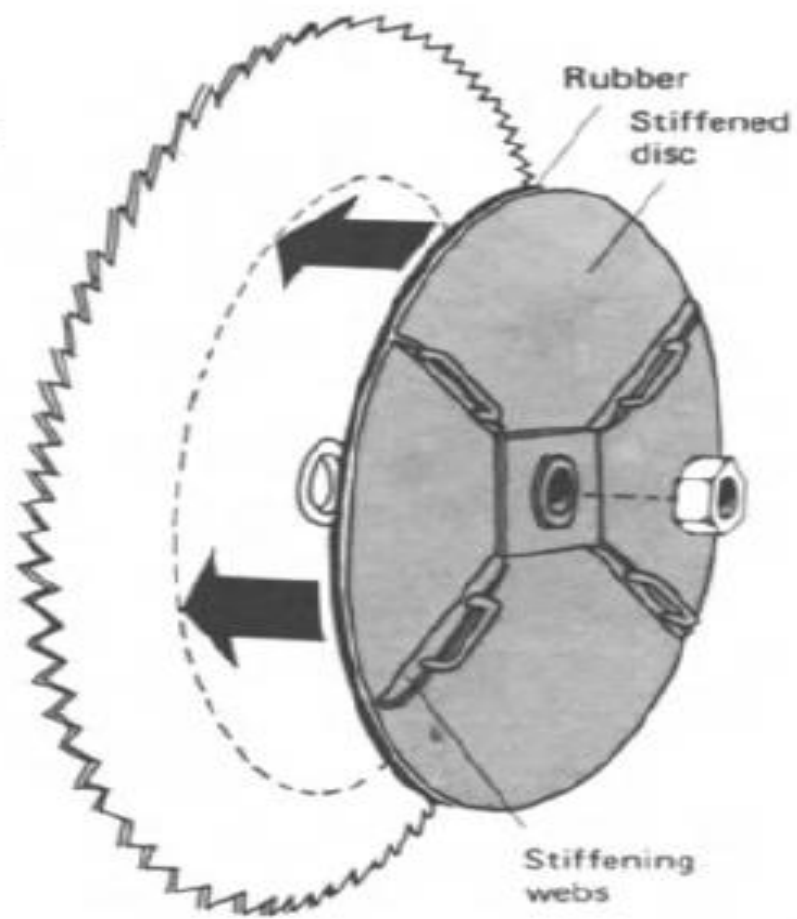
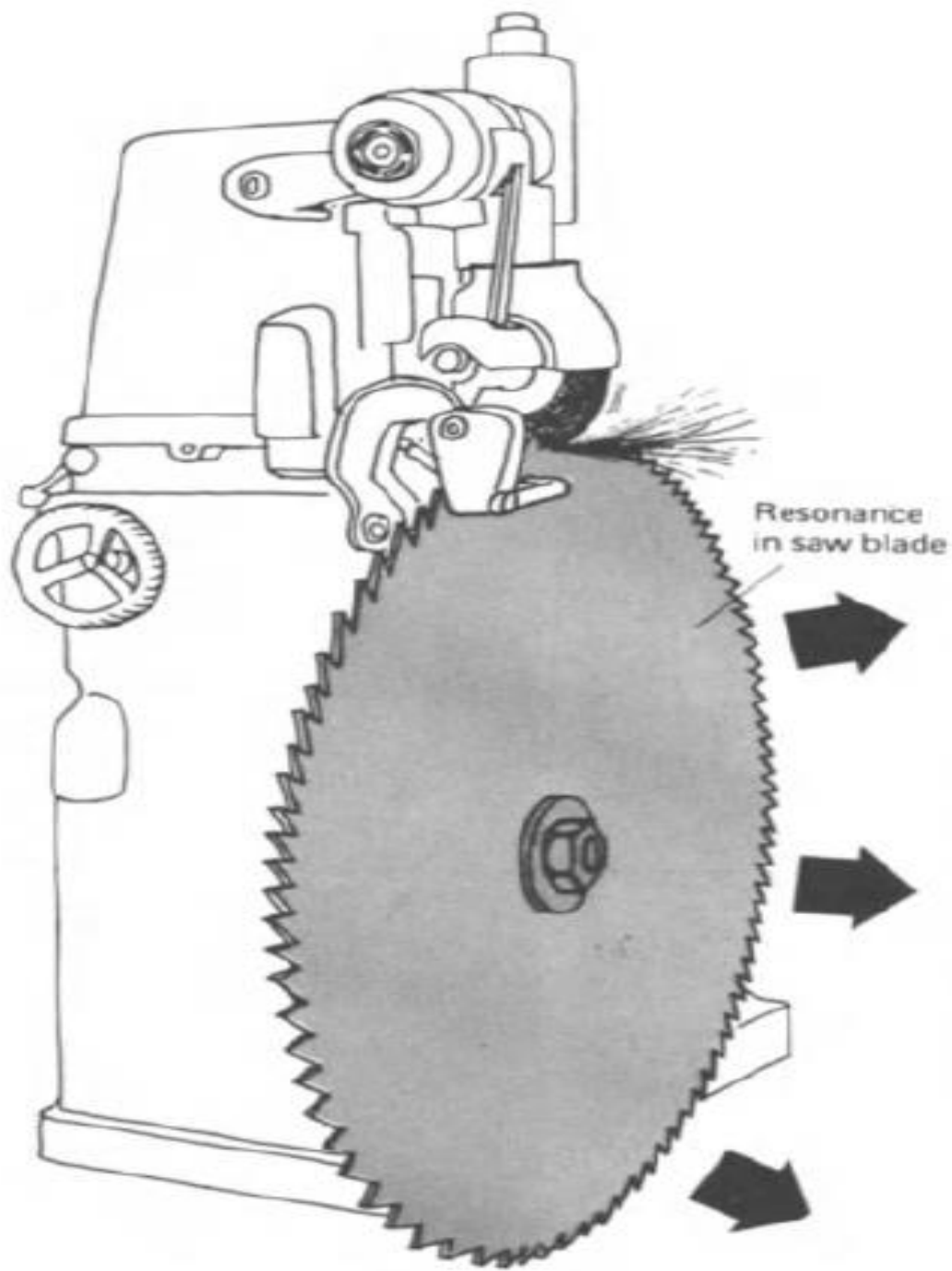


All-welded panels



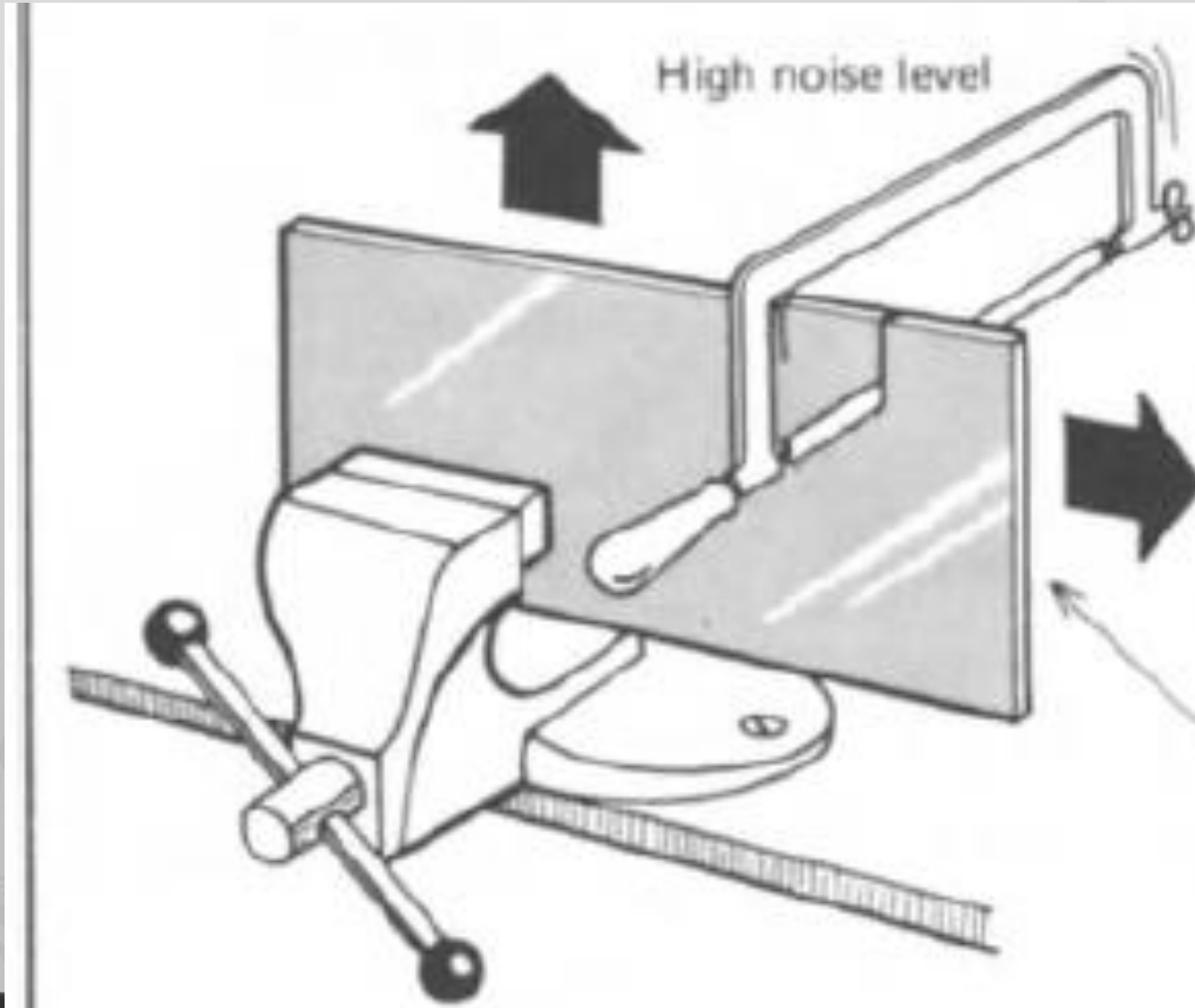
# Resonances amplify noise radiation but can be damped easily





