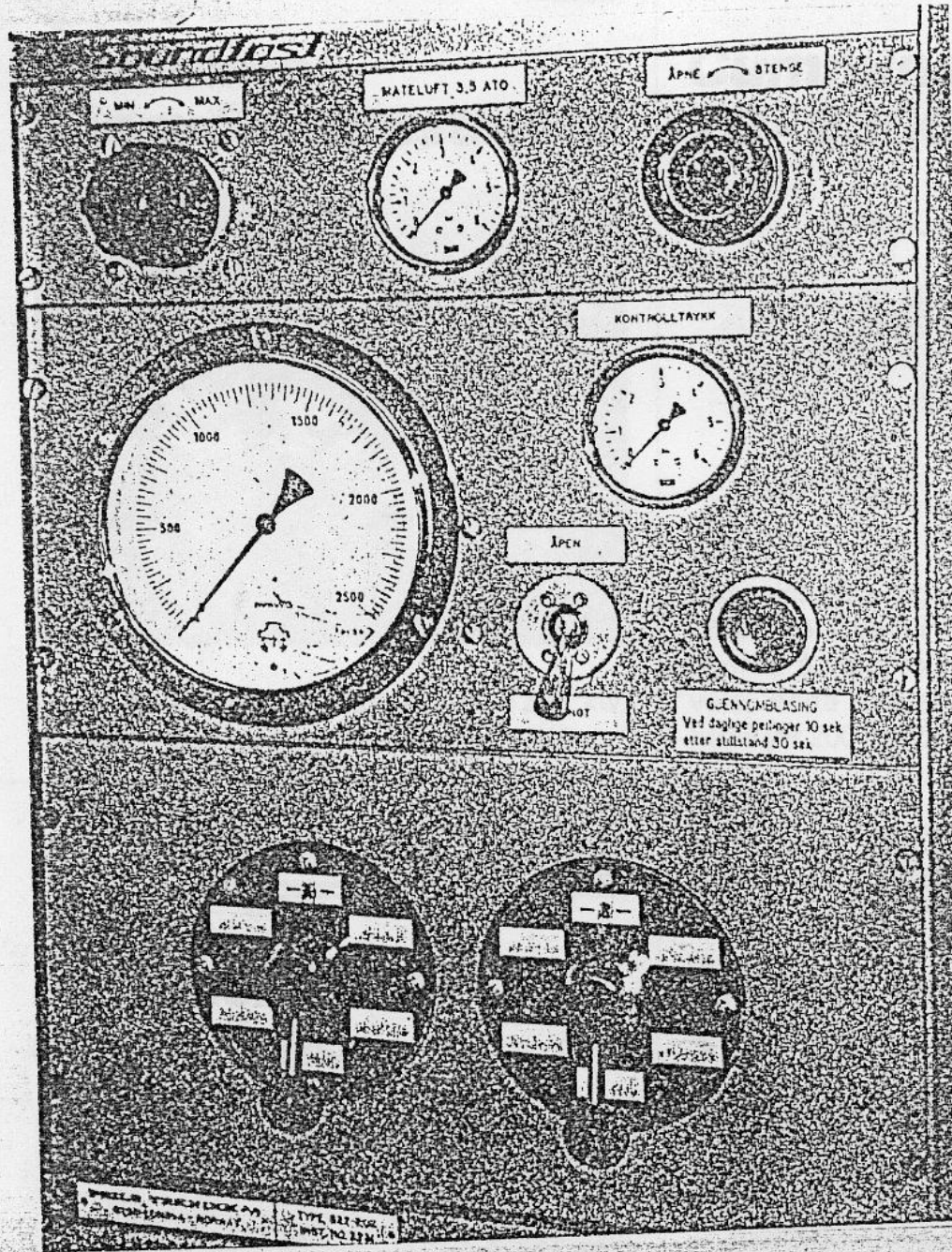
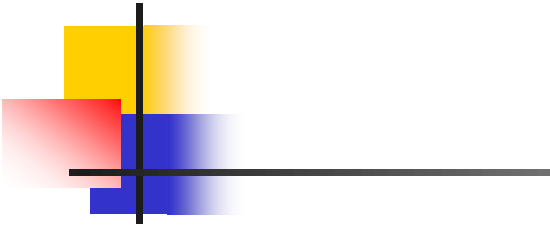
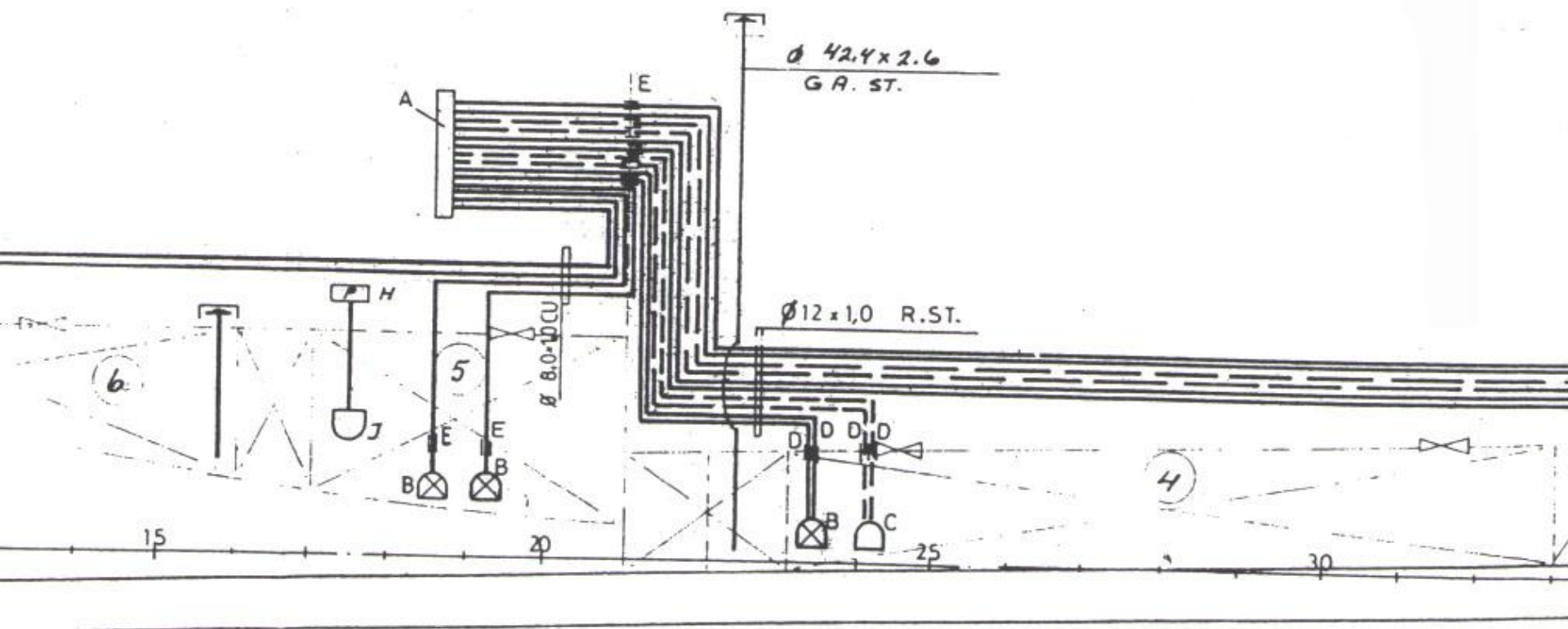
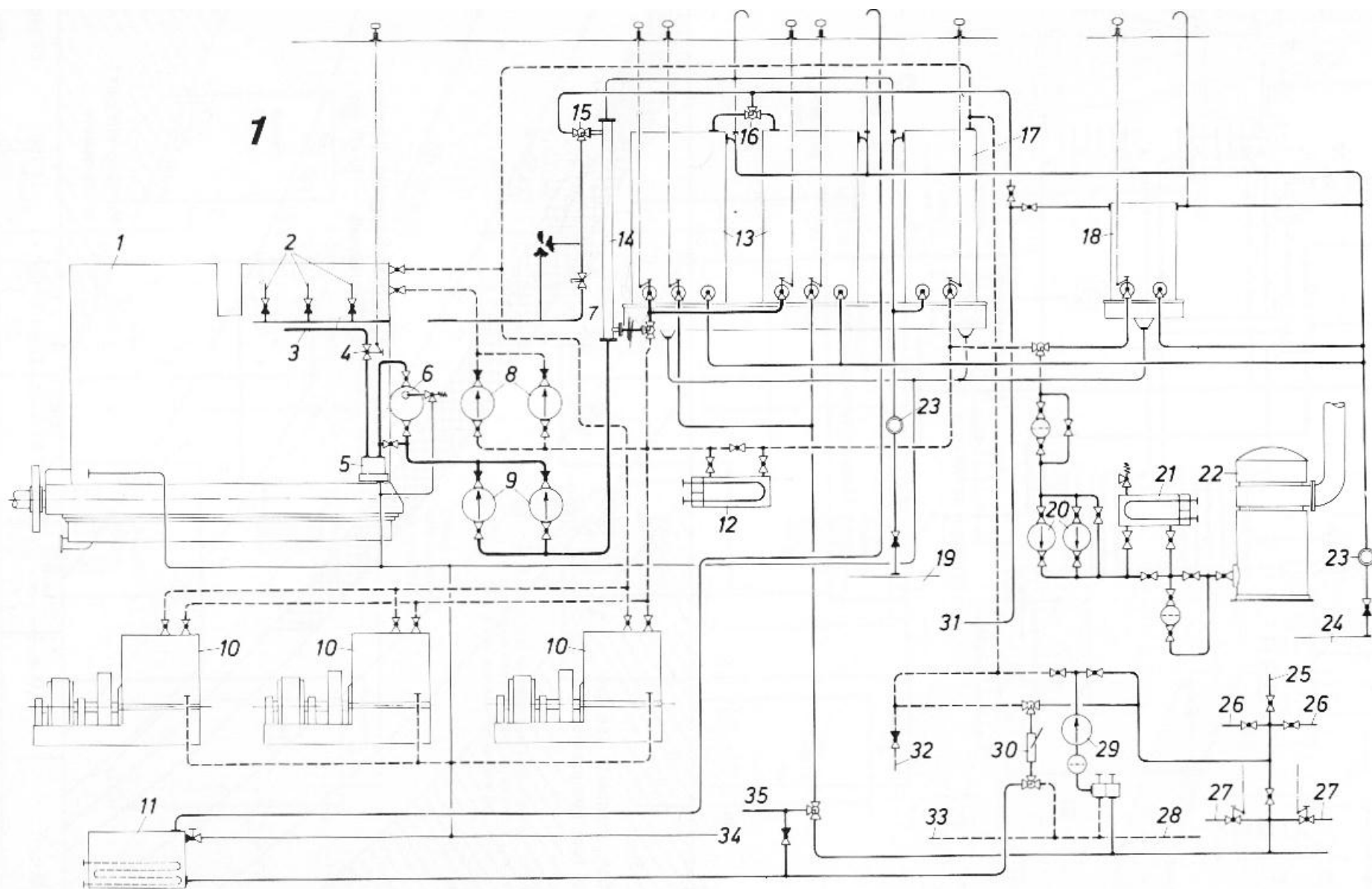




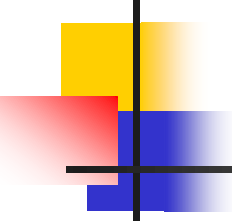
Rörakerfi fyrir mælingar



1

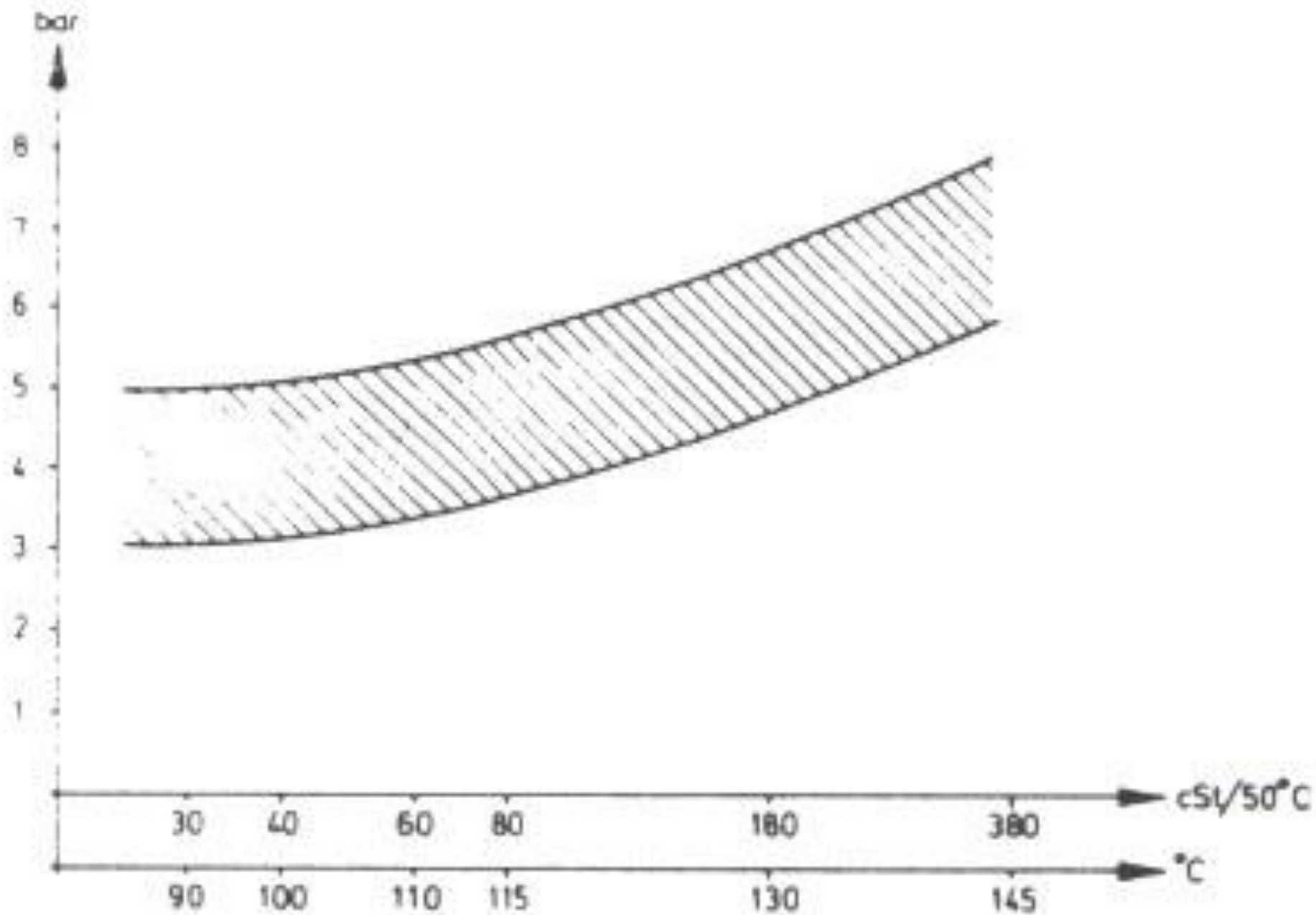


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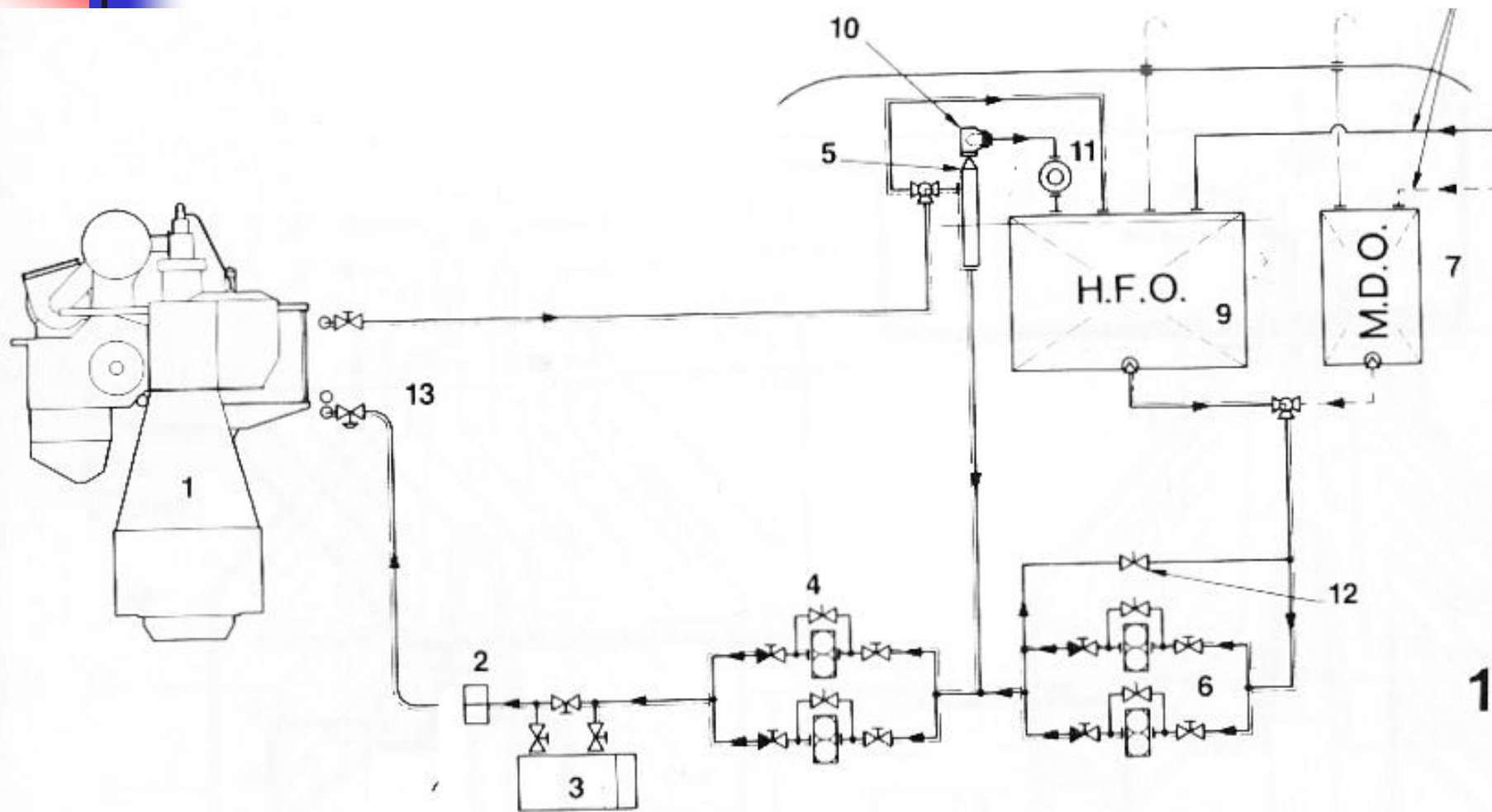


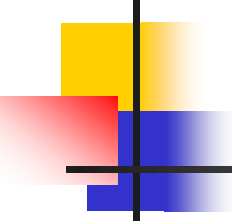
Það getur verið sprengihætta þegar vél er gangsett

- 1. Hafa eldsneytisloka í lagi
- 2. Törna vélinni fyrir gangsetningu ef hún hefur staðið í lengri tíma
- 3. Að hafa kælidælur 8 ekki í gangi eftir að vél hefur verið stöðvuð