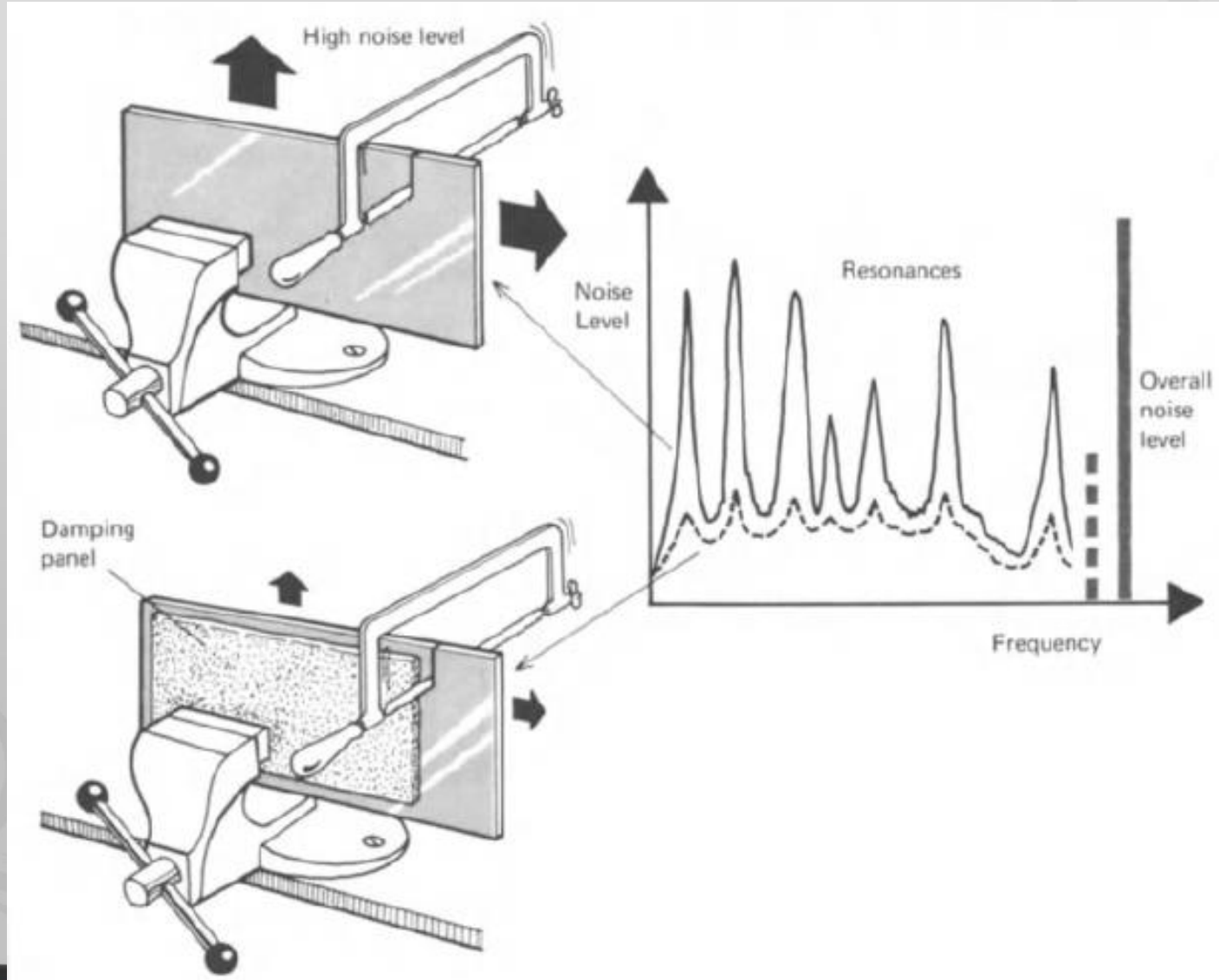


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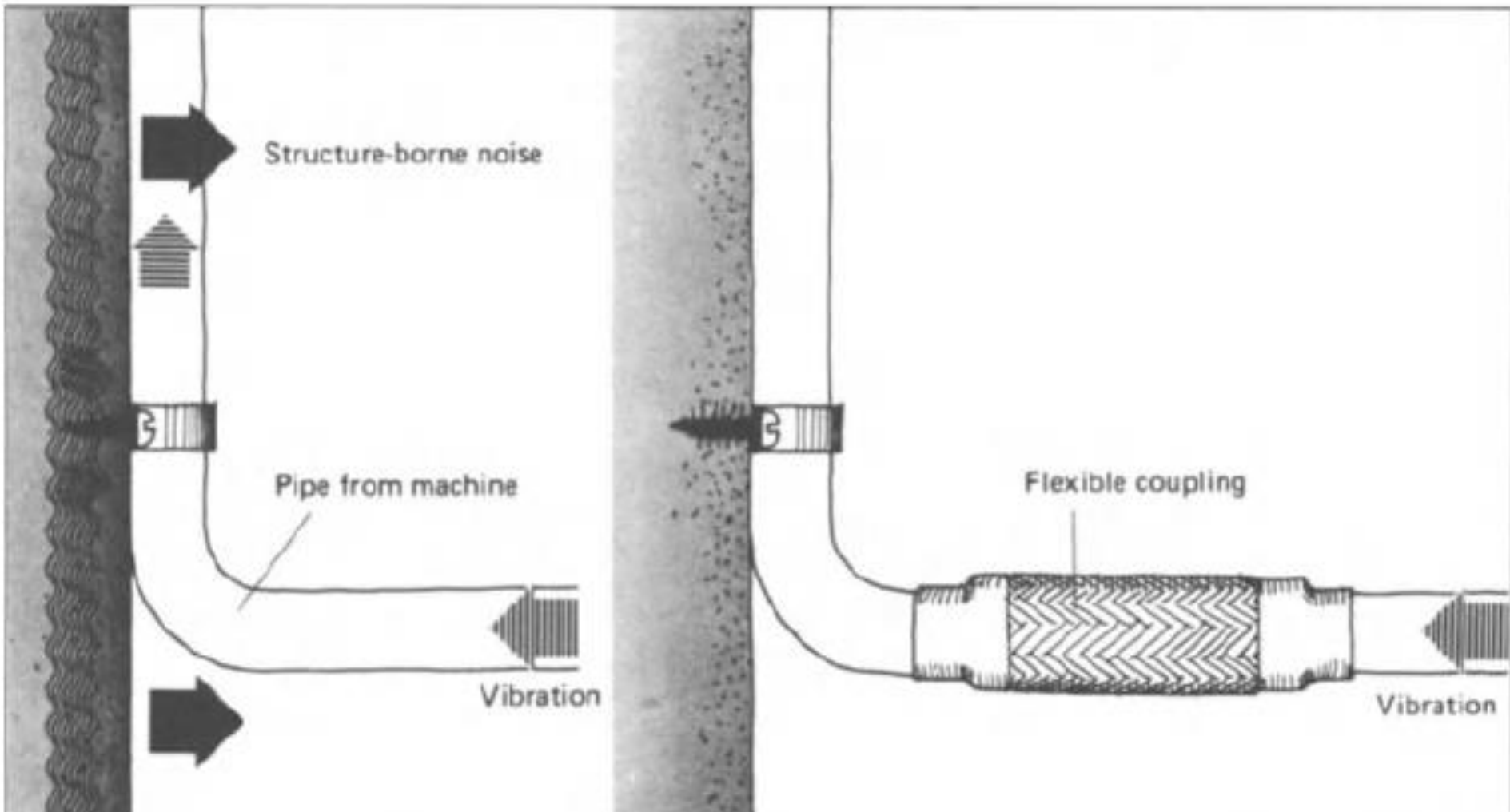




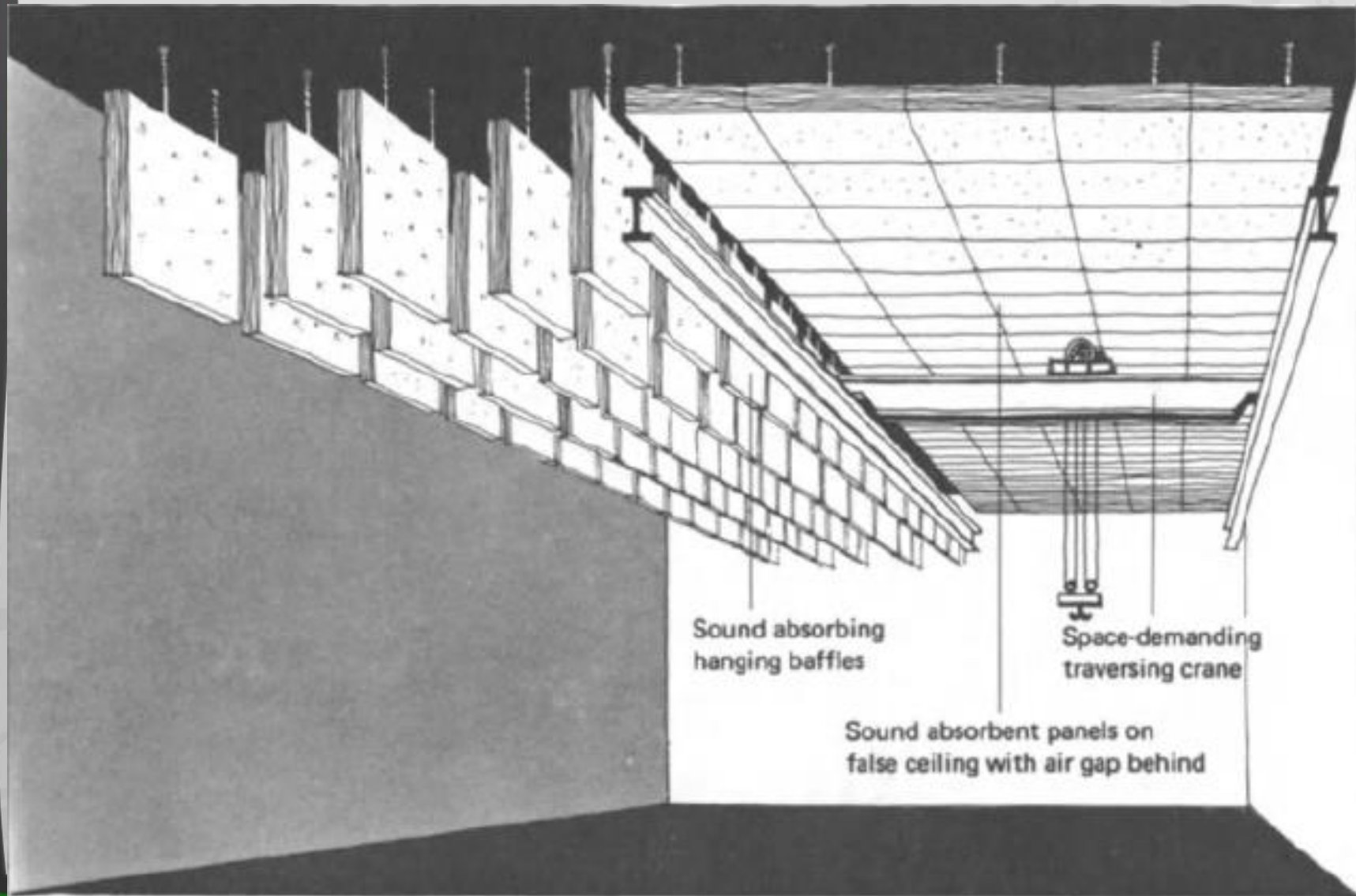
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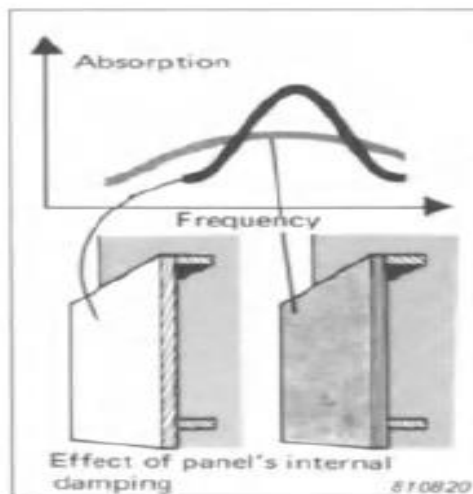
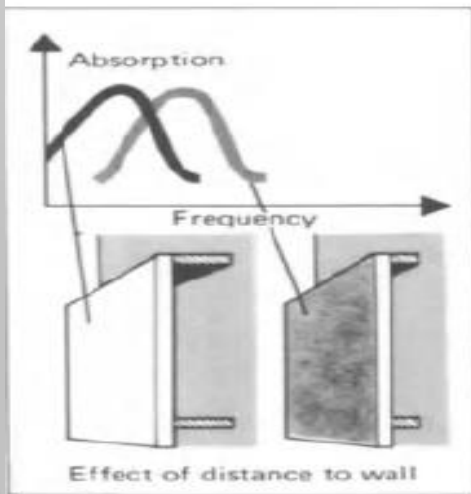
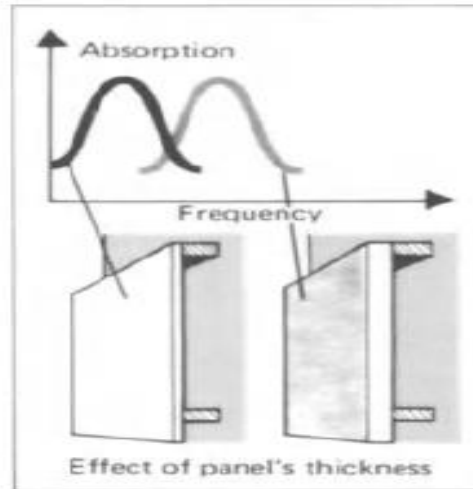
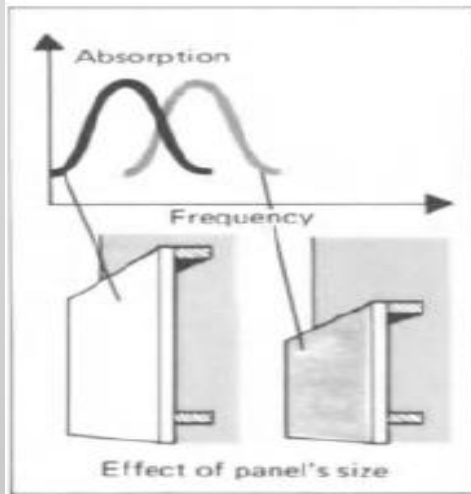
# Structure-borne sound via connections must be avoided