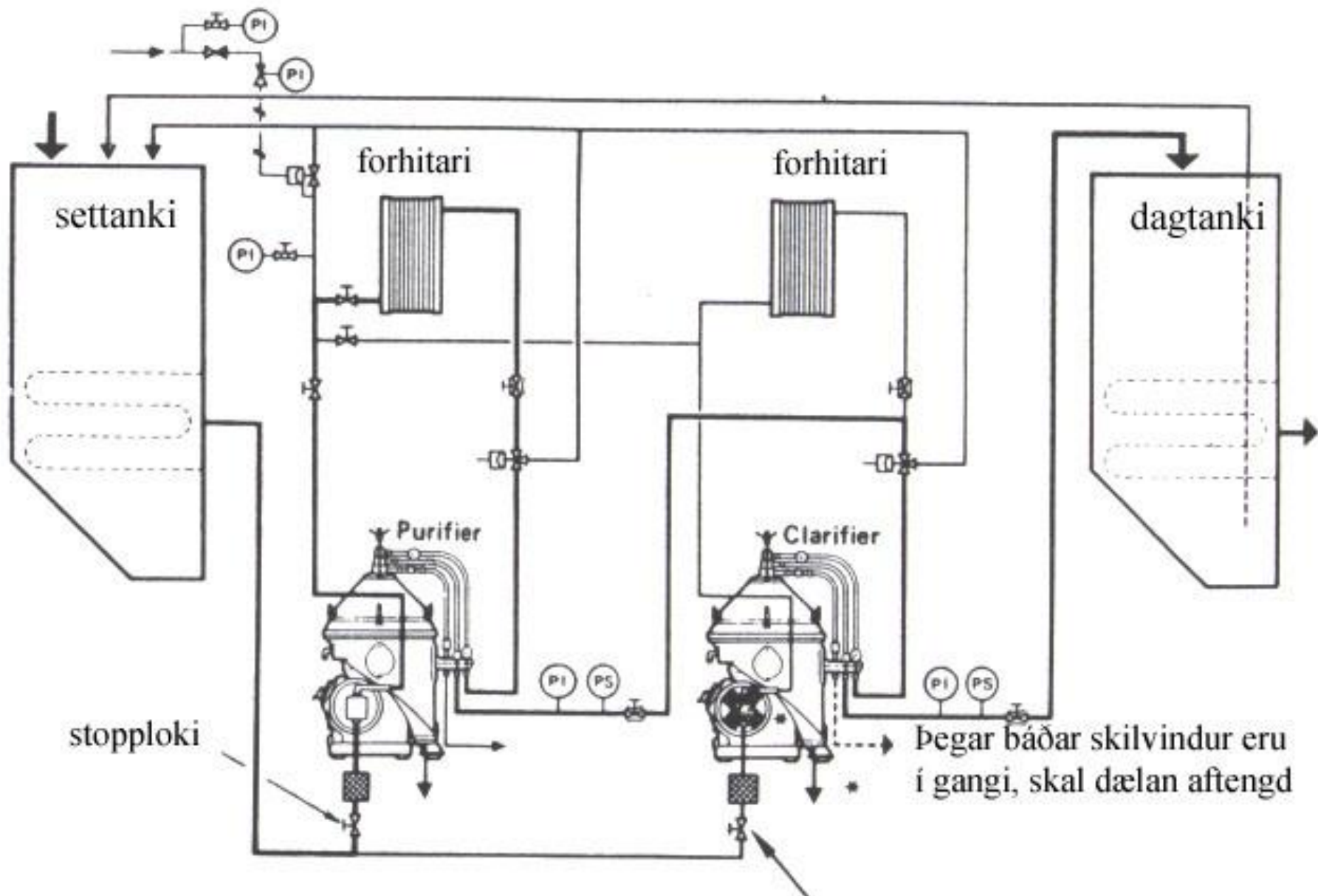
Bls. 12

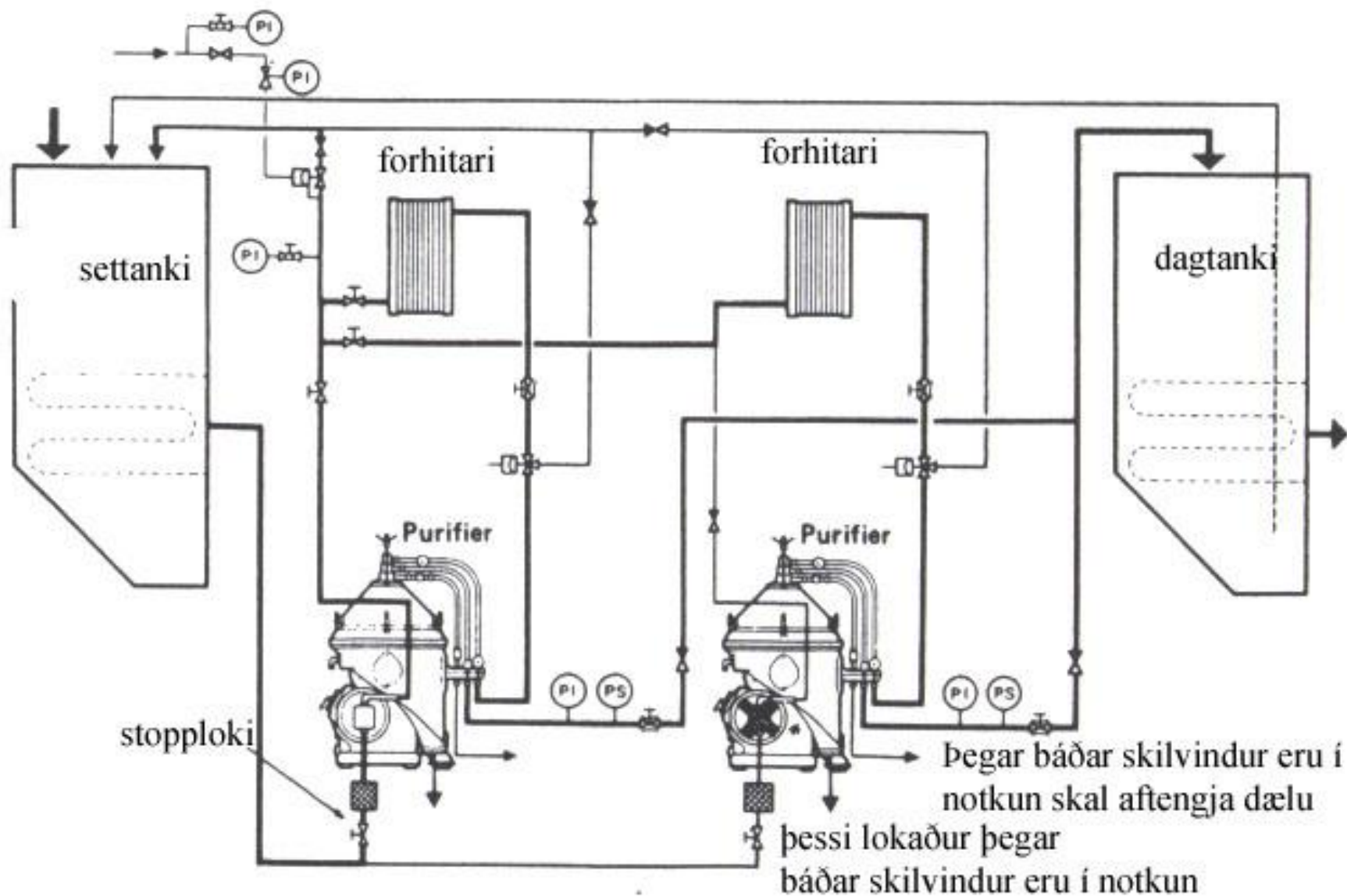


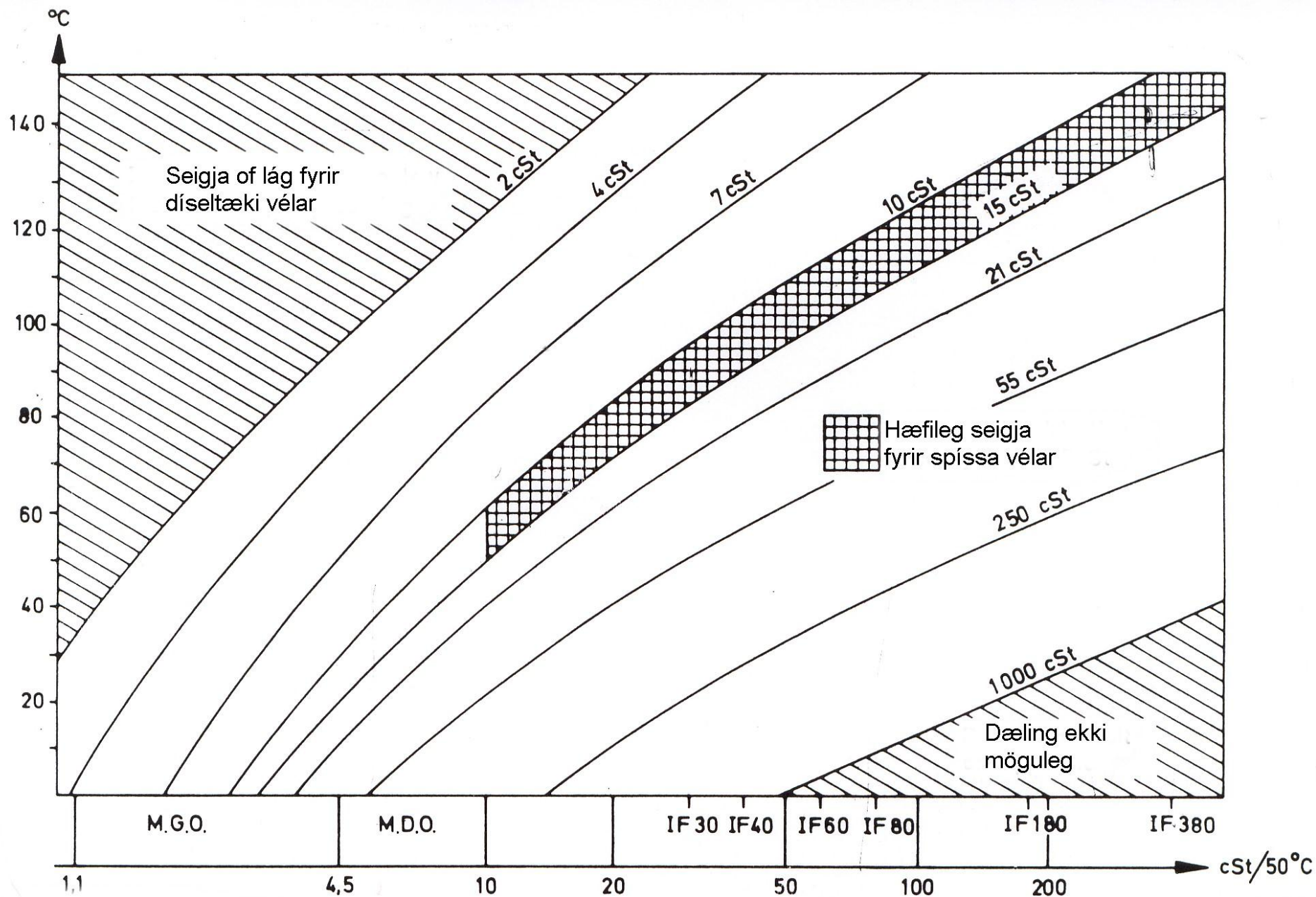


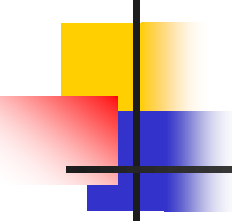
Óhreinindi geta orsakað skemmdir á vélbúnaði

- **1. Dælukólfar í olíudælum geta skemmst**
- **2. Spíssar orðið ónýtir**
- **3. Slit í slífum**
- **4. Tæring í útblásturslokum**
- **5. Sótmyndun í útblásturskerfi**
- **6. Skemmdir á túrbínuhjóli**





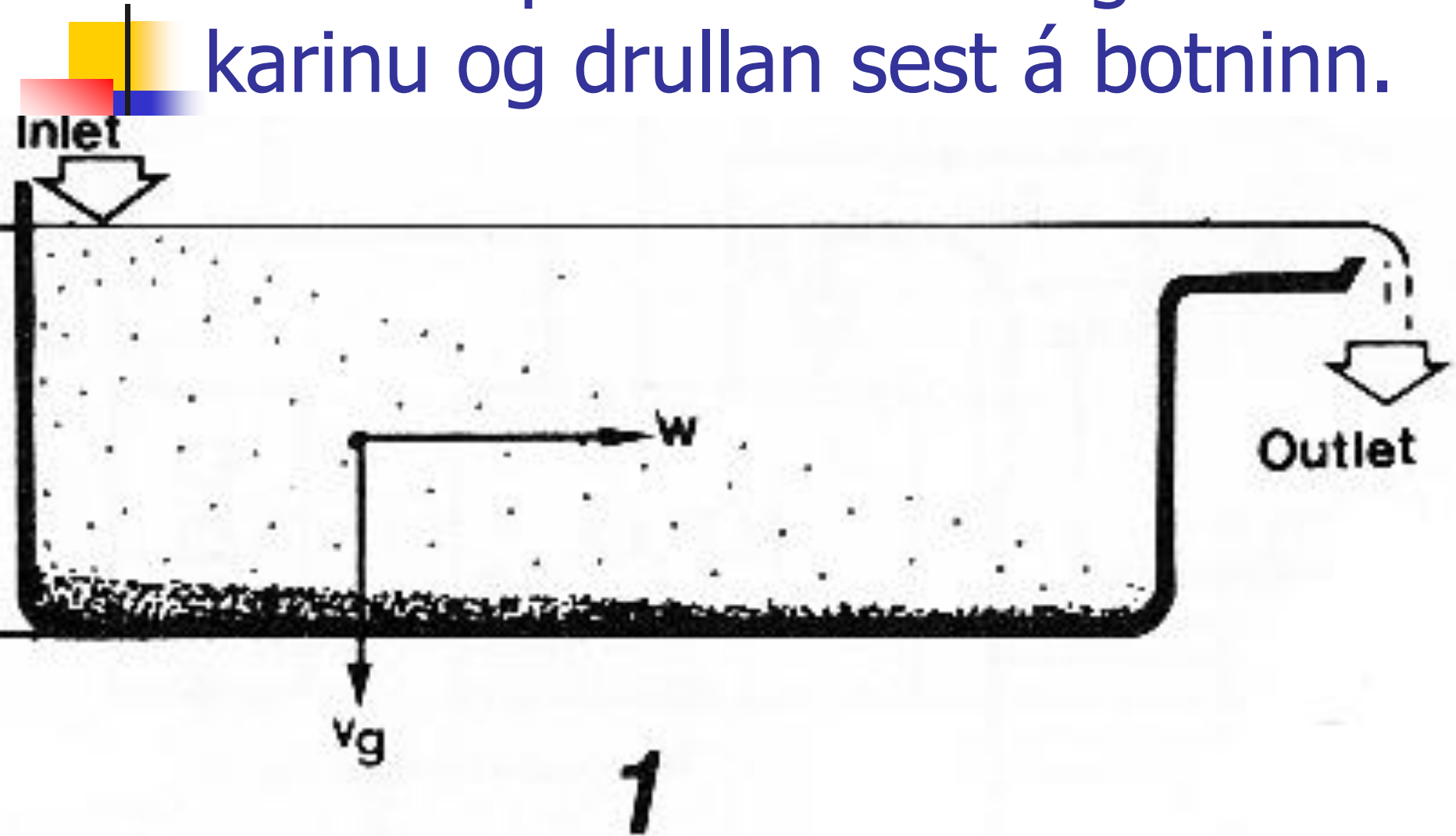




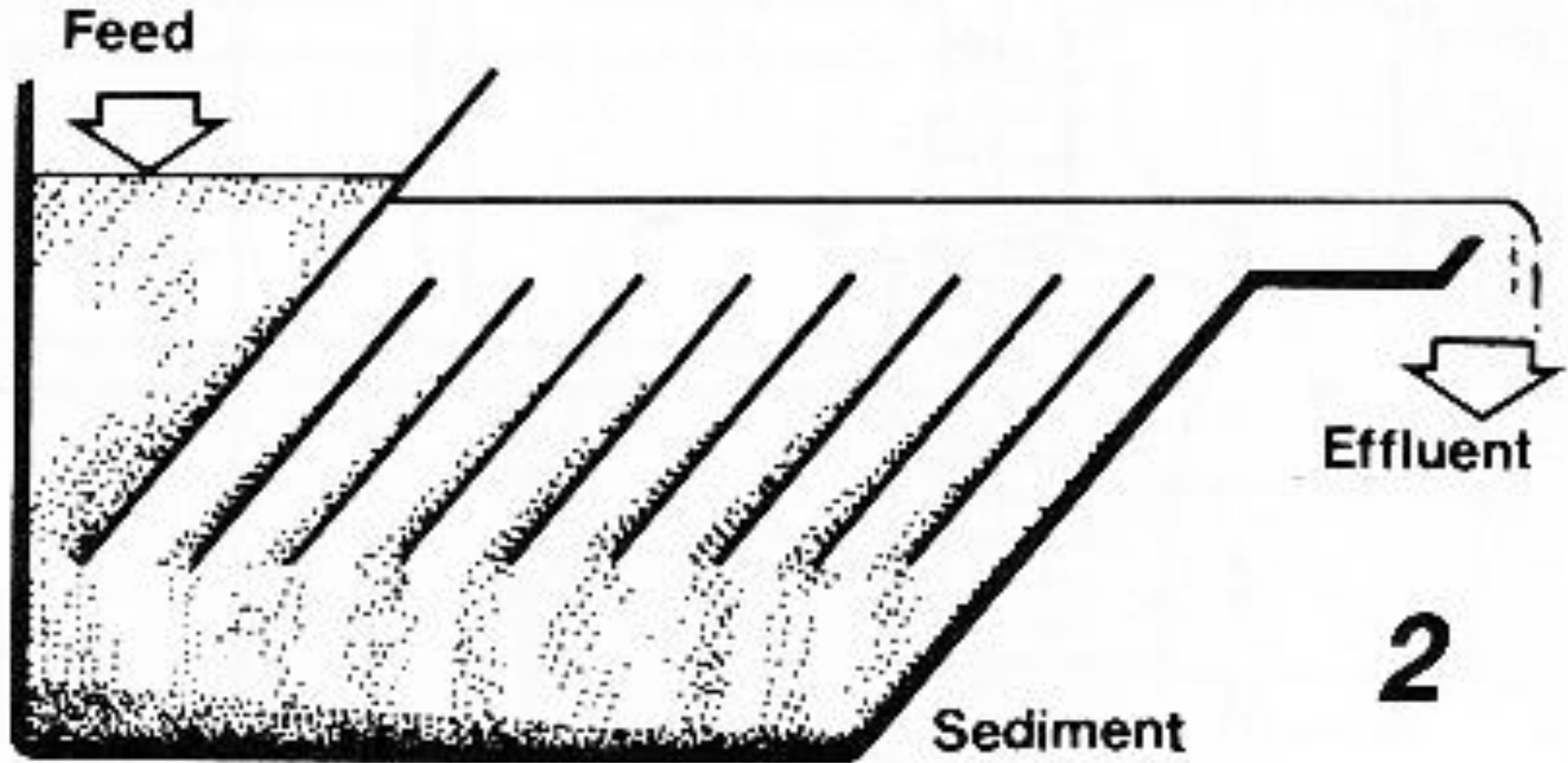
Skilhraðinn í vökva ákvarðast af eftirtöldum þáttum

- 1. Mismuninum á eðlisþyngd
- 2. Seigju olíu
- 3. Lagið á óhreinindunum
- 4. Vegalengdinni sem óhreinindin þurfa að fara.

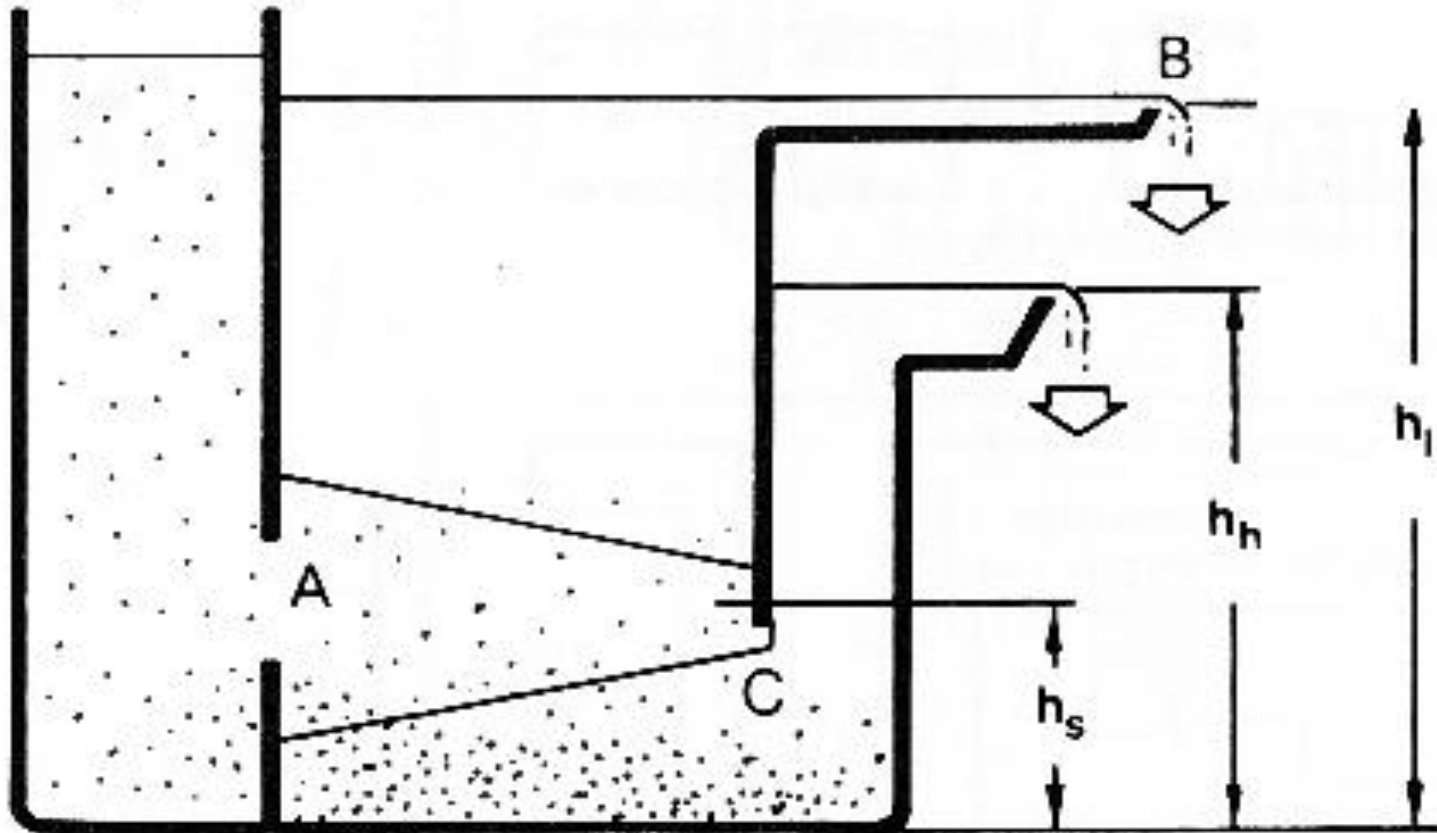
Setkar - það rennur rólega úr
karinu og drullan sest á botninn.