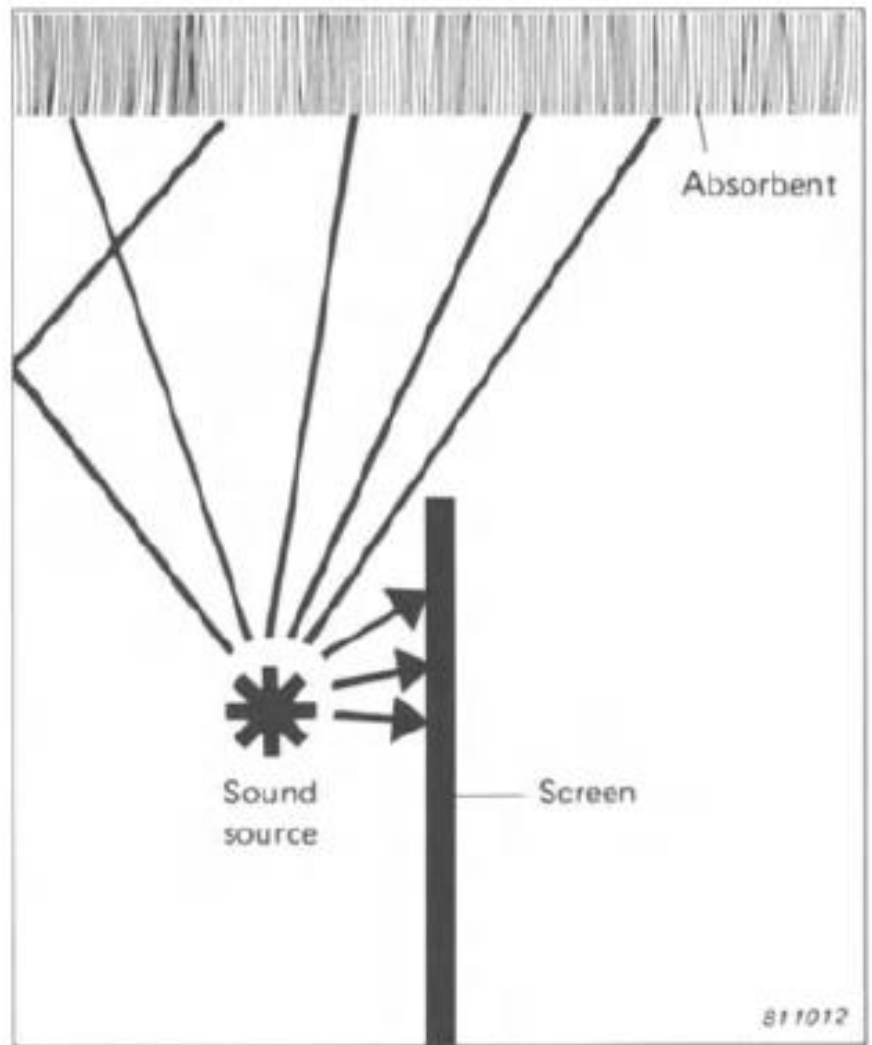
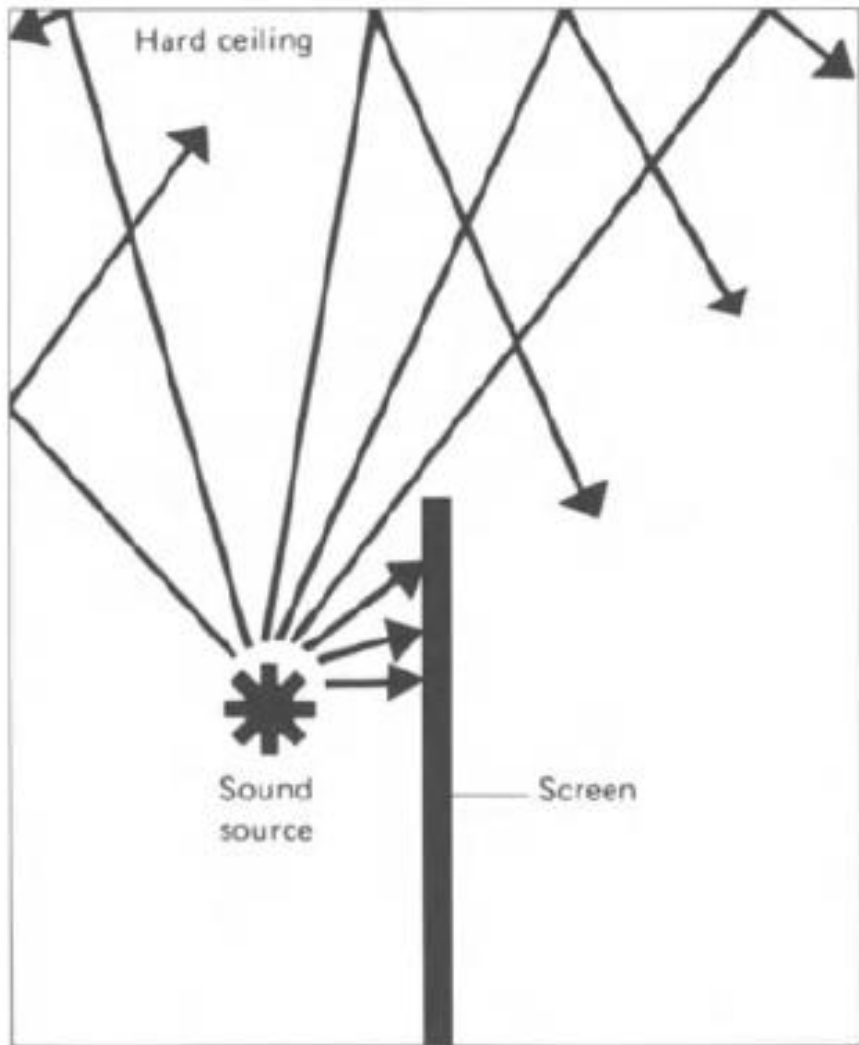