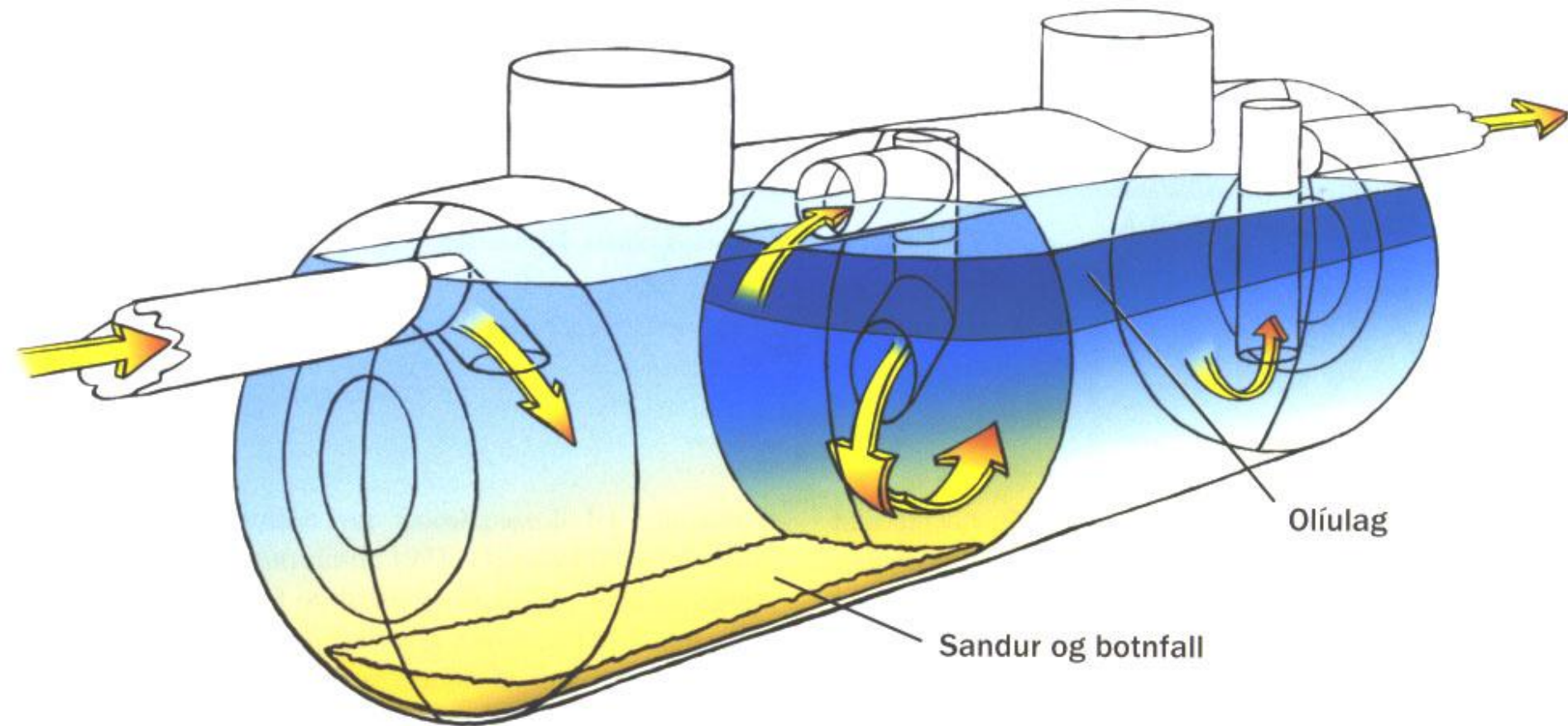
Parna eru komnar plotur og
drullan þarf að fara styttri
vegalengd.

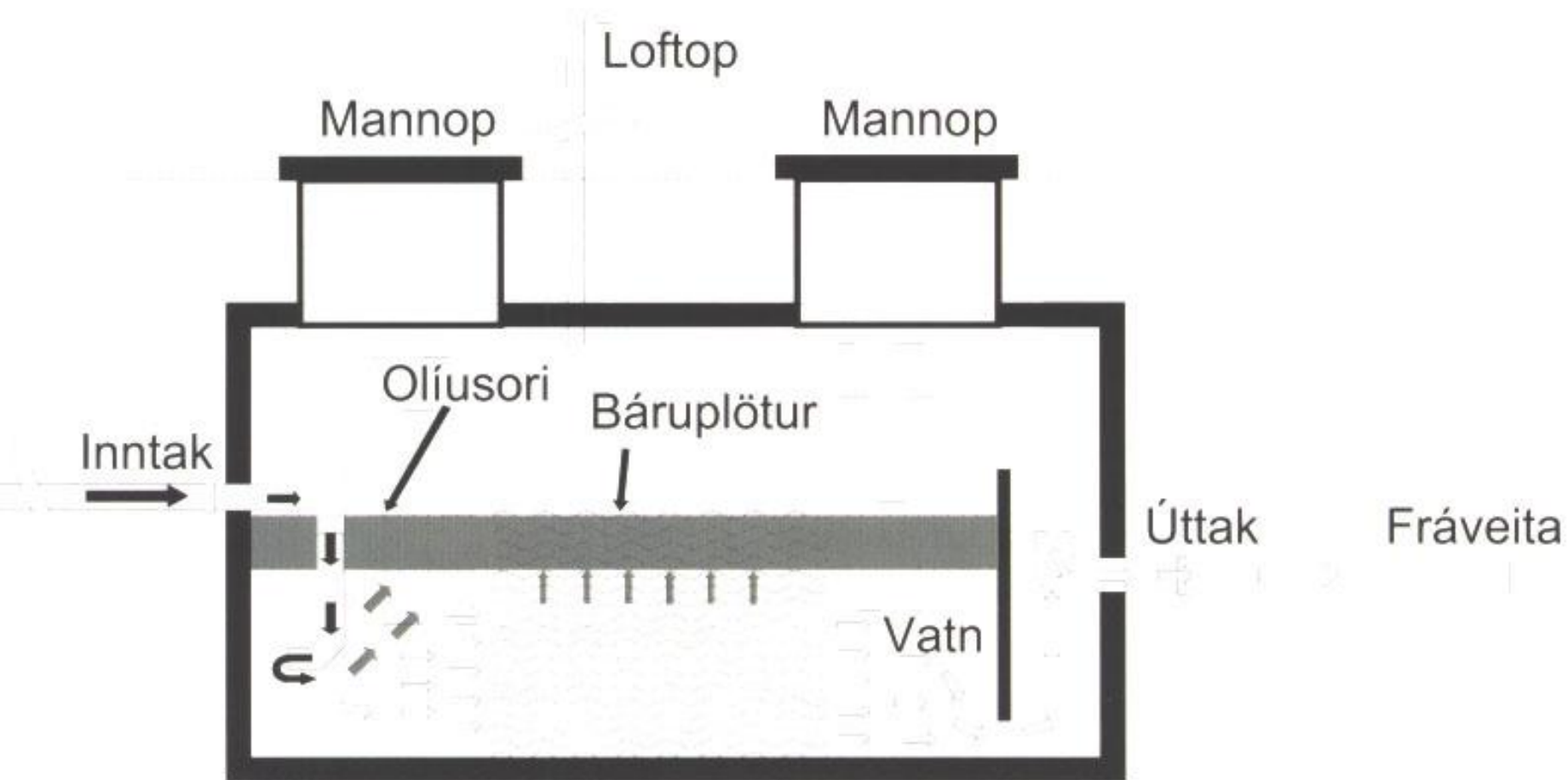


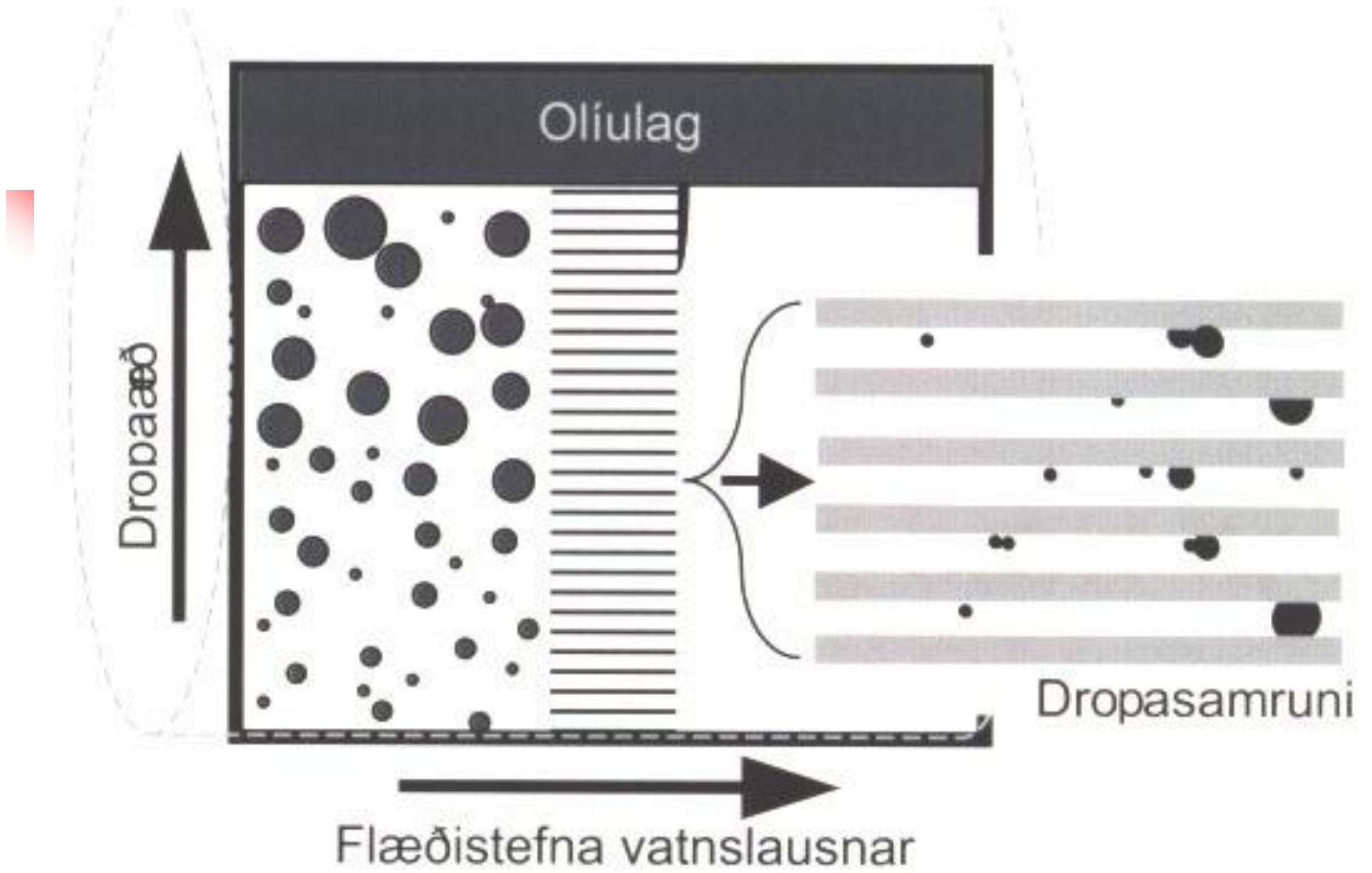
Olían rennur út um stút B en
vatnið fer um neðri stútinn.



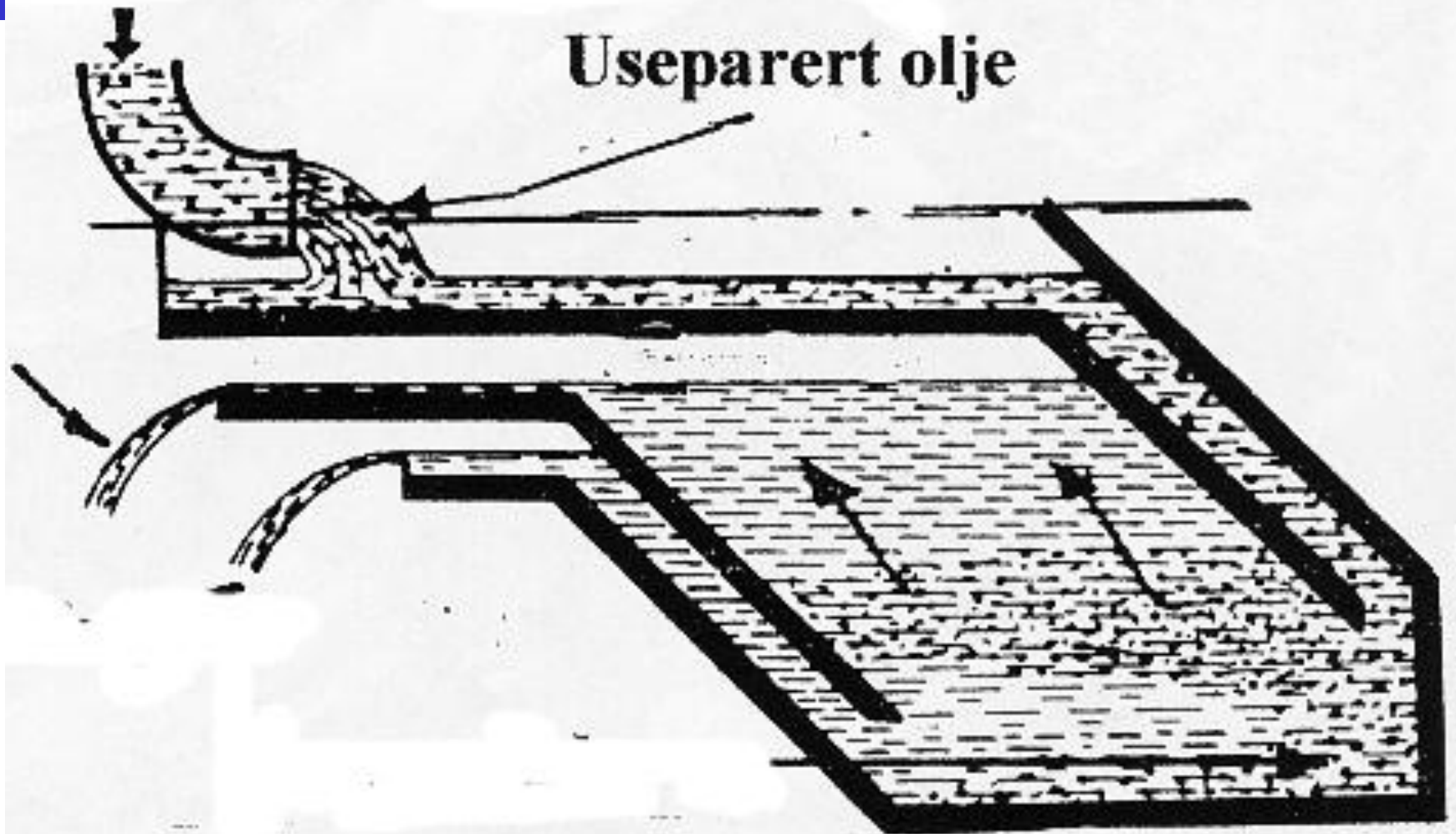
3







Óhrein olía rennur inn að ofan.