# کنترل صدای با فرکانس پایین



# Panel absorbers are effective at low frequencies



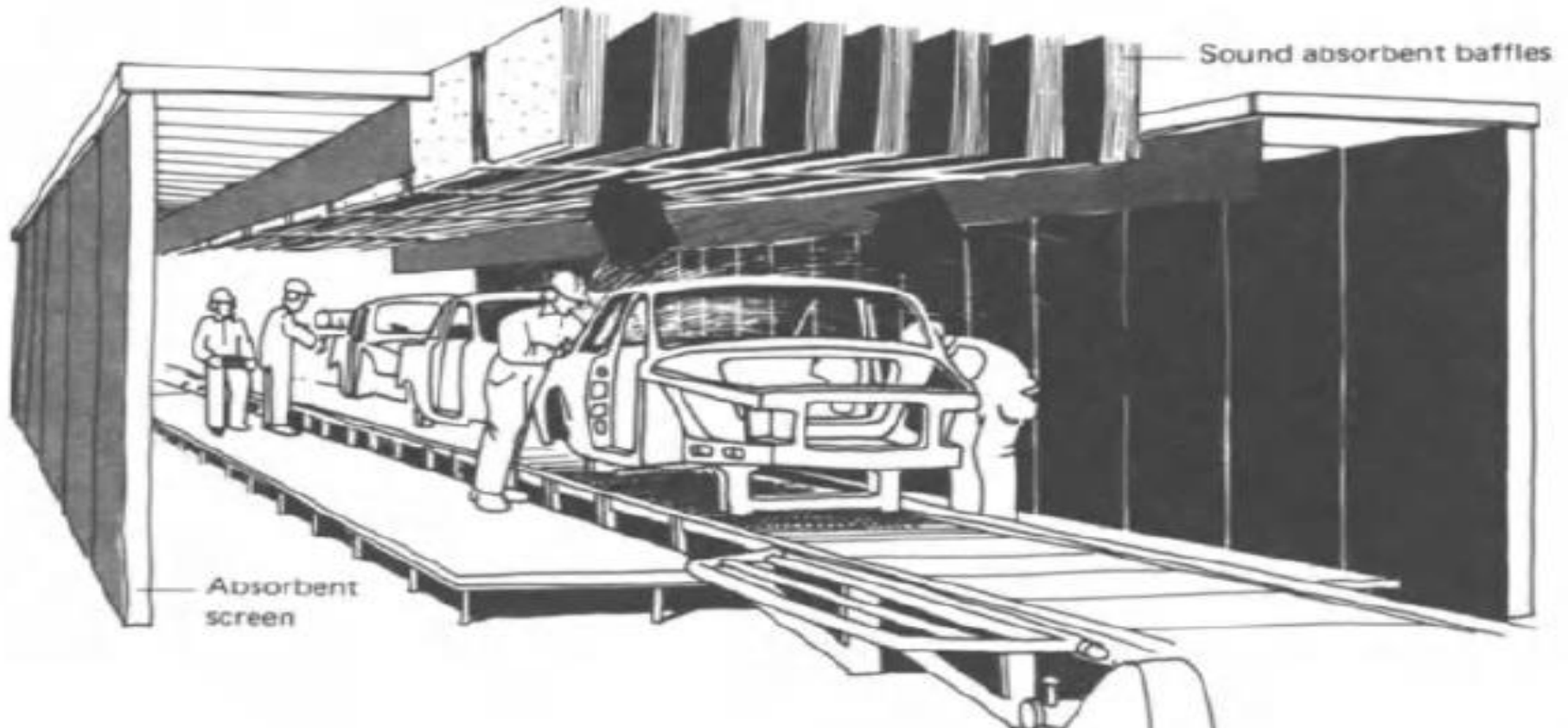






Relatively quiet line

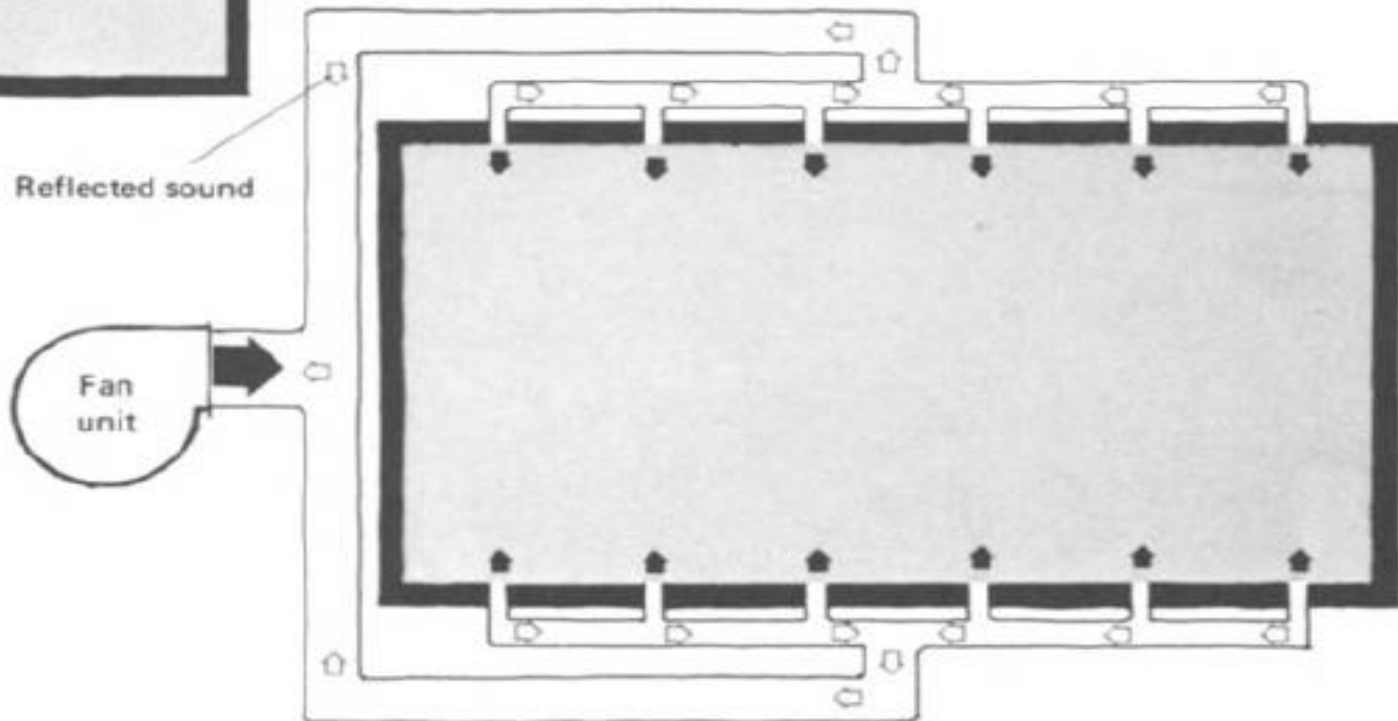
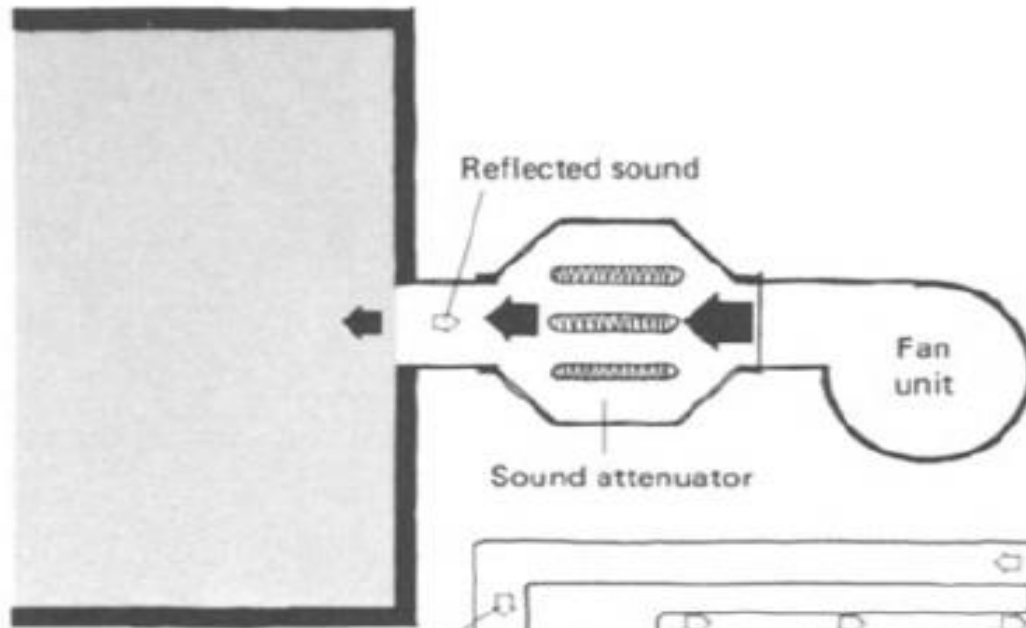
Noisy line

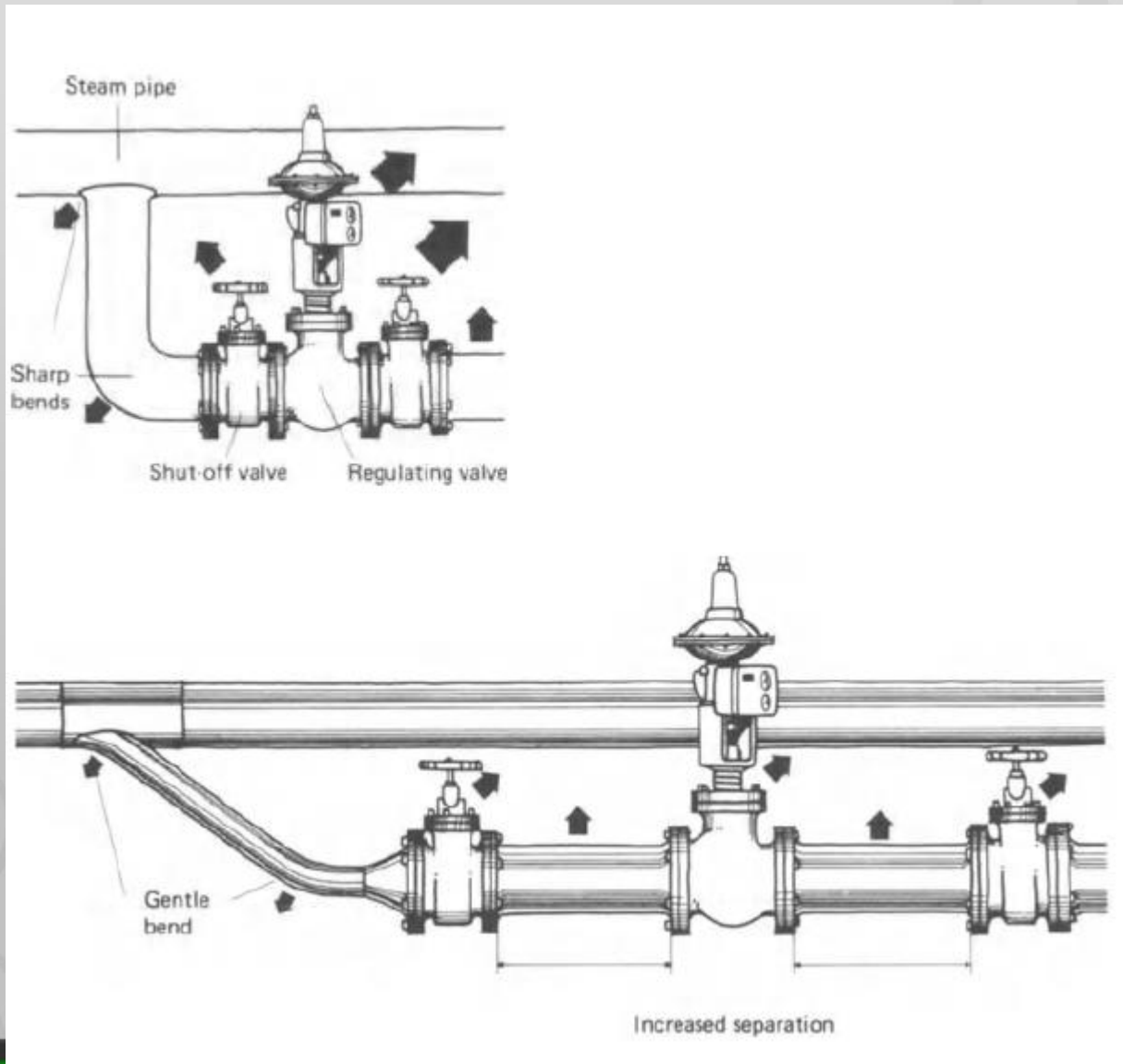


Sound absorbent baffles

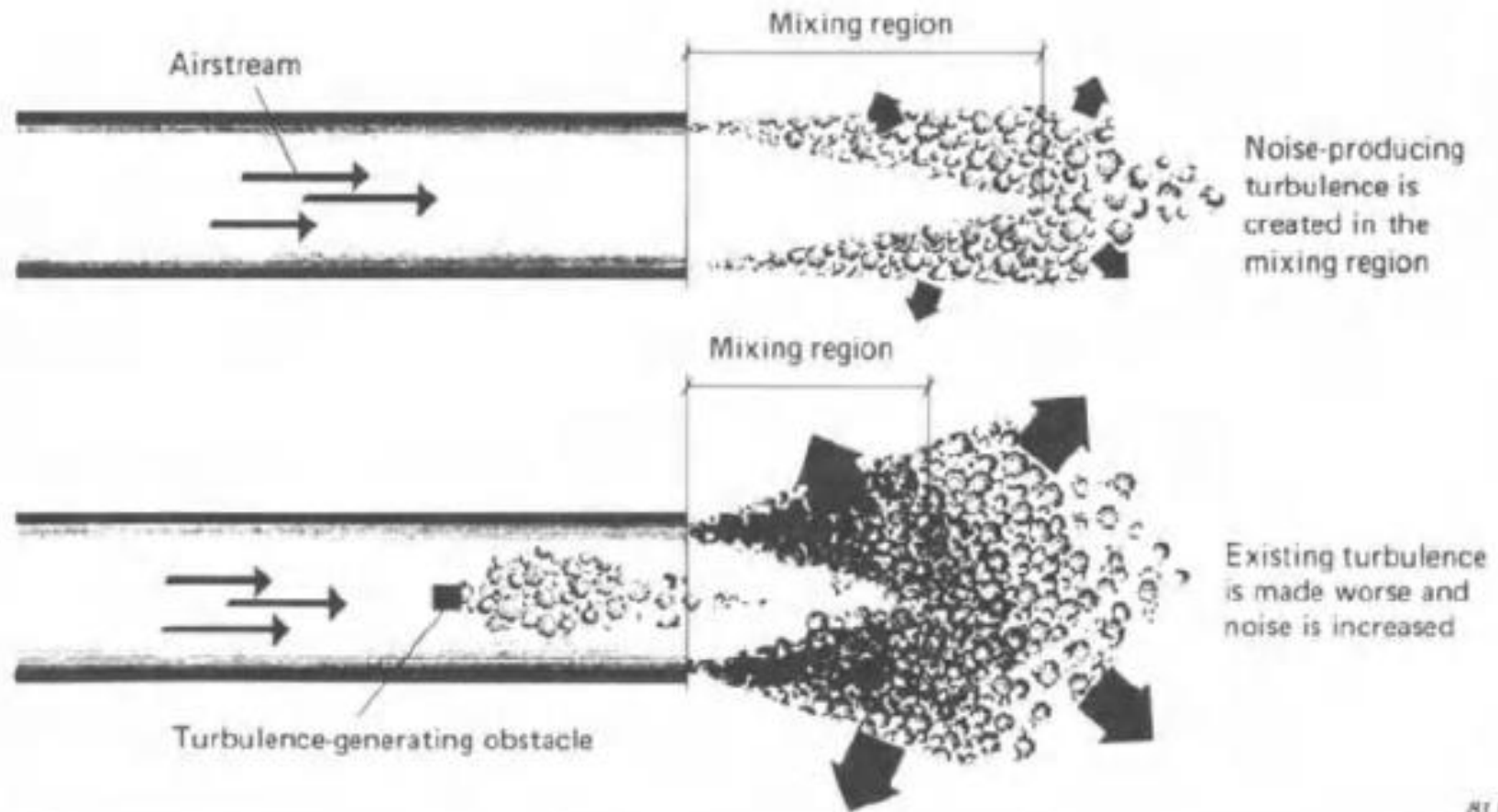
Absorbent screen