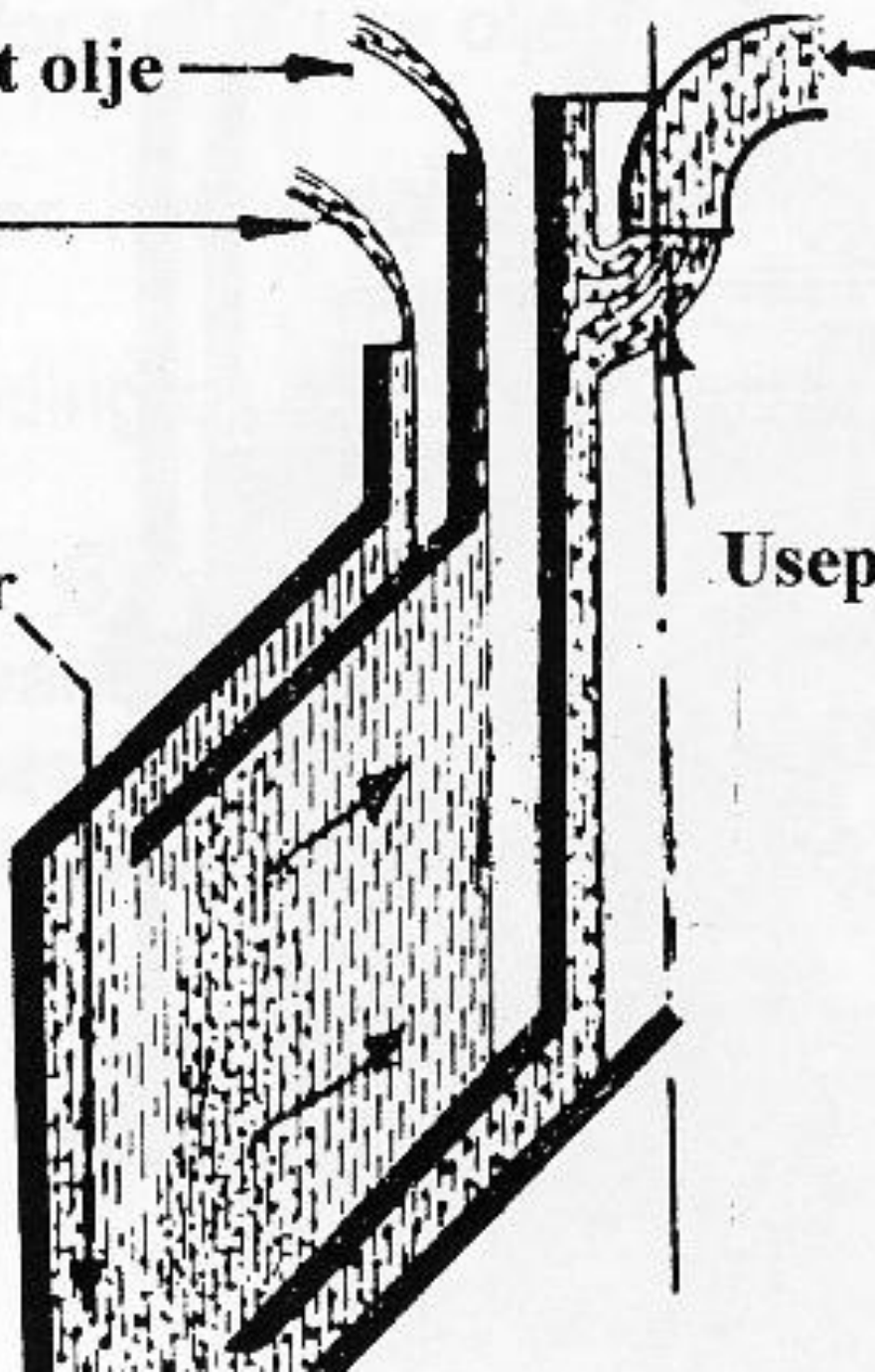


Separert olje

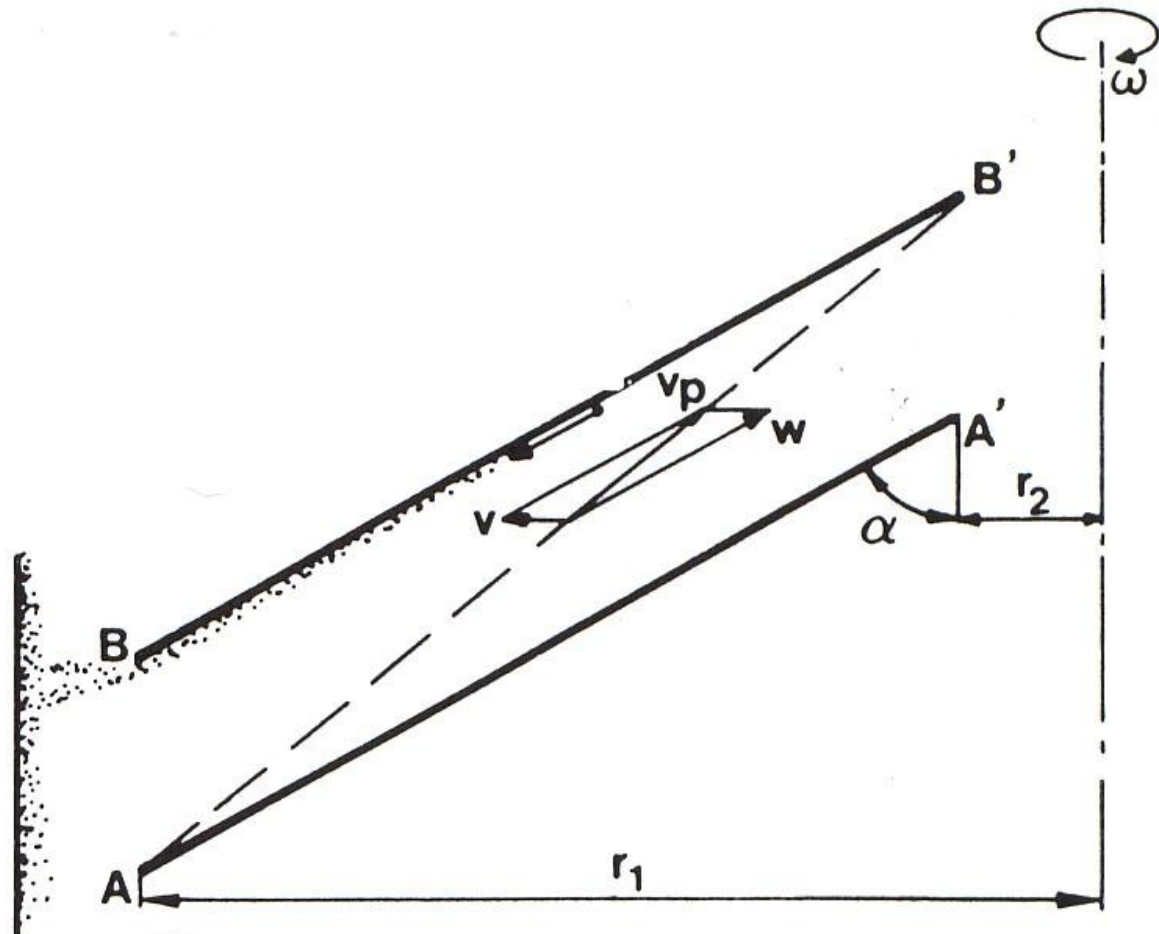
Vannutfelling

Slampartikler

Useparert olje

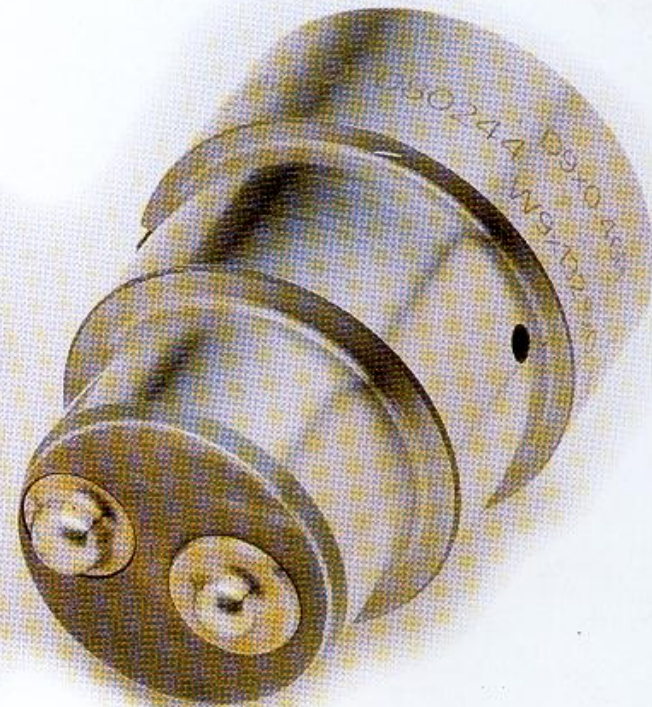
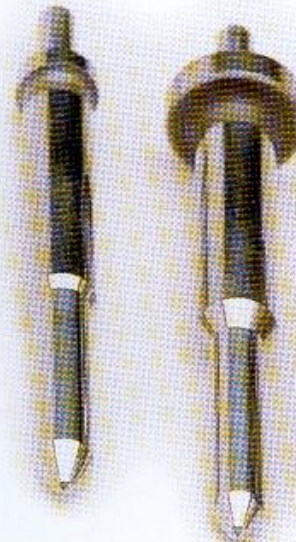
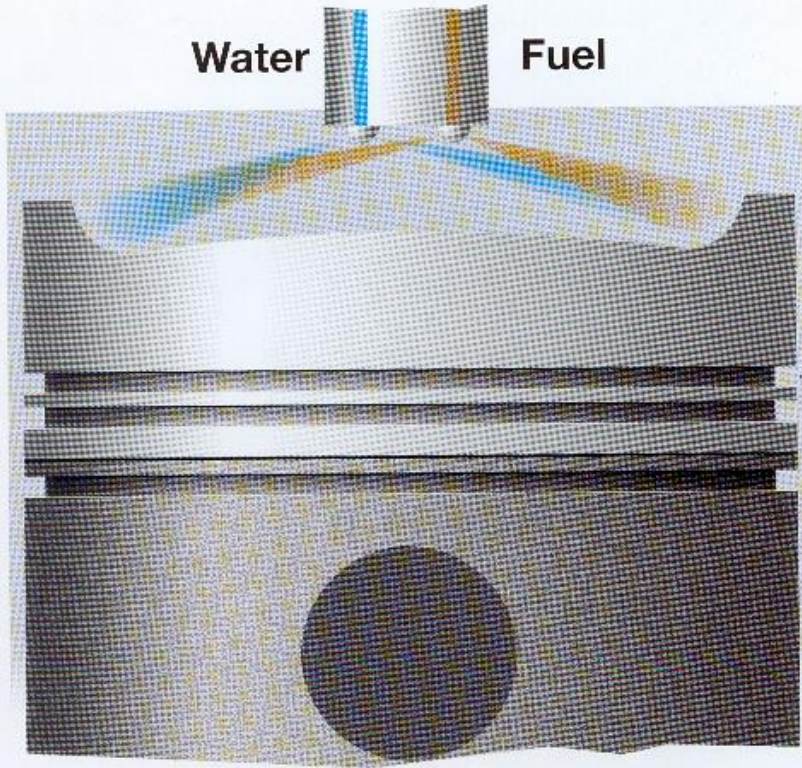


- Leið
- óhreini
- inda



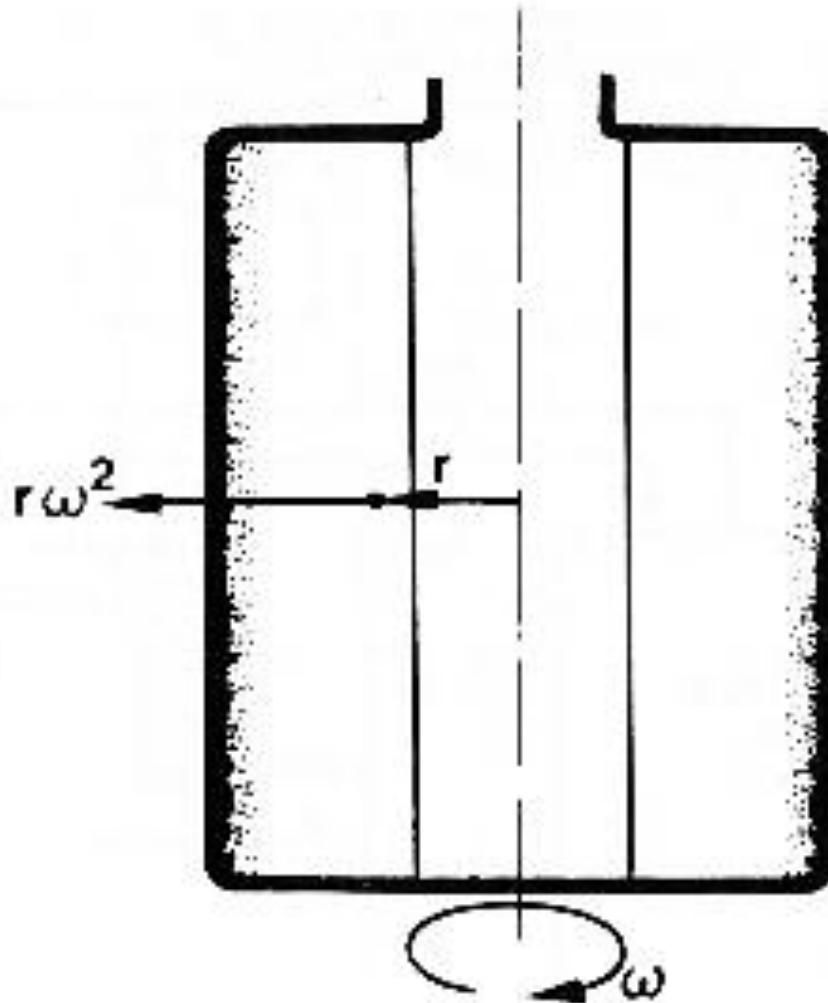
Vatni sprautað í brunahol, minni mengun.

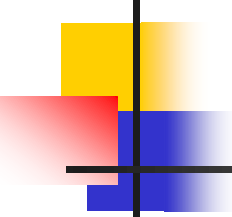
Water Fuel

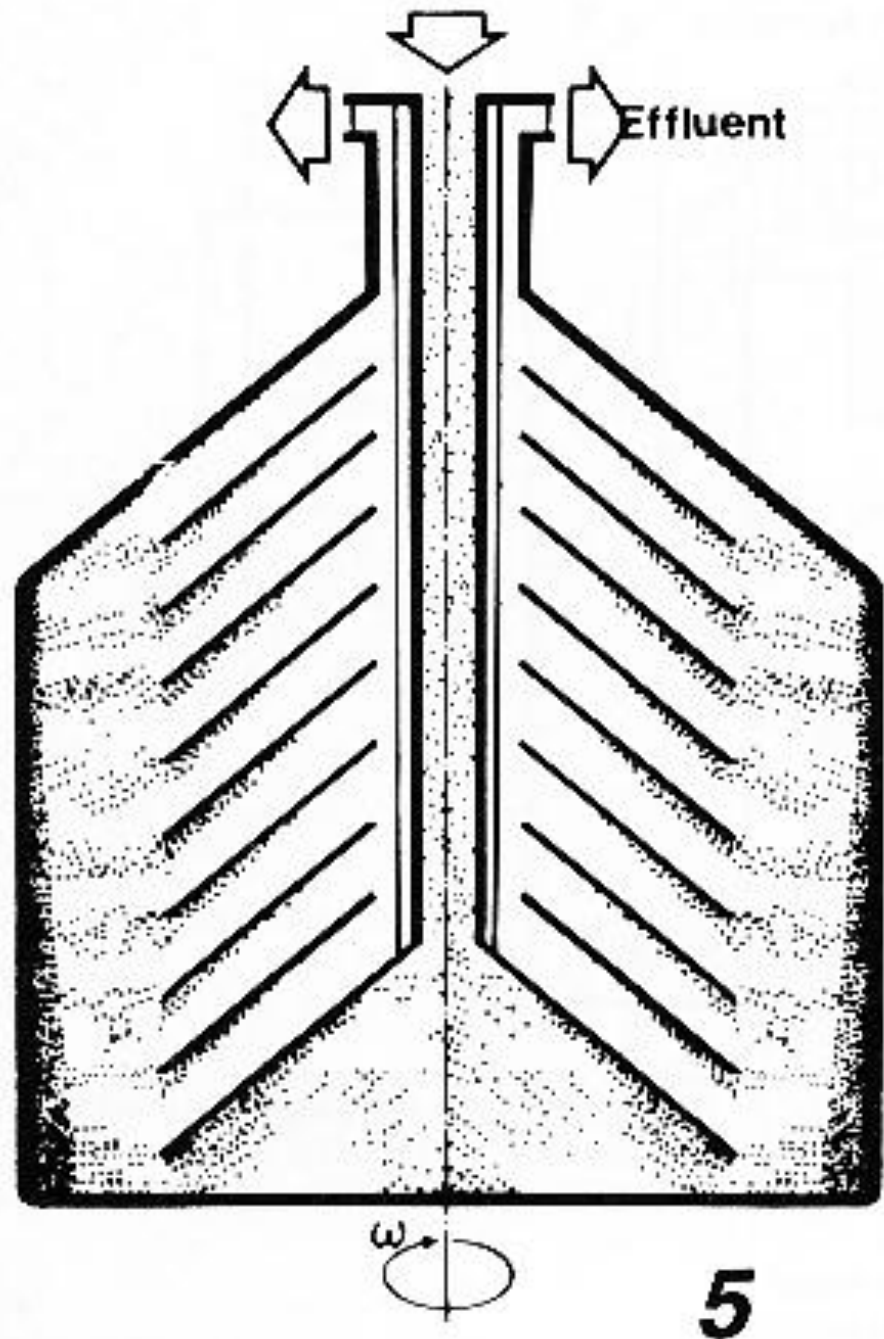


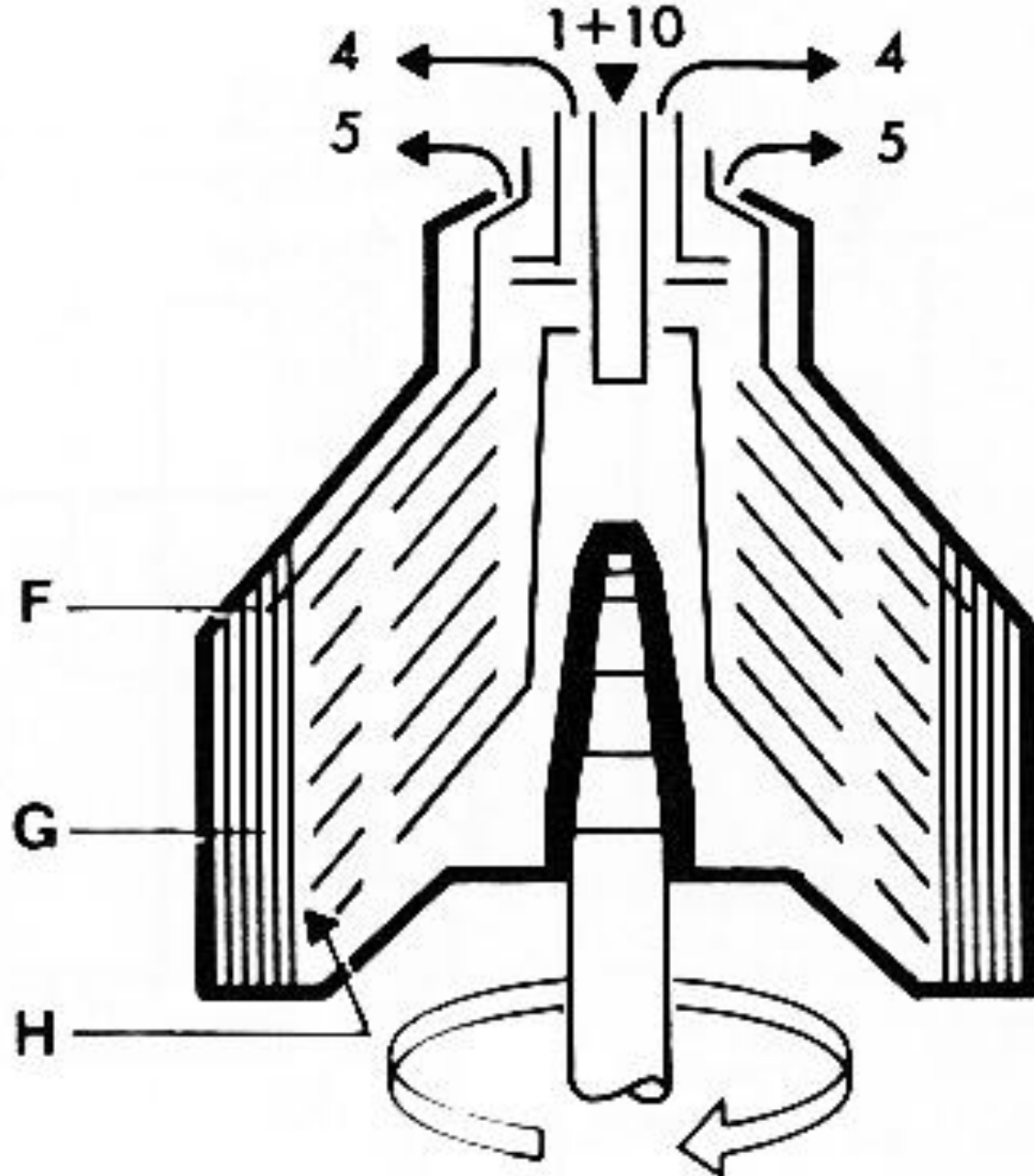
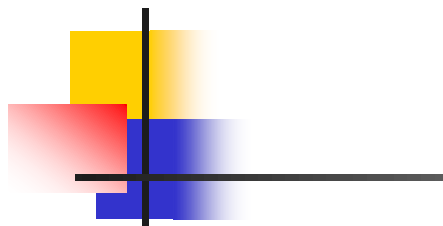
- Water needle and fuel needle in the same injector
- Water pressure 200 - 400 bar
- Fuel pressure 1200 - 2000 bar

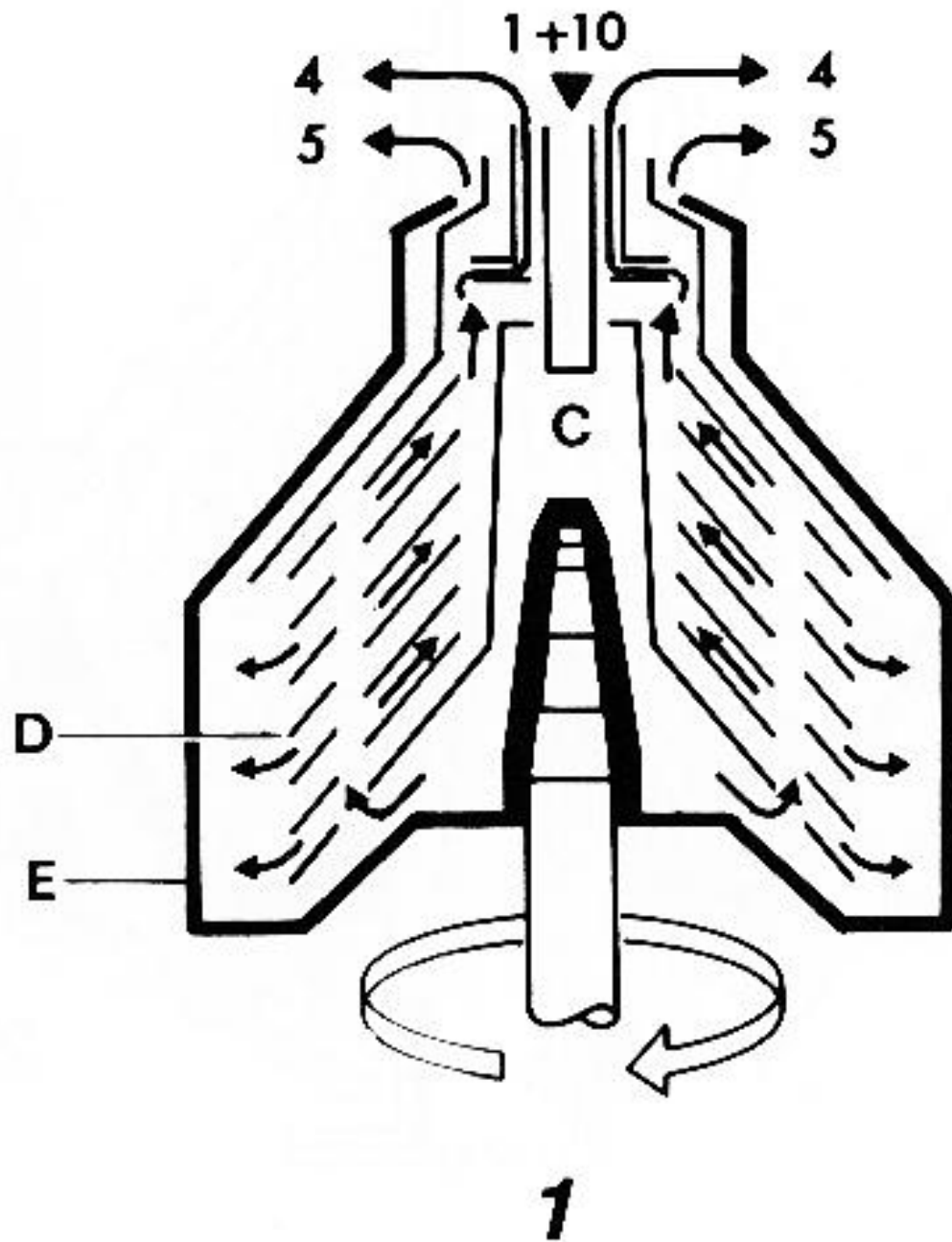
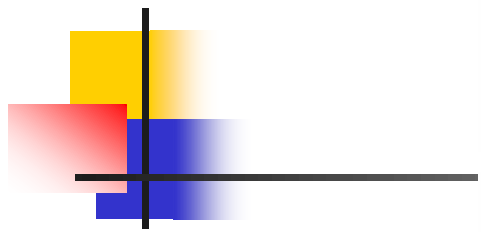
Miðflótttaflið kastar drullunni út til hliðanna