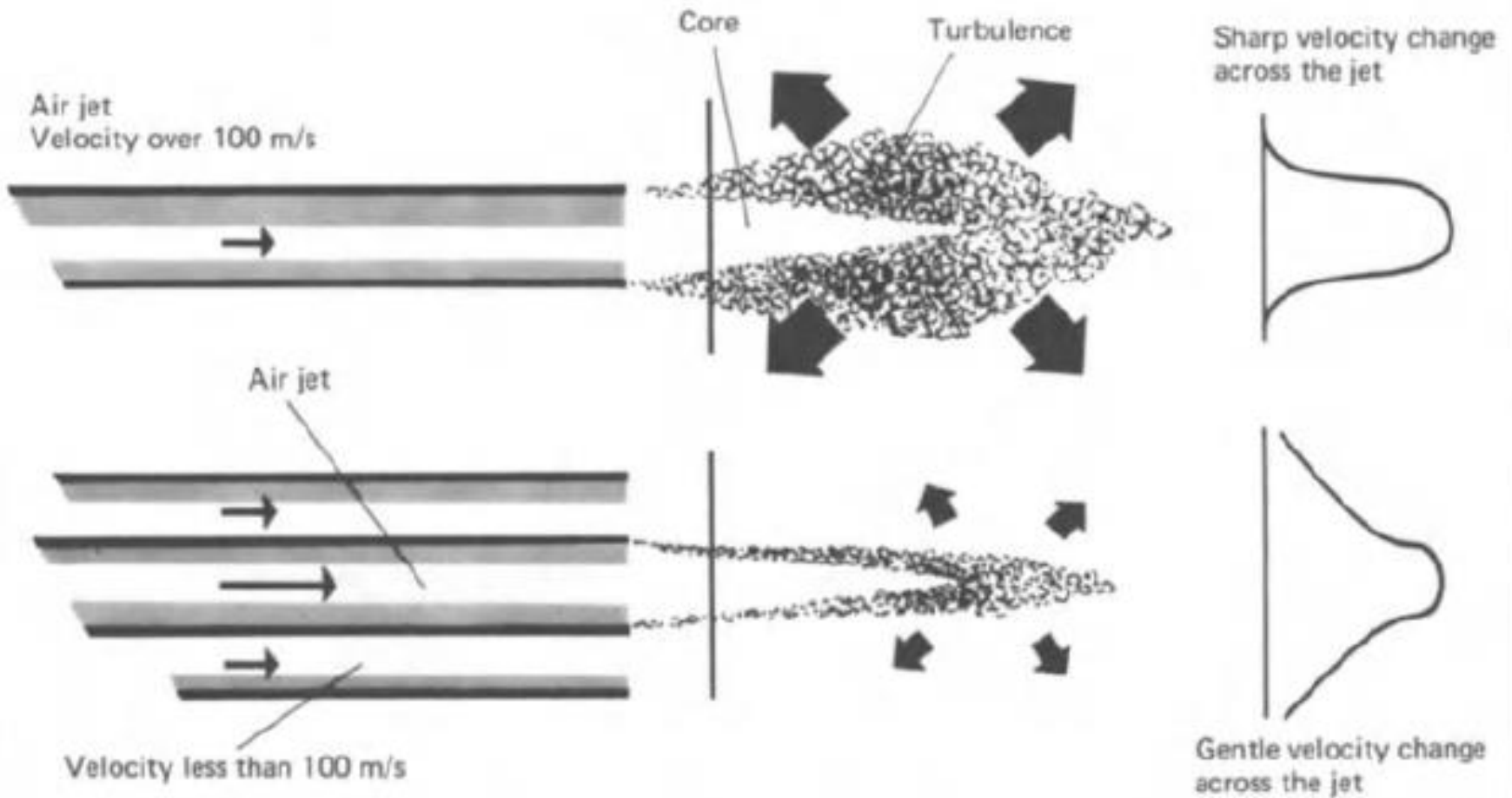


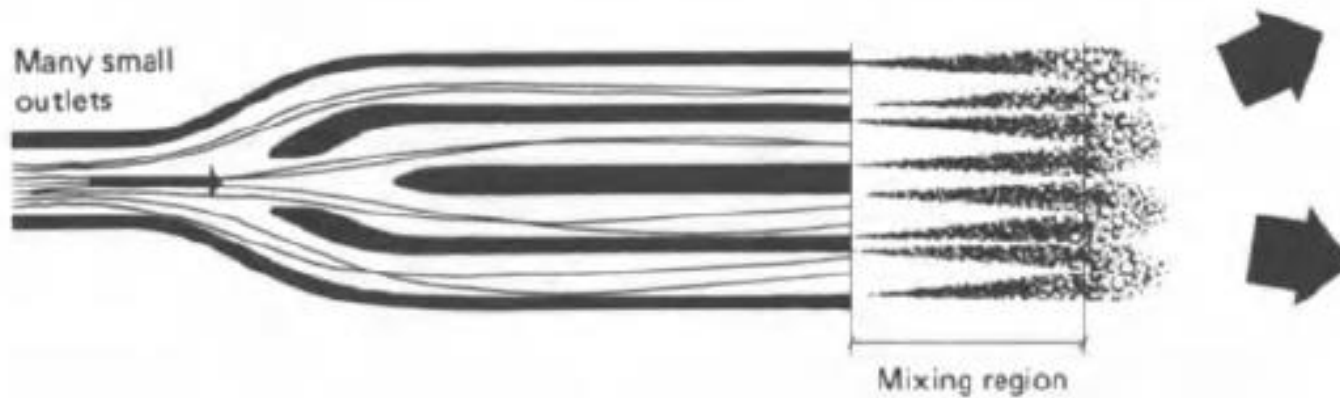
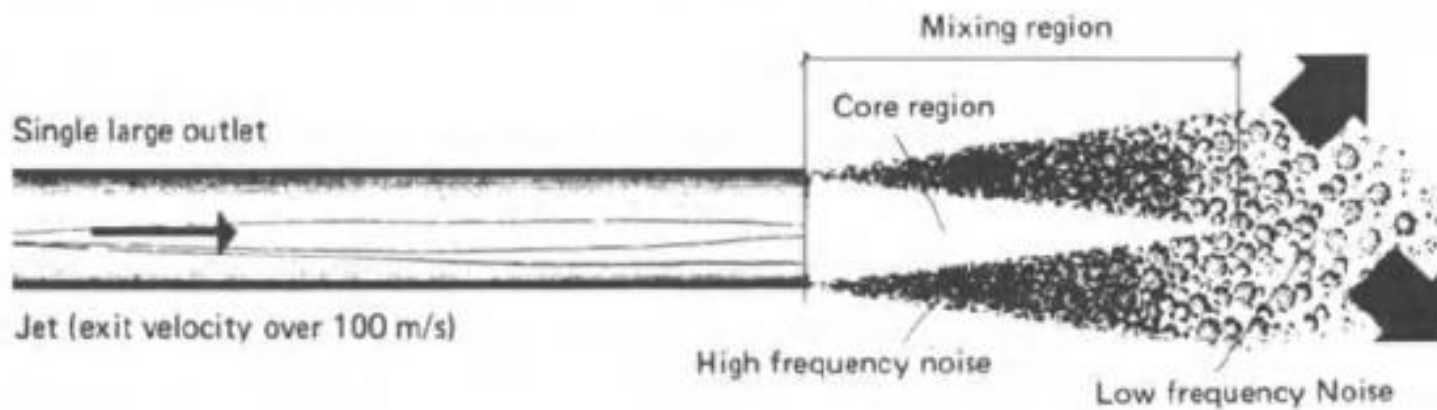