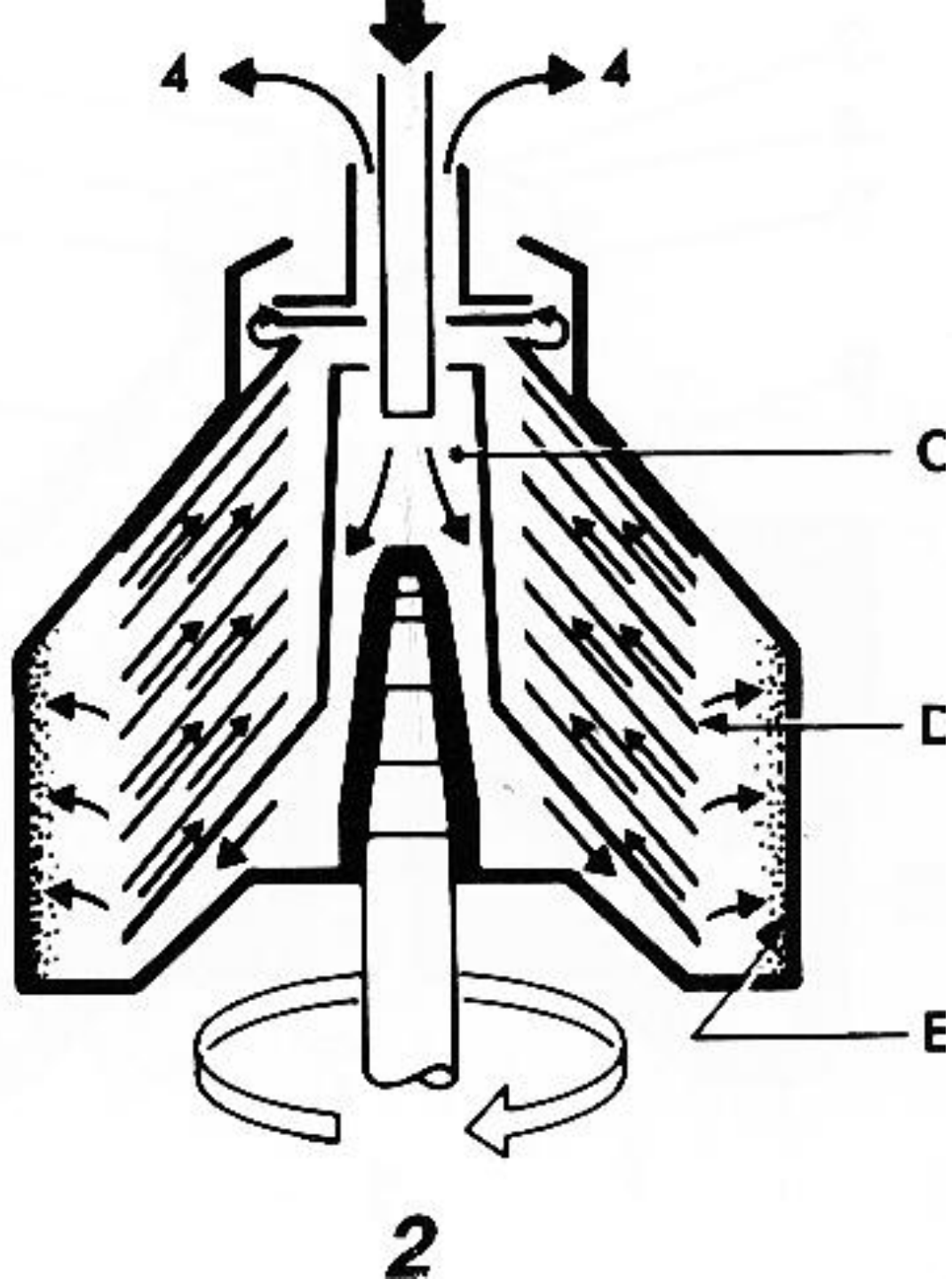
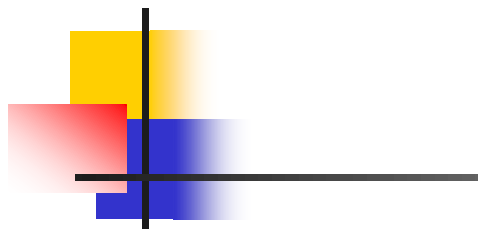


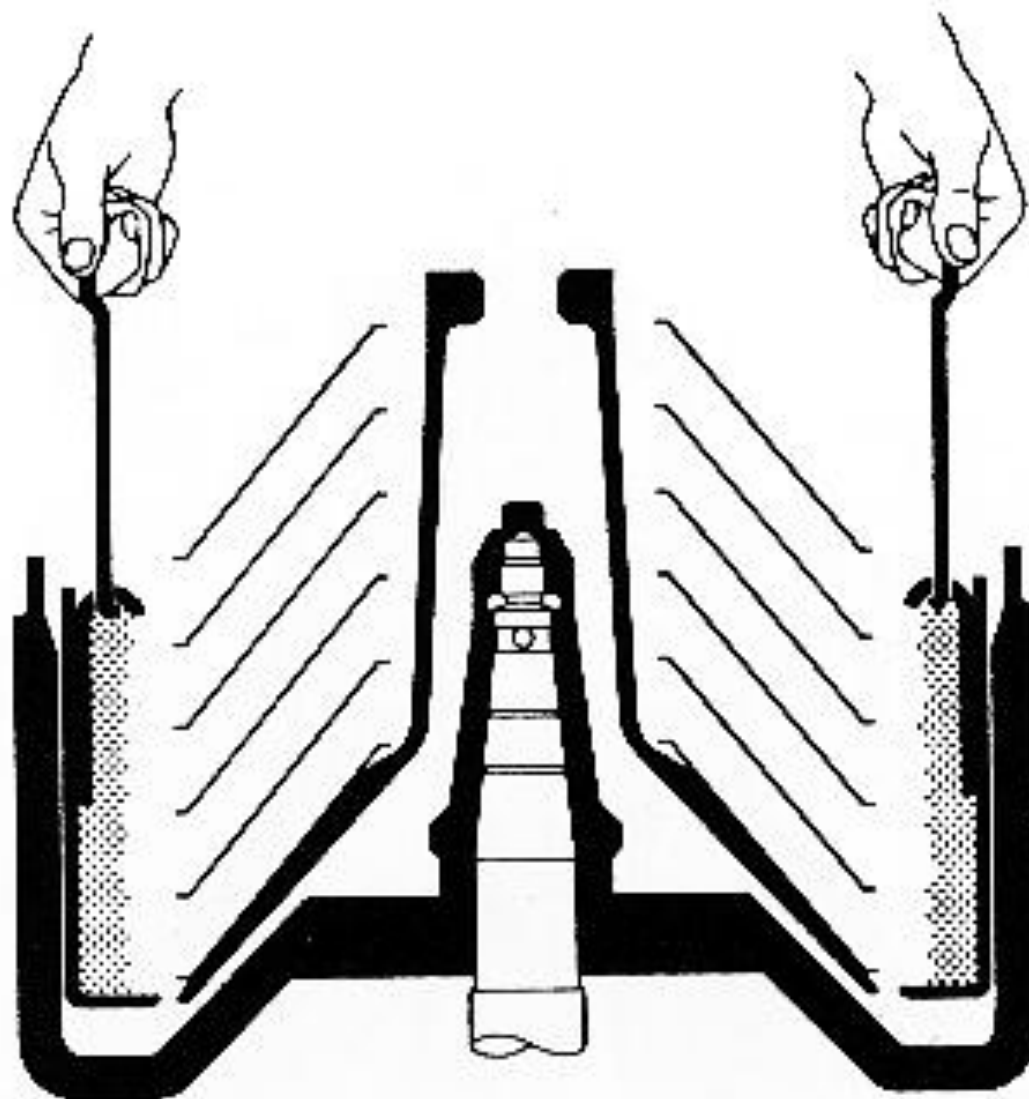
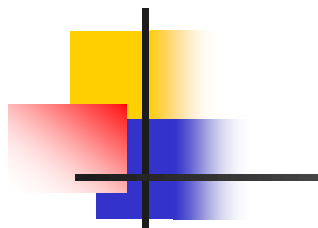
- 
- Óhreinn skil-
 - vökvi fer inn
 - miðjuna



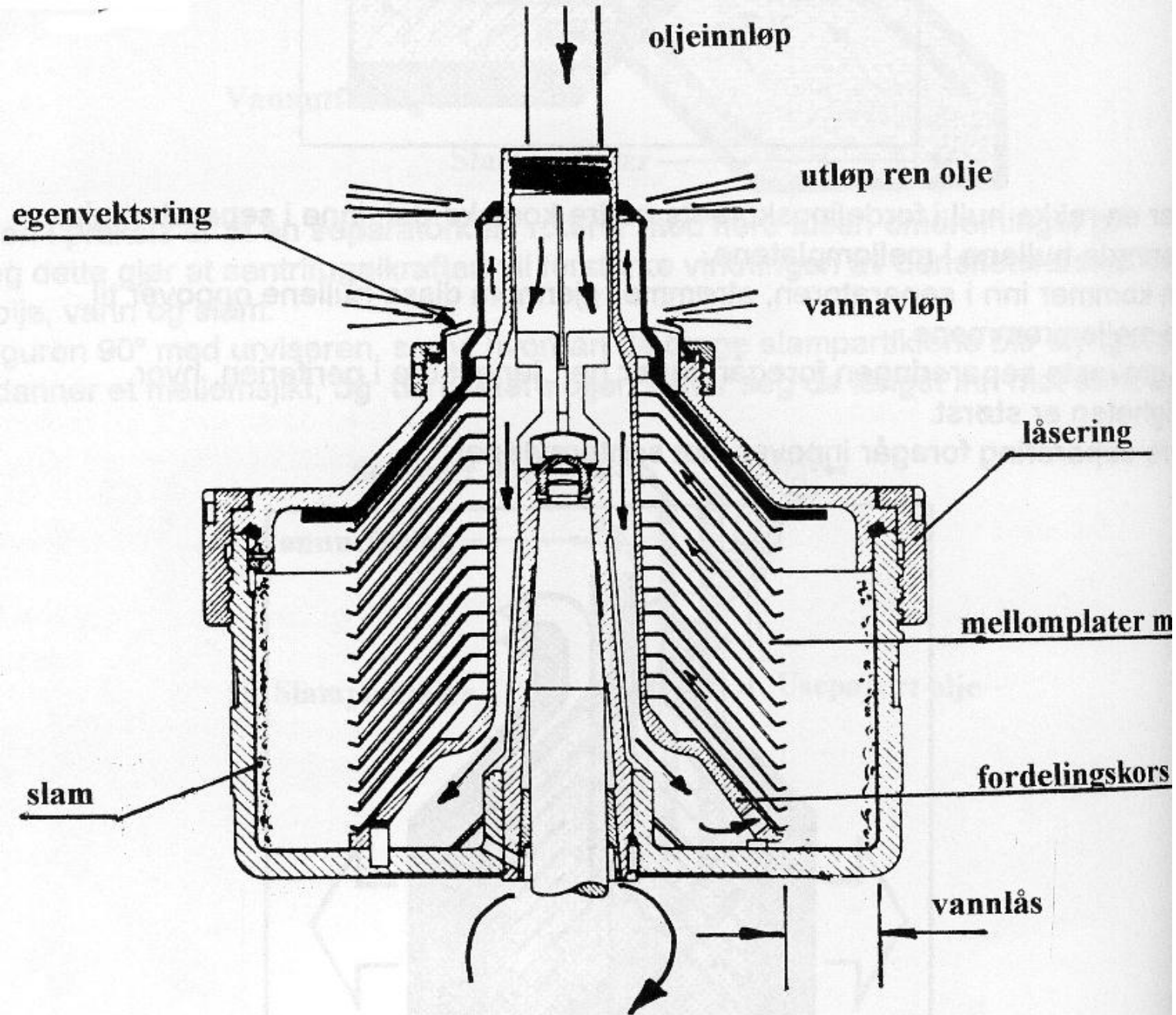


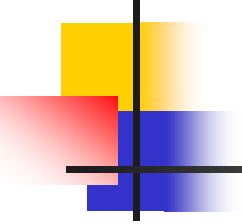




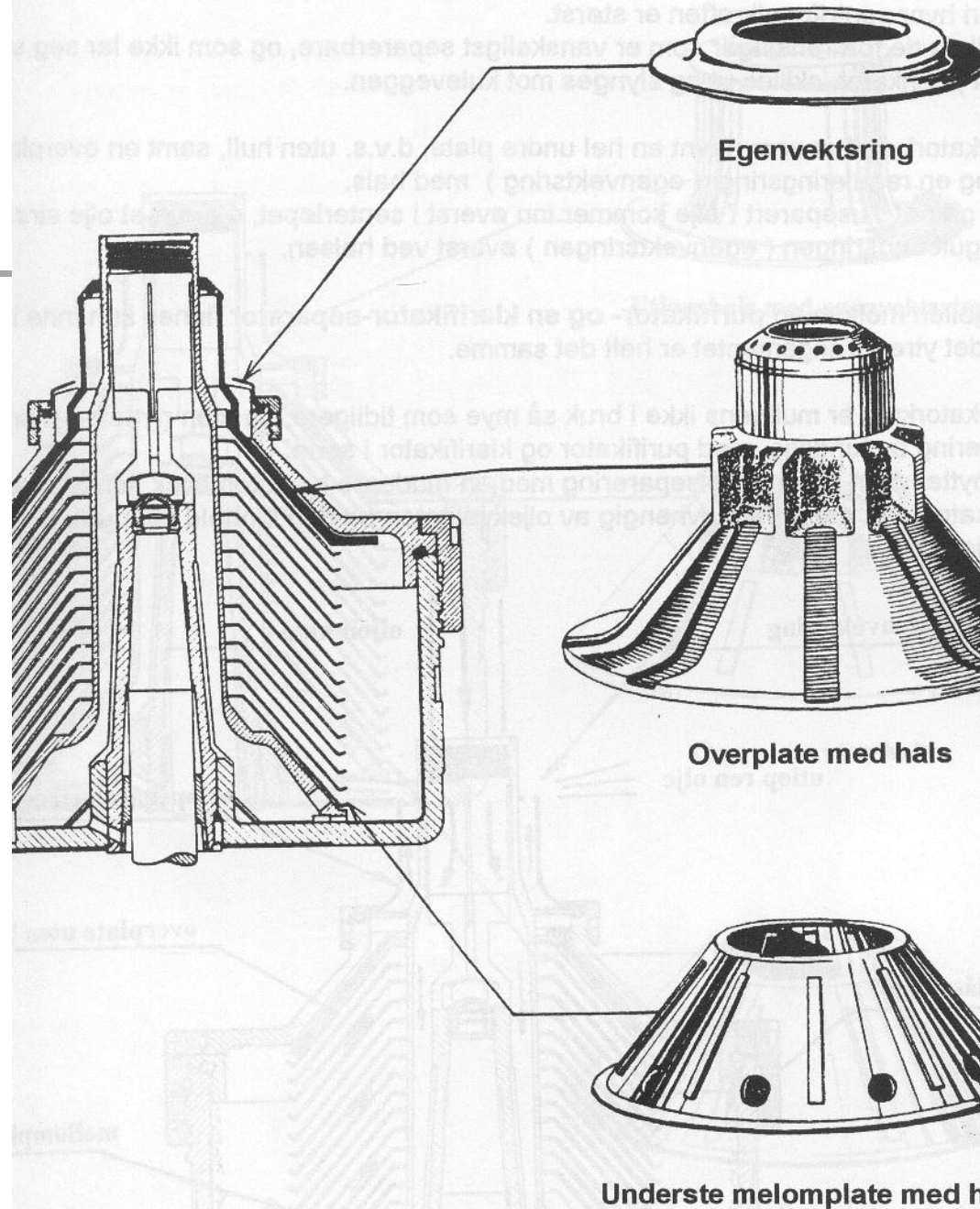


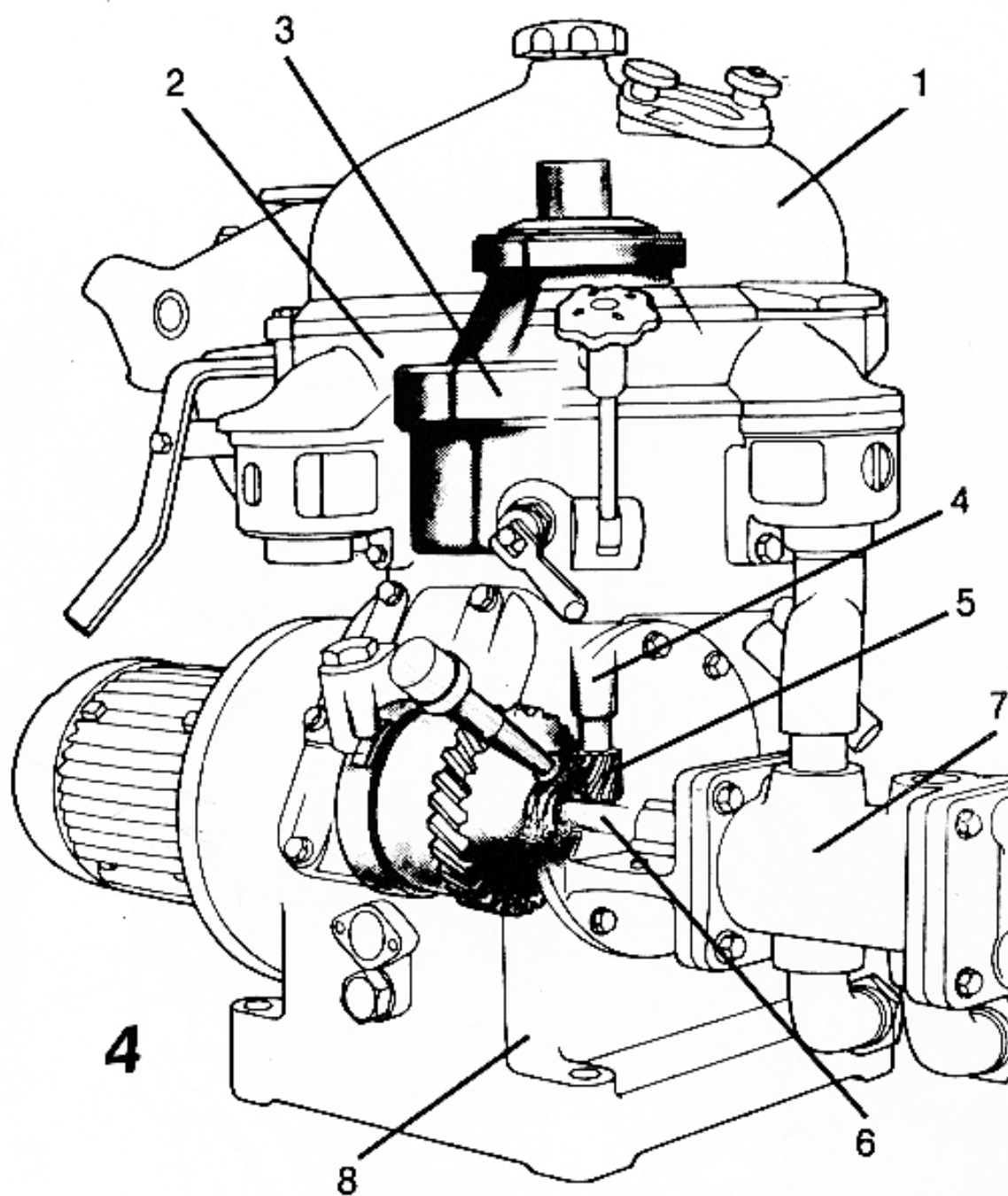
3

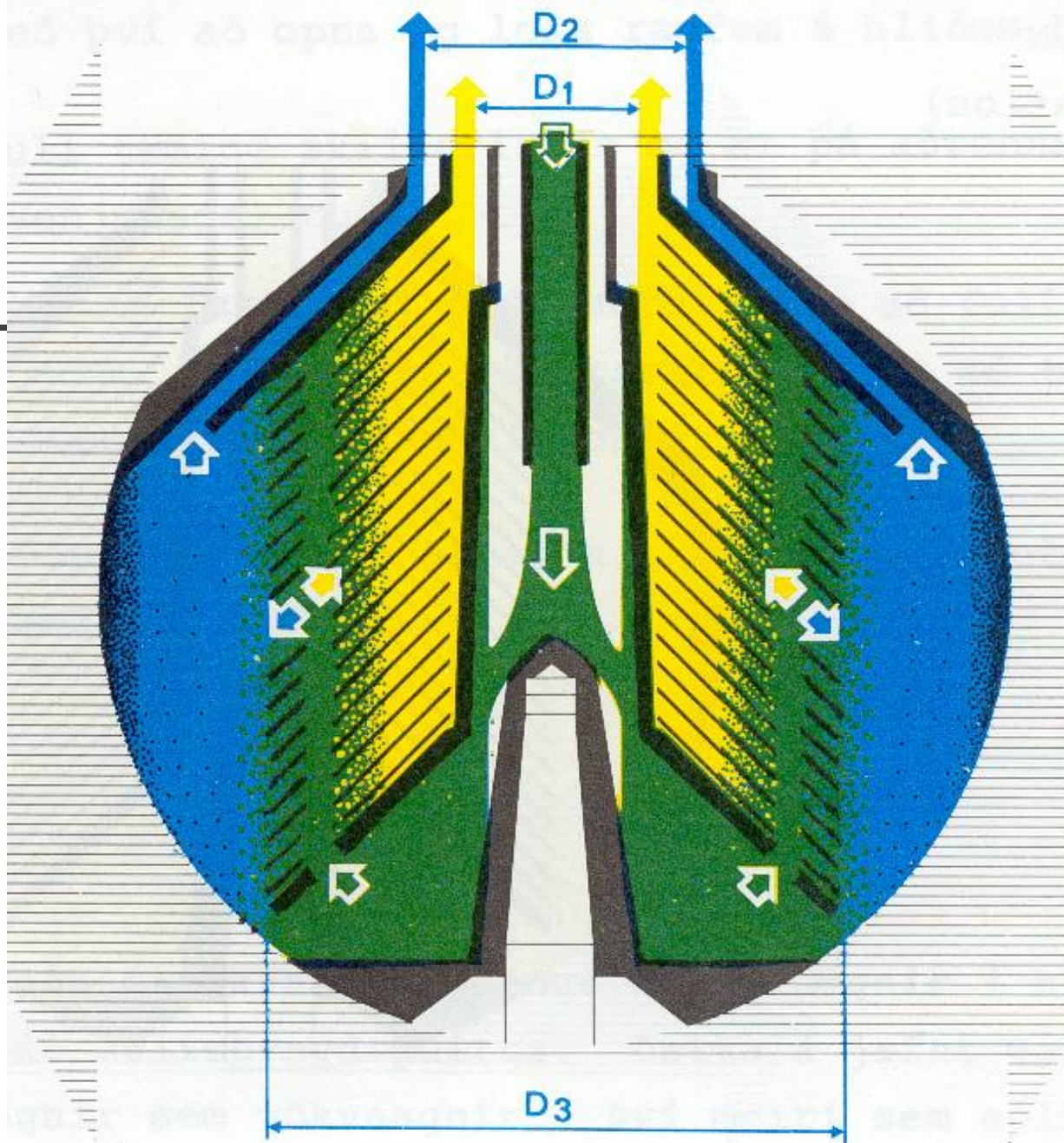


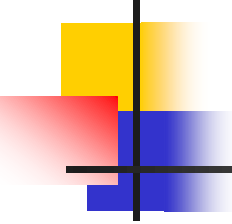


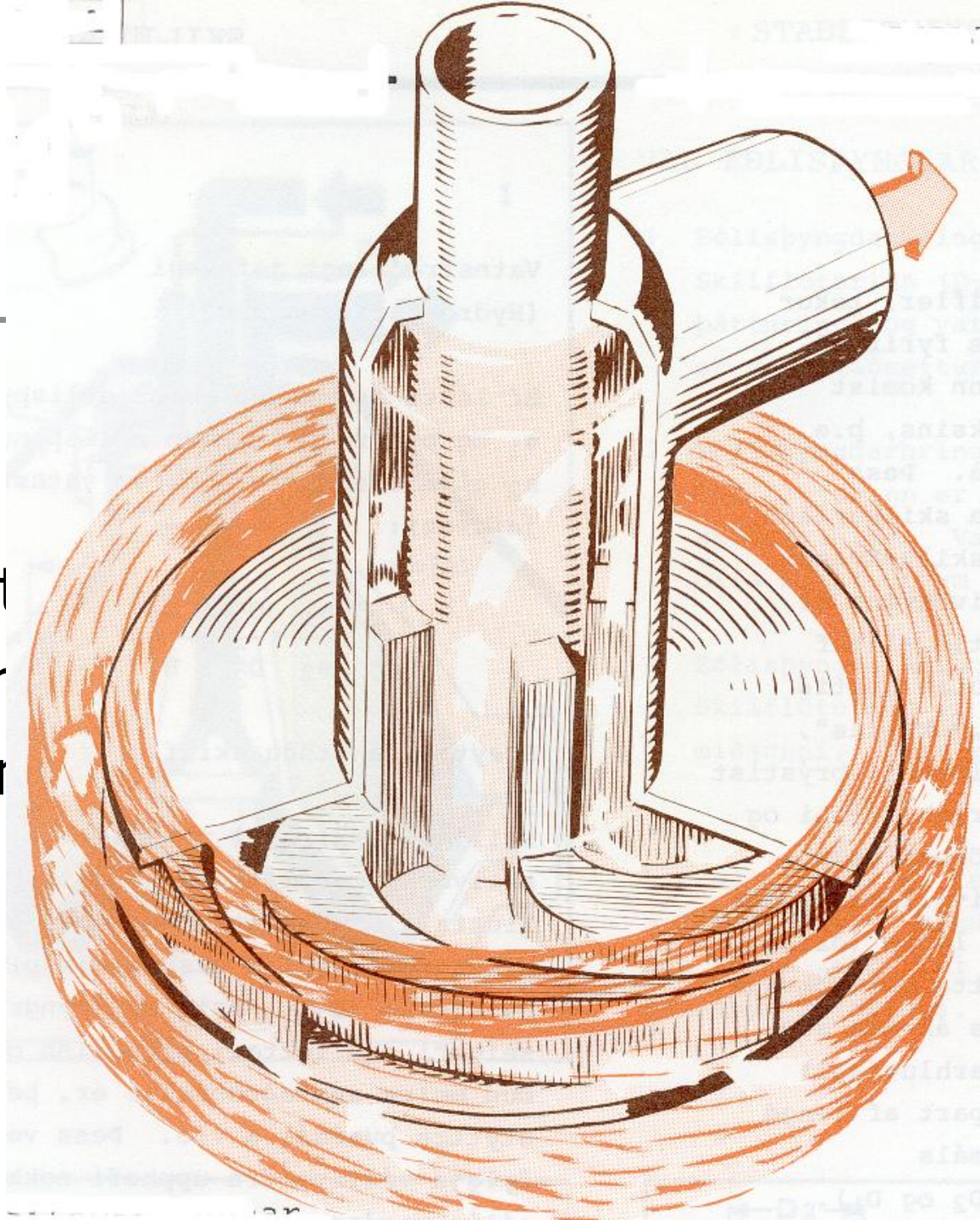
Efst er eðlis-
þyngdarhringur,
svo er yfirdiskur,
síðan einn diskur
af mörgum



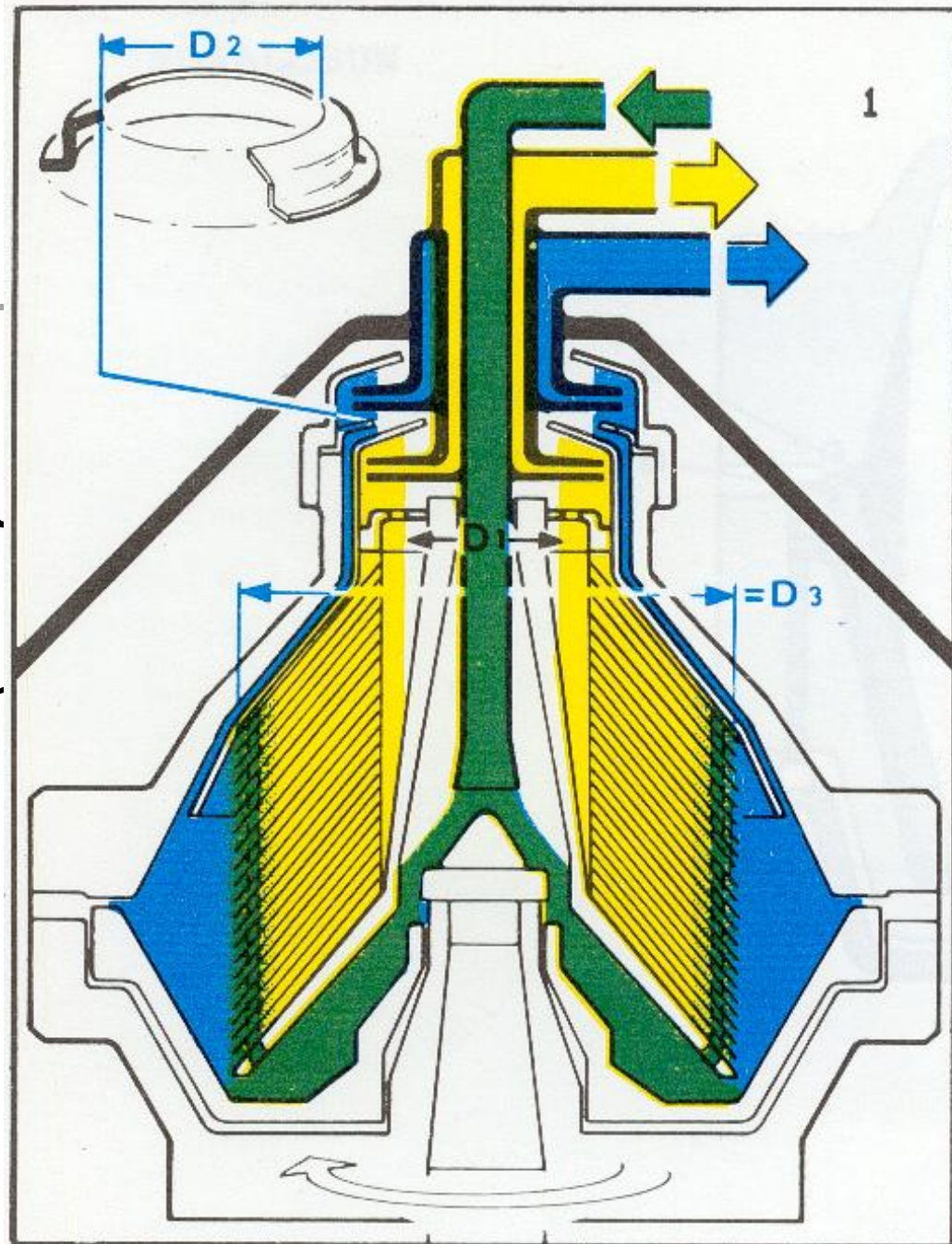


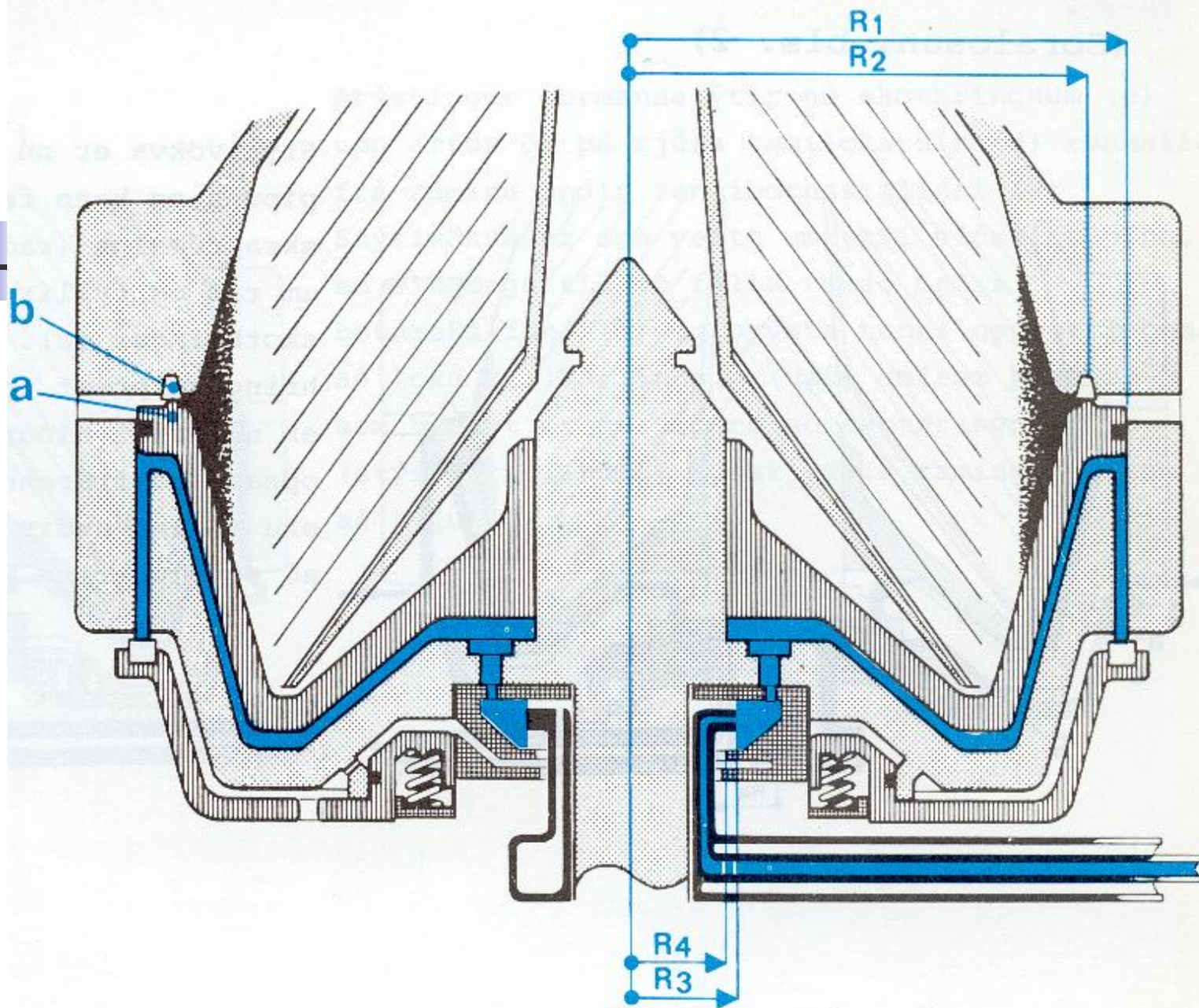


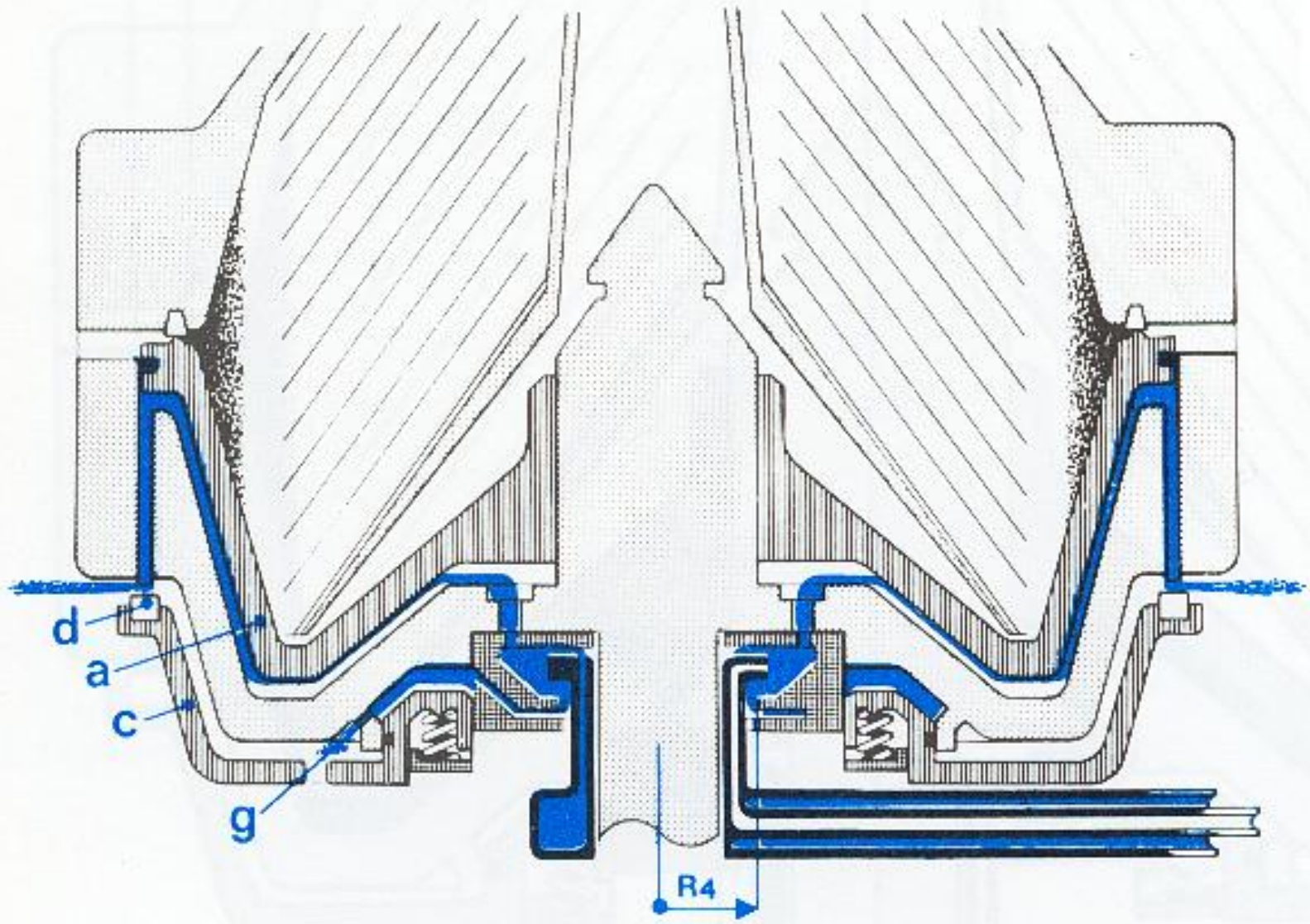
- 
- Skrapskífan
 - er eiginlega
 - dæla sem ýt
 - olíunni áfrar
 - og setur har
 - á snúning

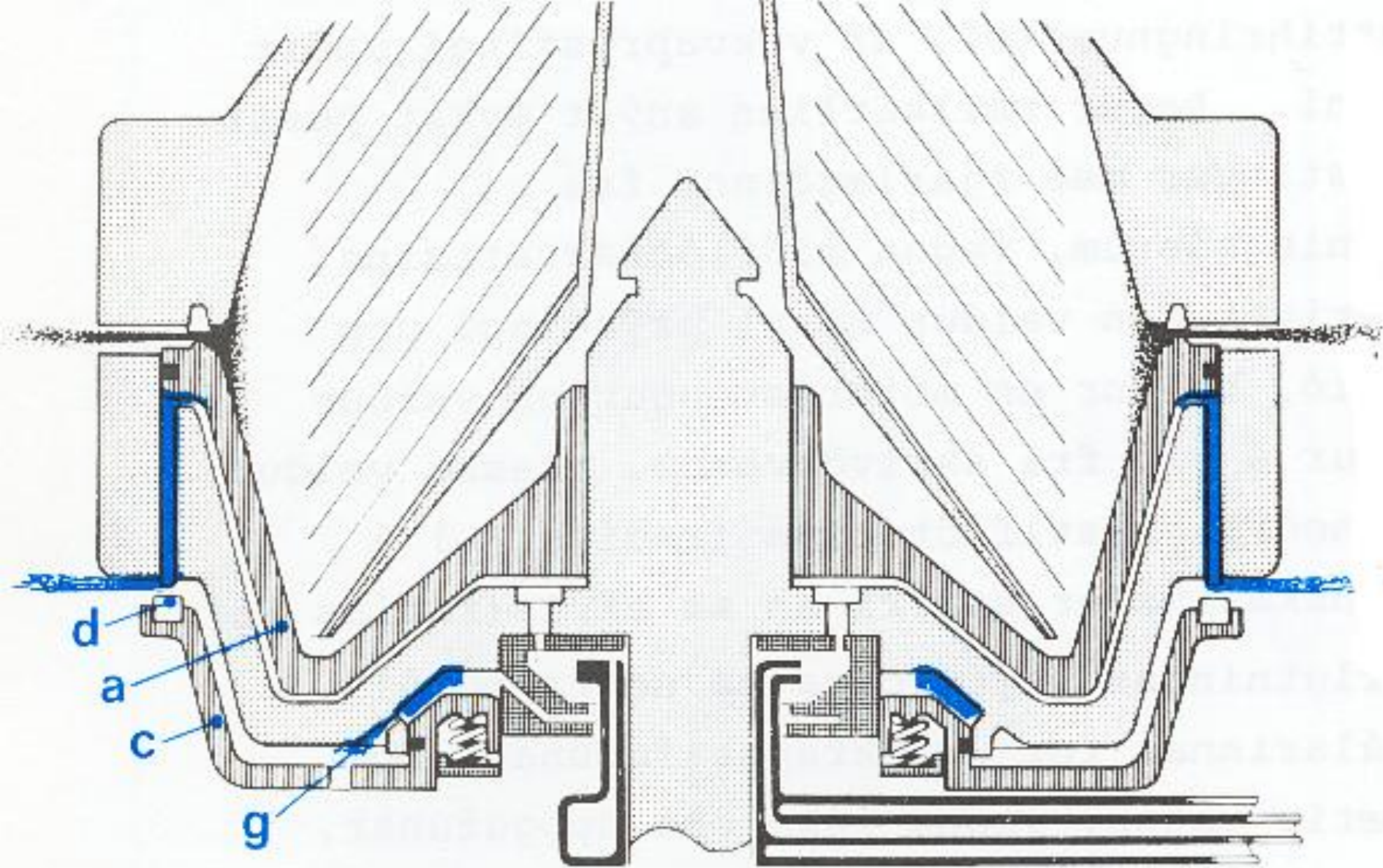


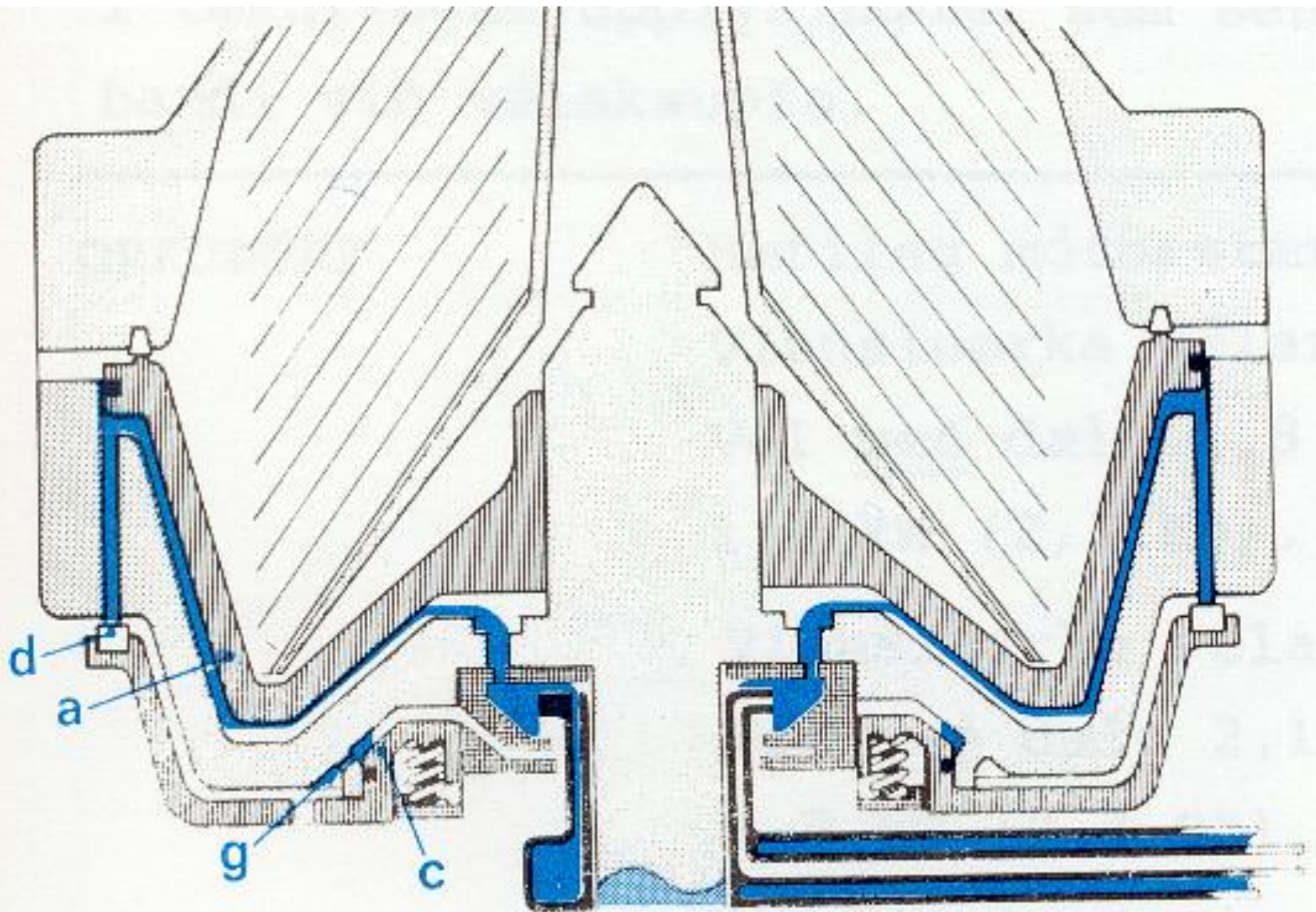
- Eðlisþyngdar-
- hringurinn heldur
- við vatnslásinn,
- þyngri olía, þrer
- hringur.