# Undisturbed flow gives rise to less exhaust noise

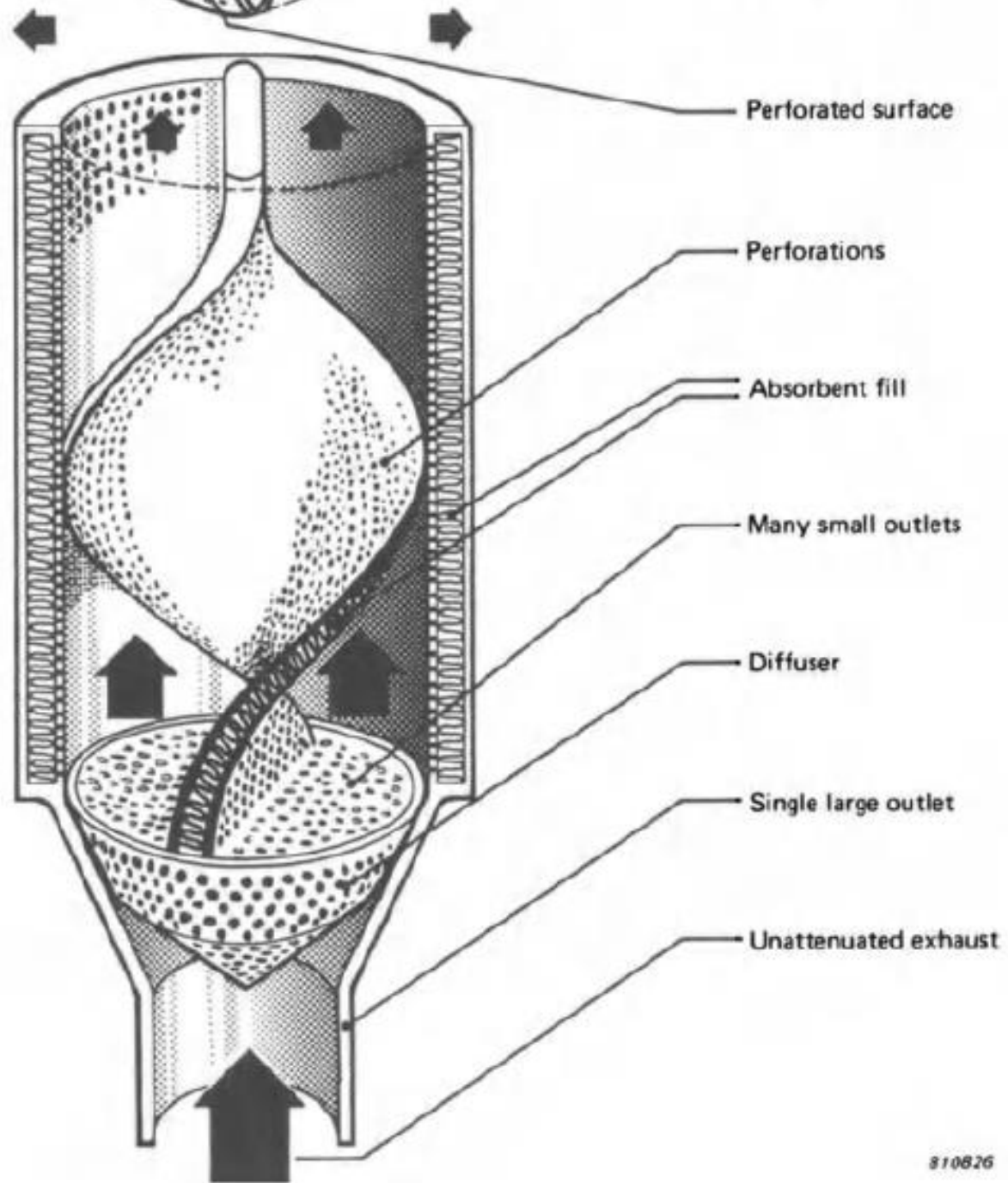


# Jet noise can be reduced by an extra airstream









Perforated surface

Perforations

Absorbent fill

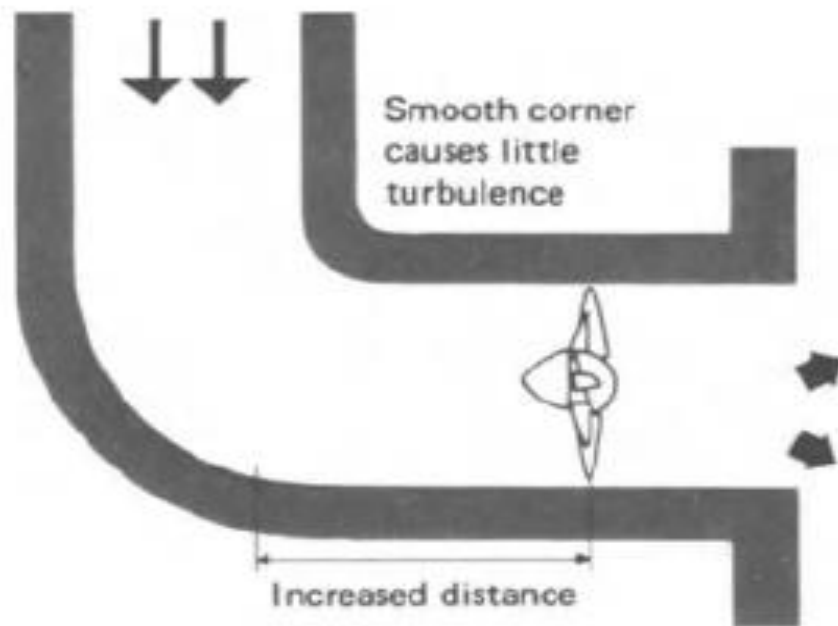
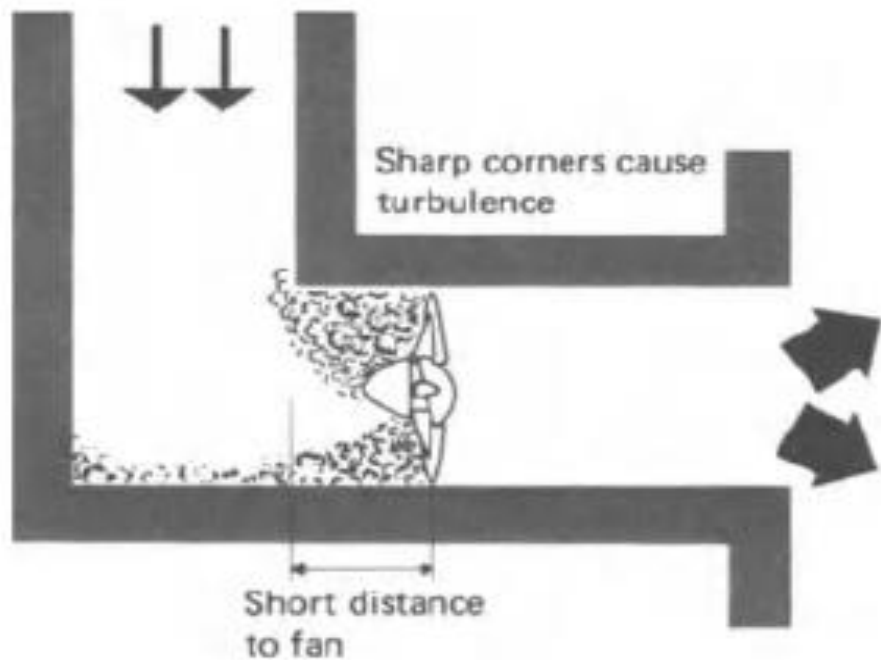
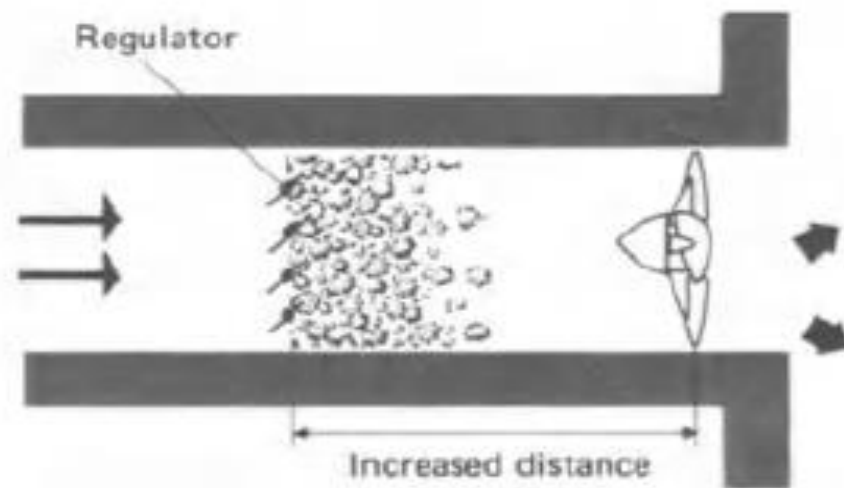
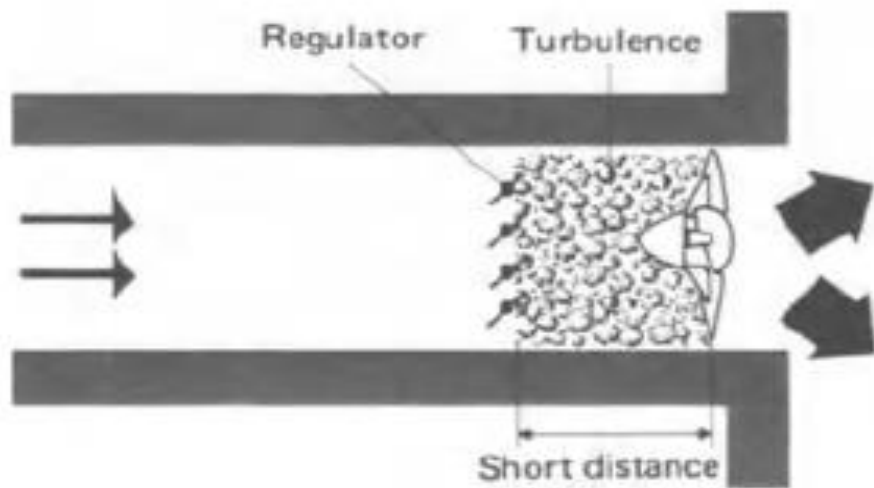
Many small outlets

Diffuser

Single large outlet

Unattenuated exhaust





با تسک از تو به ما