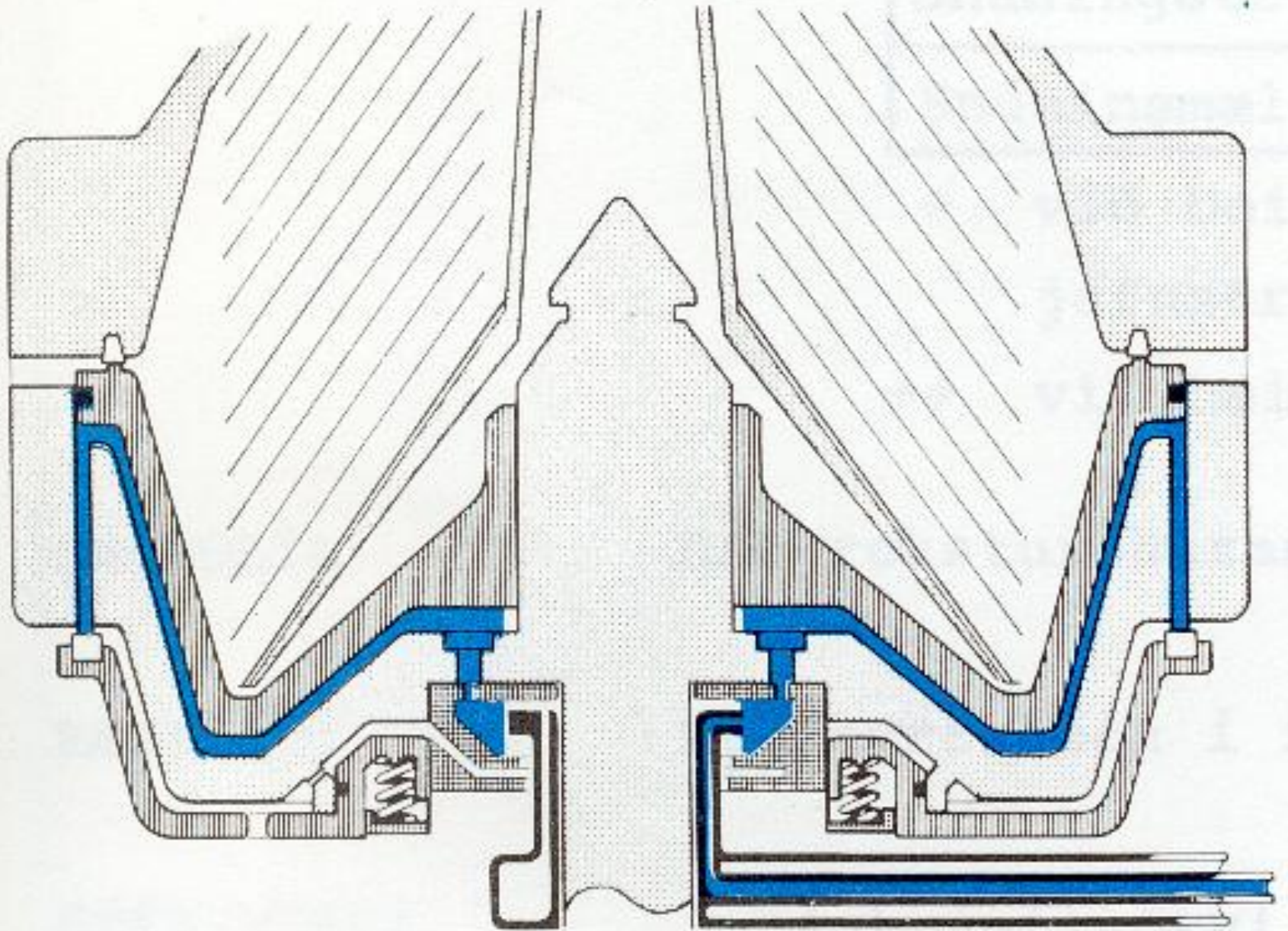




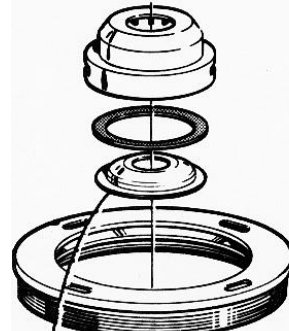
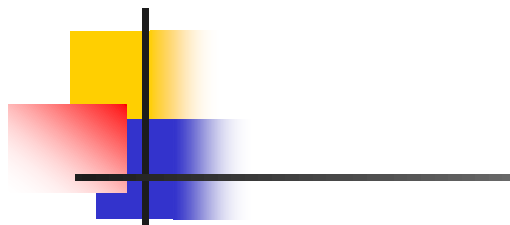




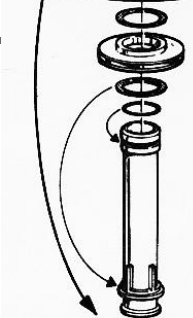




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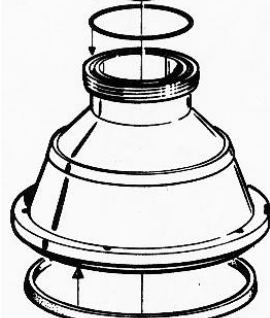


Festihringur
--- 528137-2
(vinstri handar skráfur)
Pakkning
--- 223330-2
Eðlisþyngdarhringur
--- sjá kafla „F“
Festihringur
--- 525653-1
vinstri handar skráfur)



Pakkning -- 223314-4
Skrapskífa -- 525719-80
Pakkning -- 223314-4
Þéttihringur -- 223406-16

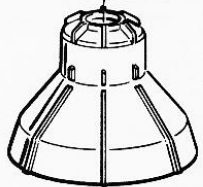
Stýrihólkur -- 525686-2



Þéttihringur
-- 70942

Skilkarlslok
-- 528131-1

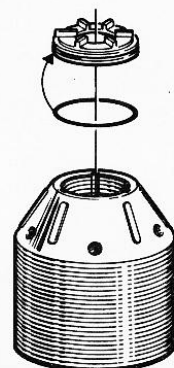
Þéttihringur
-- 521875-2



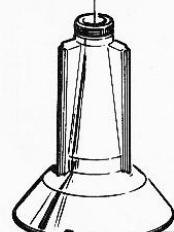
Toppdiskur
-- 528135-2

Pakkning -- 223312-2
Þéttihringur -- 223404-1

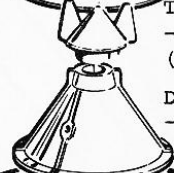
Skrapskífa ásamt hólki
-- 525713-80



Hæðarhringur
-- 525648-2
Þéttihringur
-- 223406-15

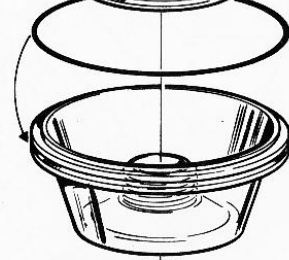


Diskarör
-- 525646-2



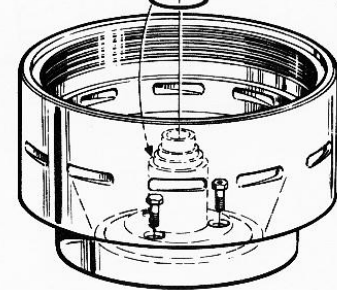
Toppró
-- sjá skilkarlsás
(vinstri handar skráfur)

Dreifikeila
-- 525644-80



Þéttihringur
-- 525643-1

Skriðbotn skilkarls
-- 525642-1

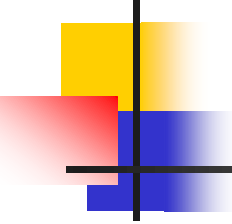


Þéttihringur
-- 42150

Skilkarlsunggjörð *

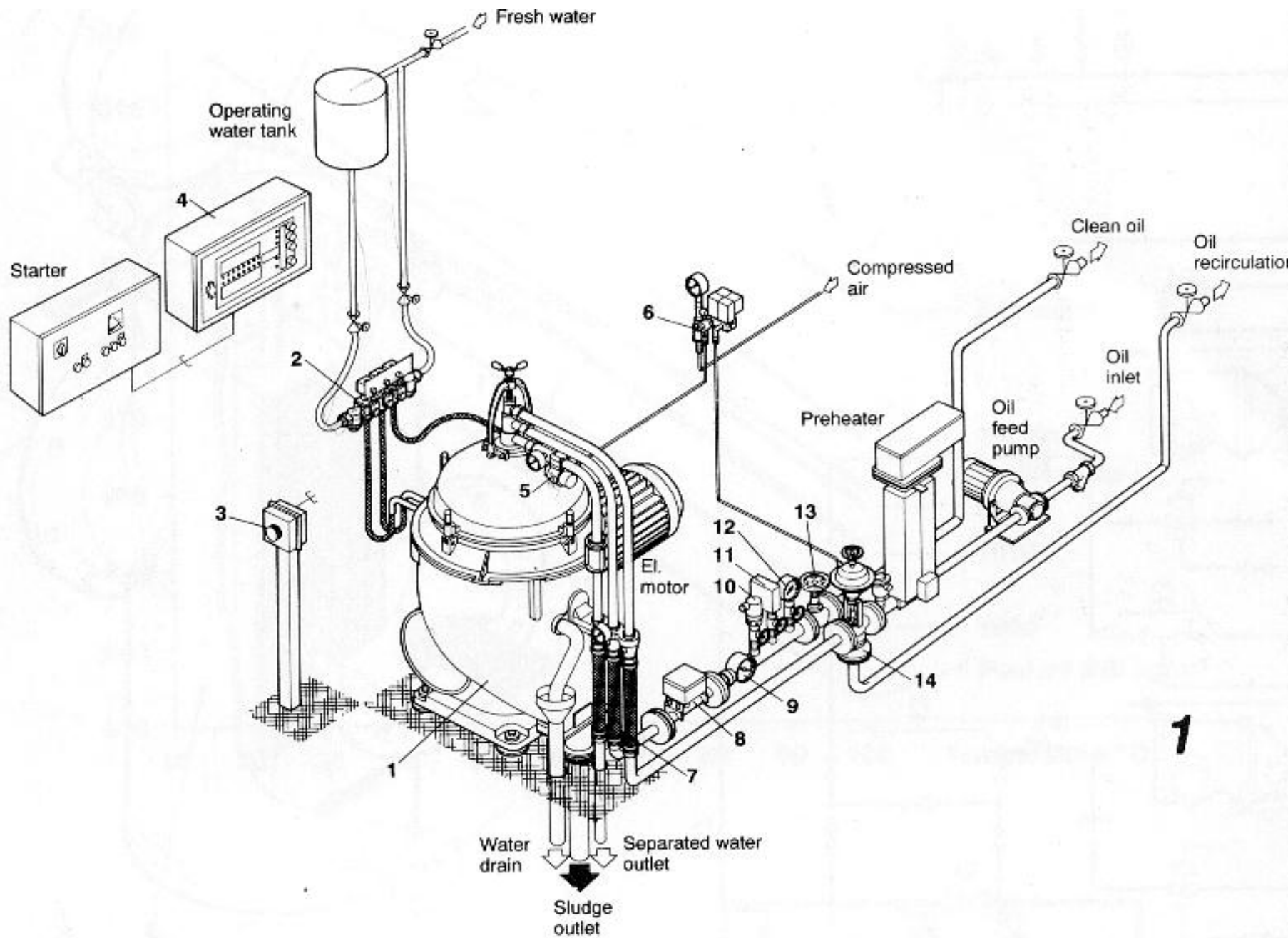
Skrúfa með gati *
-- 524000-3

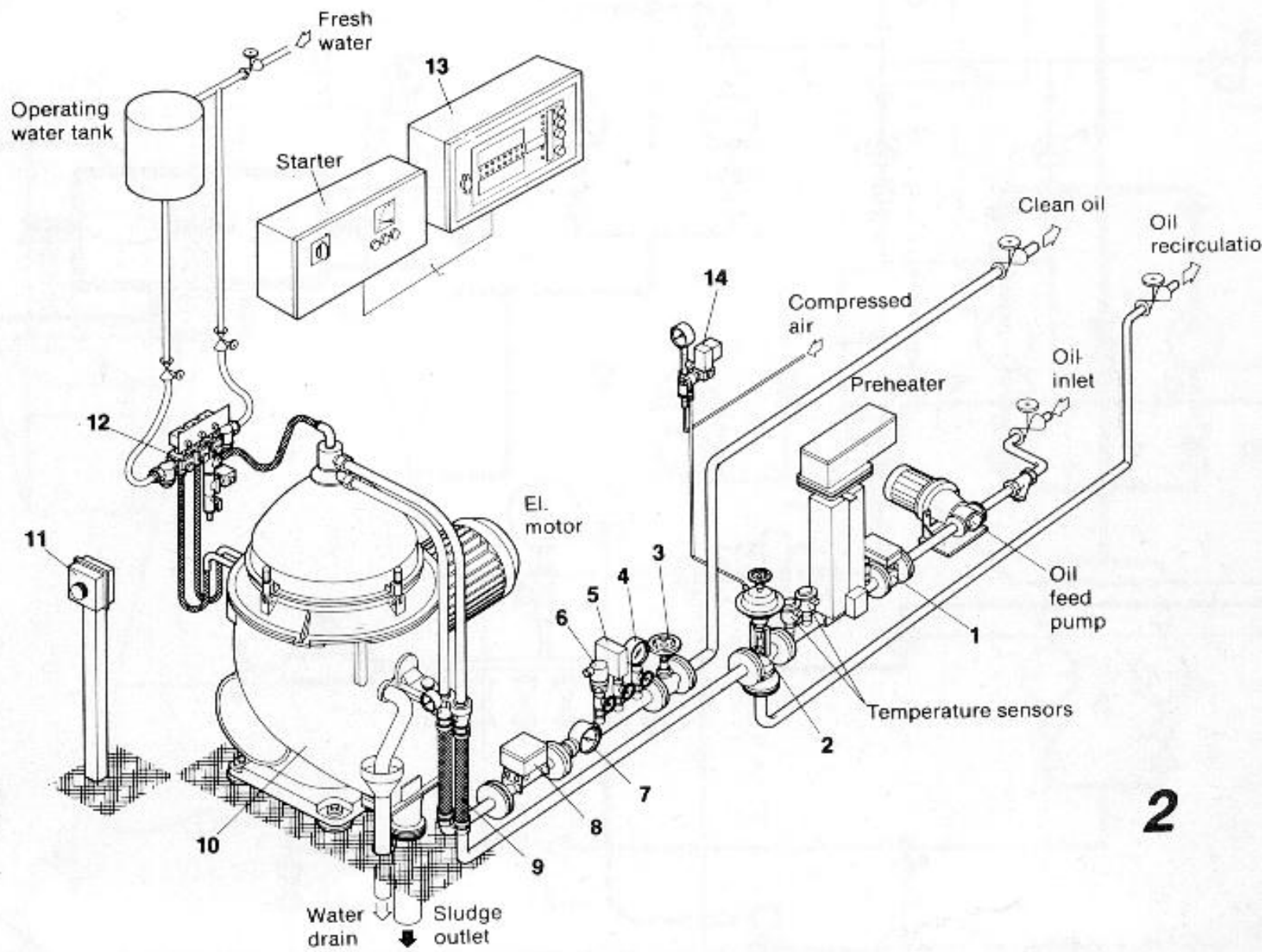
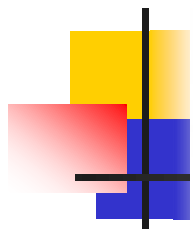
Skrúfa (2) **
-- 2210938-21



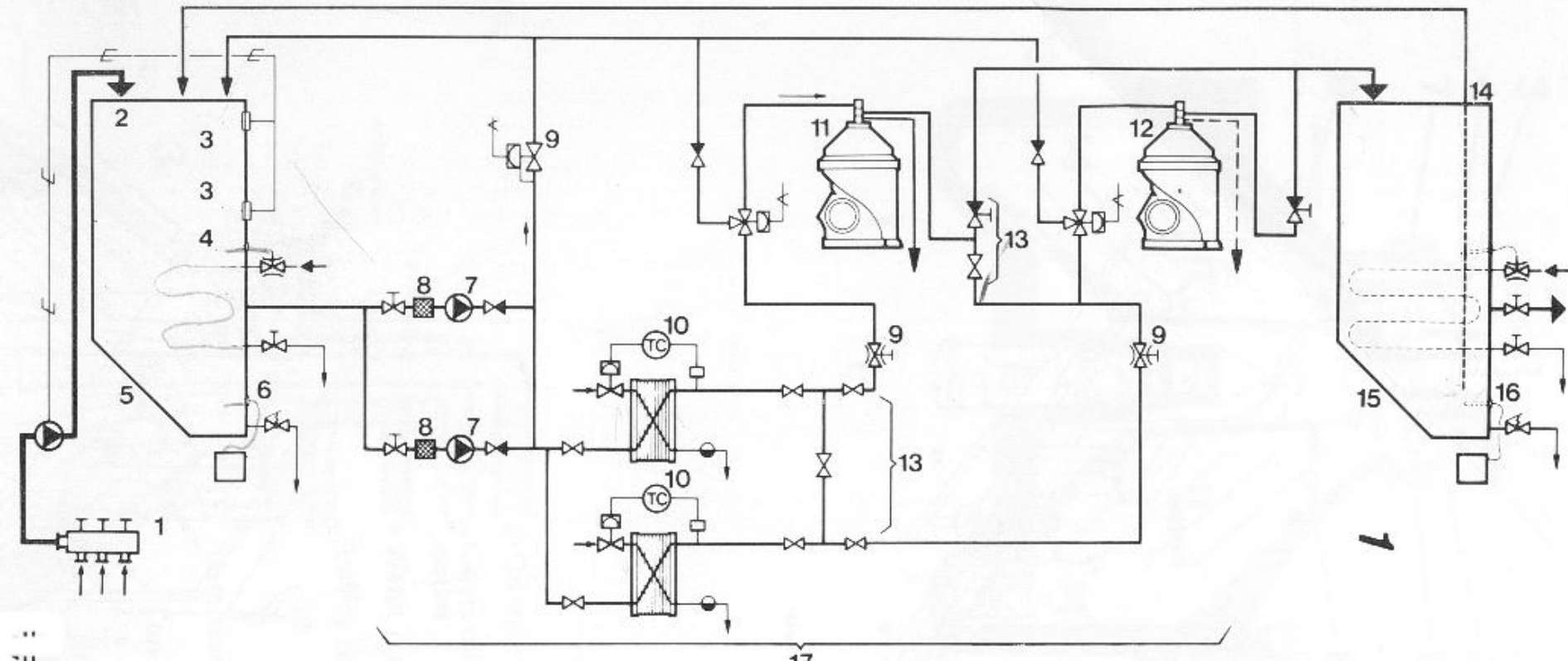
Að skilja þunga olíu

- Reynslan hefur sýnt að hægt er að nota purifier fyrir olíu að 991 kg / rúmmetra.
- Ef olía er þyngri þarf að nota clarifier og sjálfvirkan búnað.





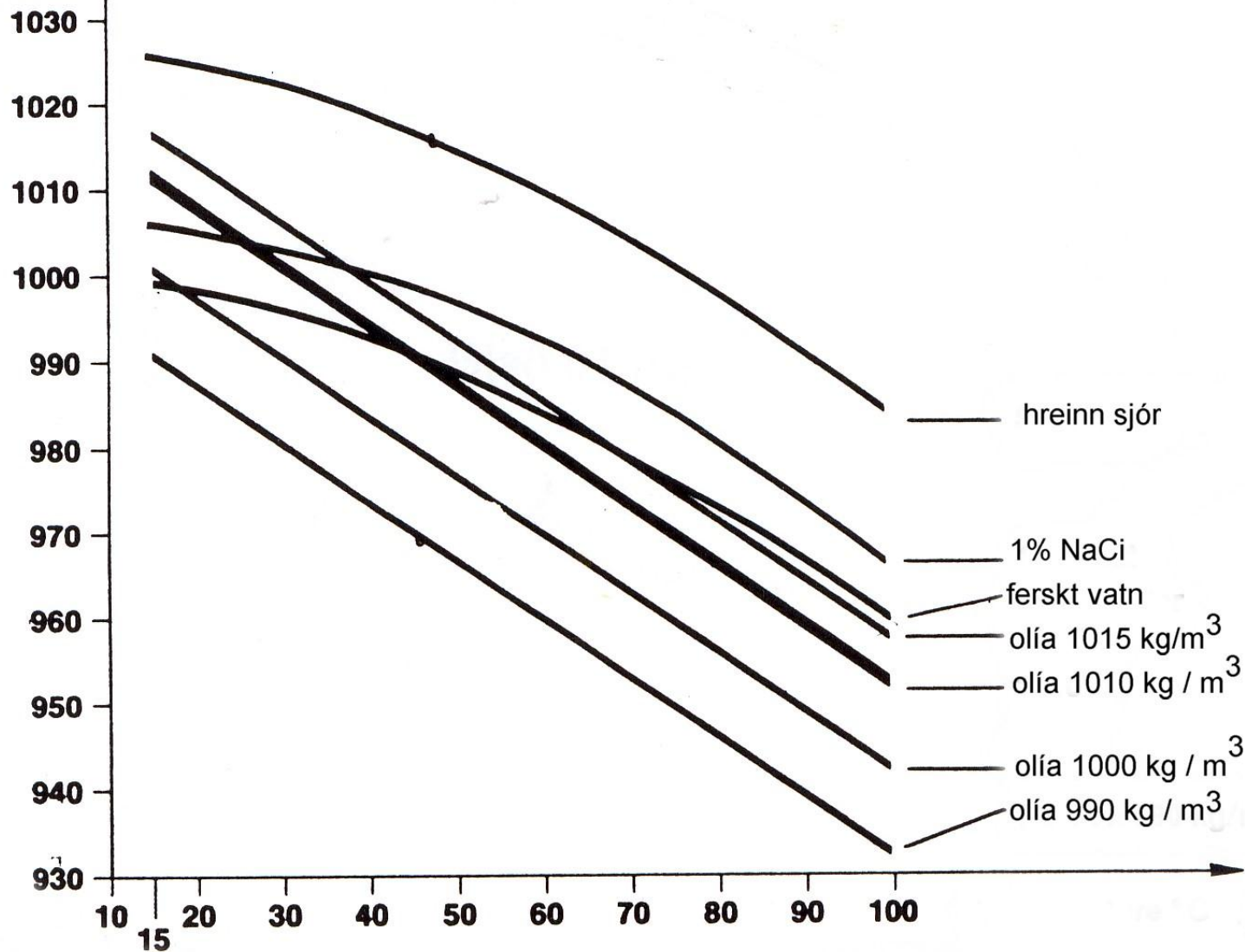
Kerfi fyrir HFO

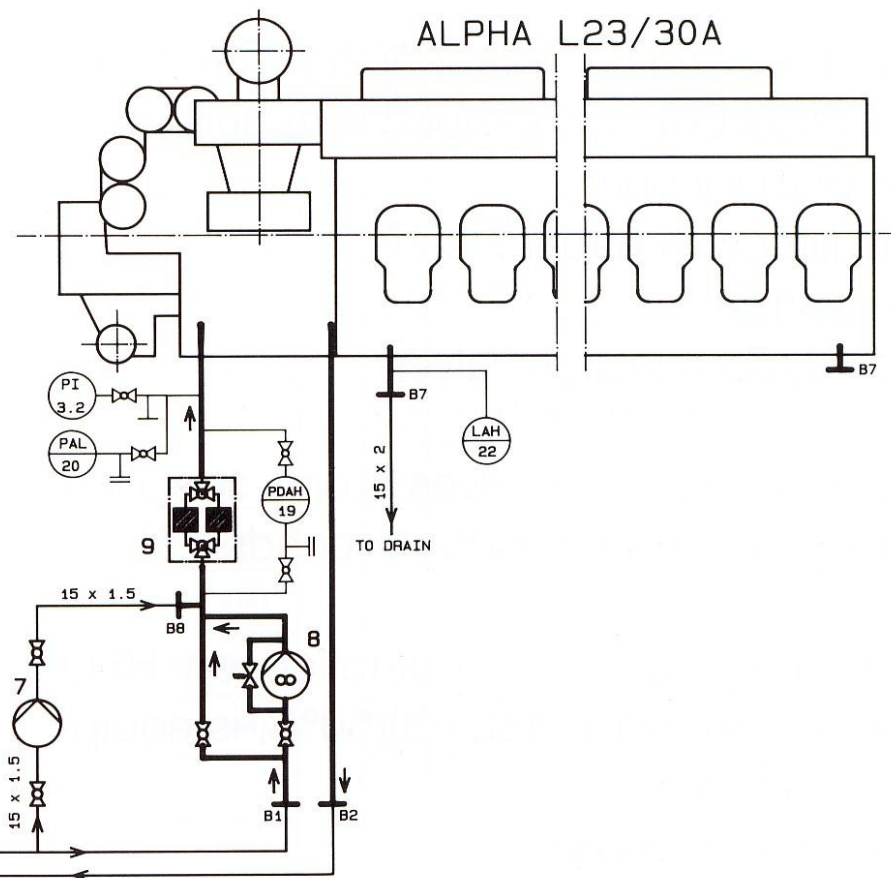
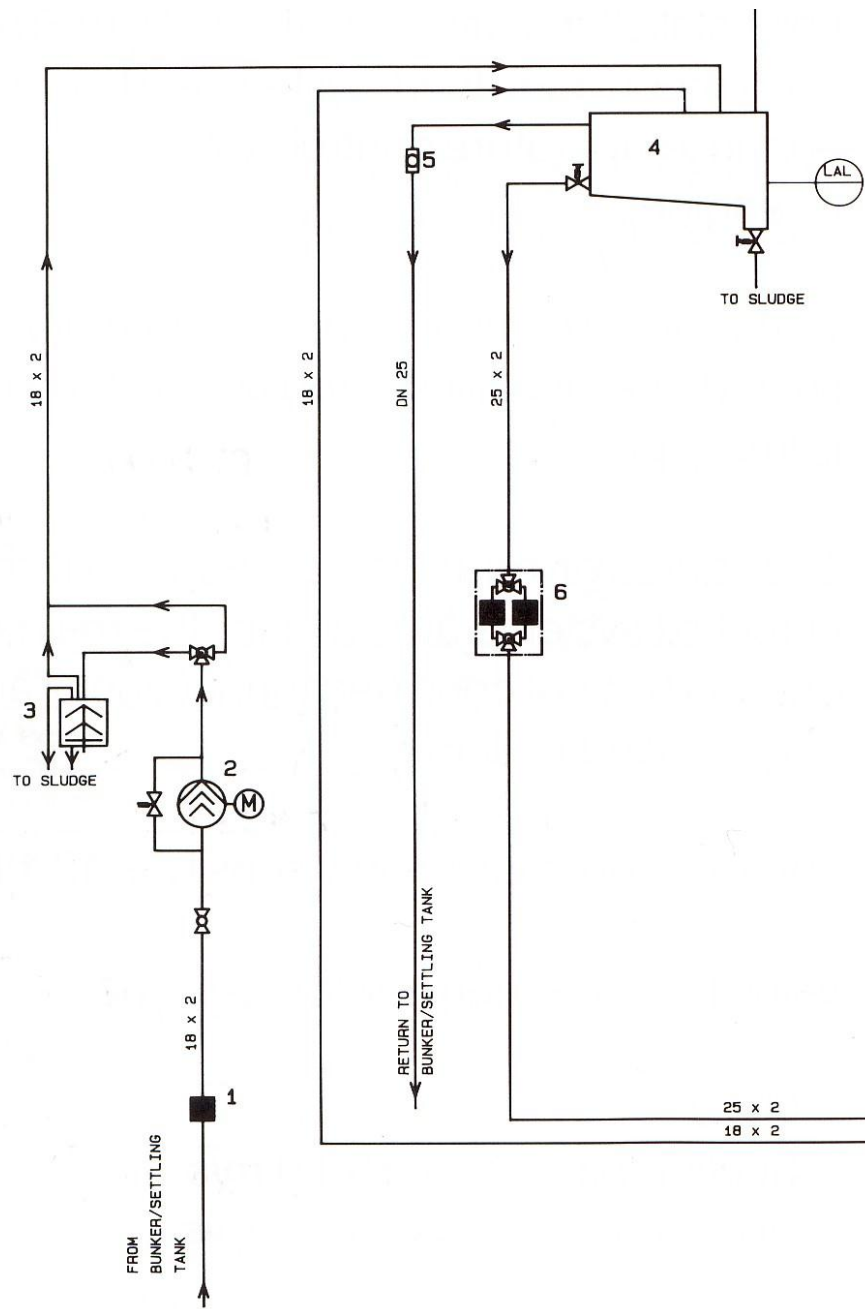


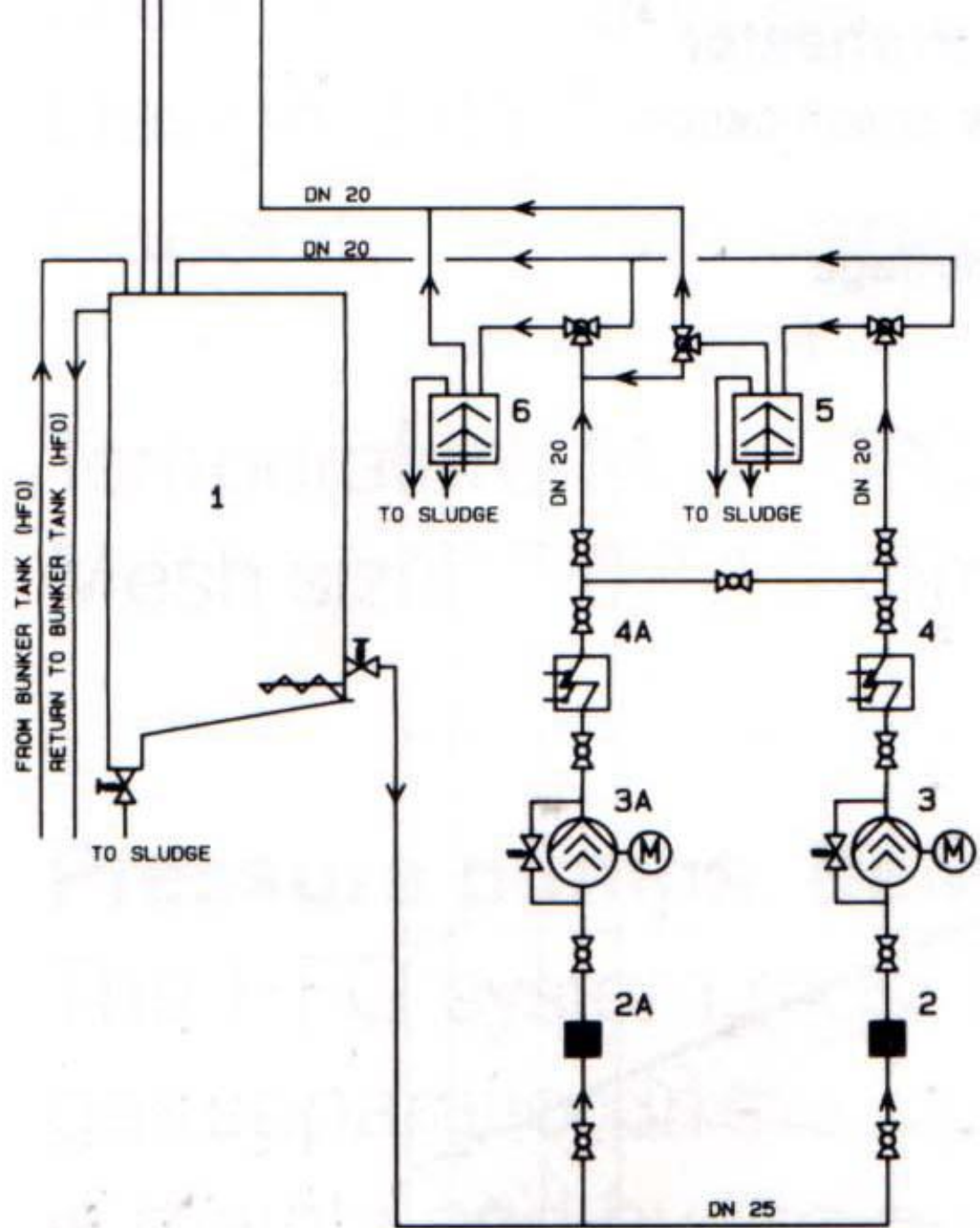
Olíutegundir / efnagreining	A	B	C
Conradson carbon % (kolefni)	10	15	18
aspahl % (tjara)	7	10	12
Diesel index (kveikihæfni)	740	735	735
aske % (aska)	0.08	0,1	0,15
sulphur (brennisteinn) 0/00	4	4	4
vand (vatn) %	0,25	0,25	0,25
vanadium (málmur) 0/00	150	200	300
sodium 0/00	50	65	75
aluminiumoxid 0700	10	12	15
seigja í cSt	hámark 10 cSt við vél		
densitet g/ml (eðlisþyngd)	0,99	0,99	0,99
blossamark °C	60	60	60
einingar fyrir flokka olíunnar	IF 60 – 240	IF 108 – 380	IF að 600

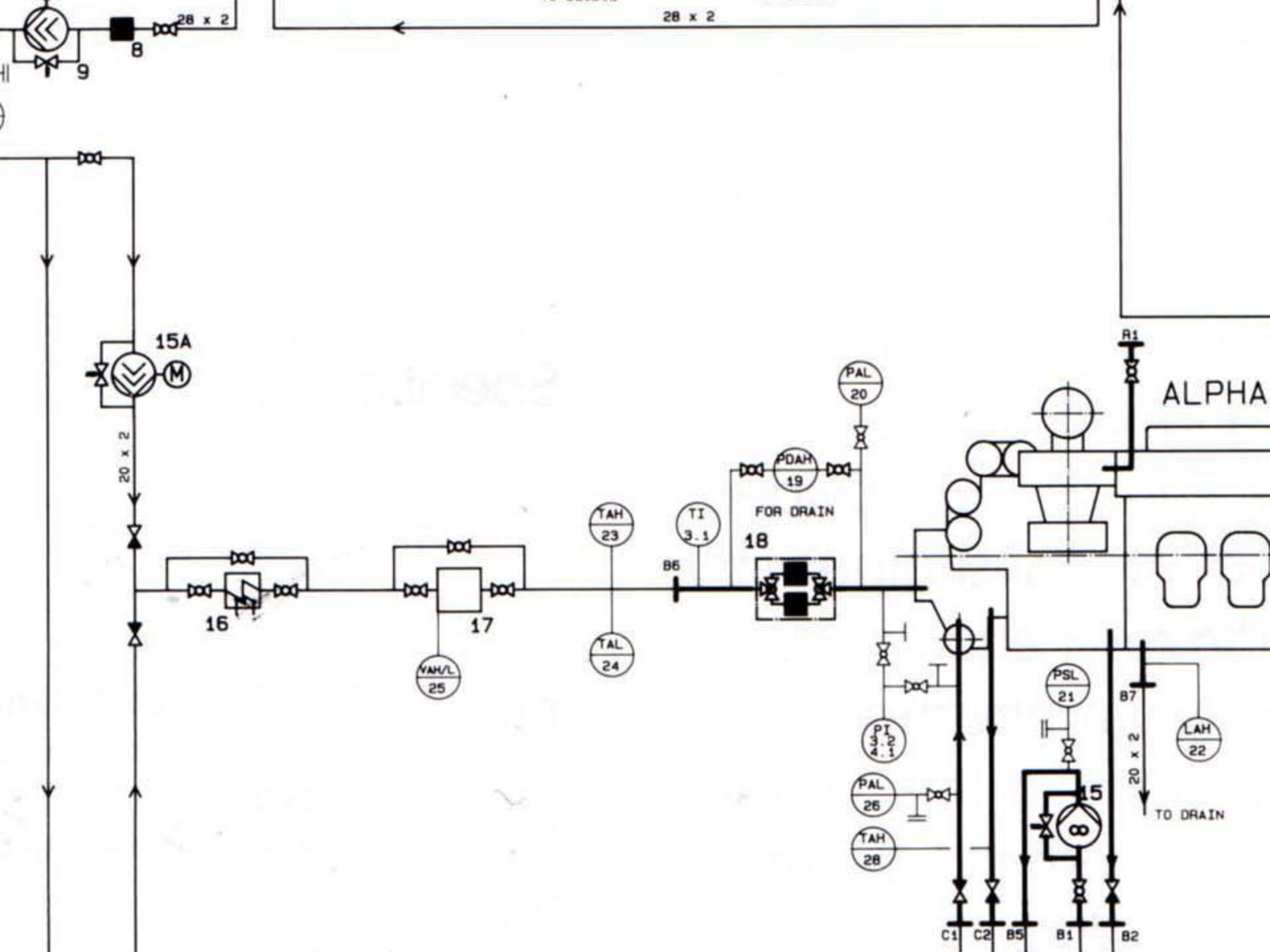
eðlisþyngd
 kg / m^3

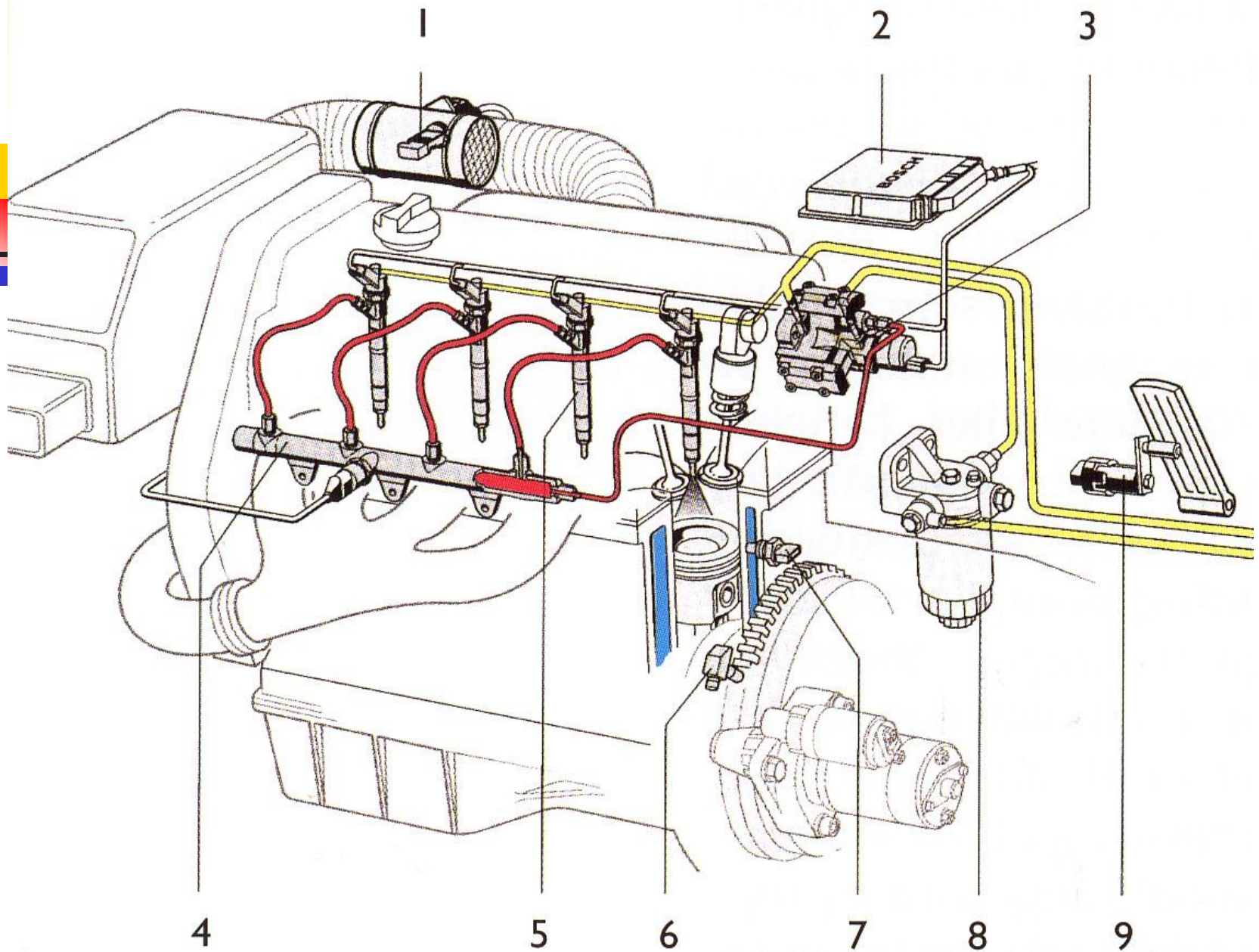
Línurit fyrir upphitun vökva

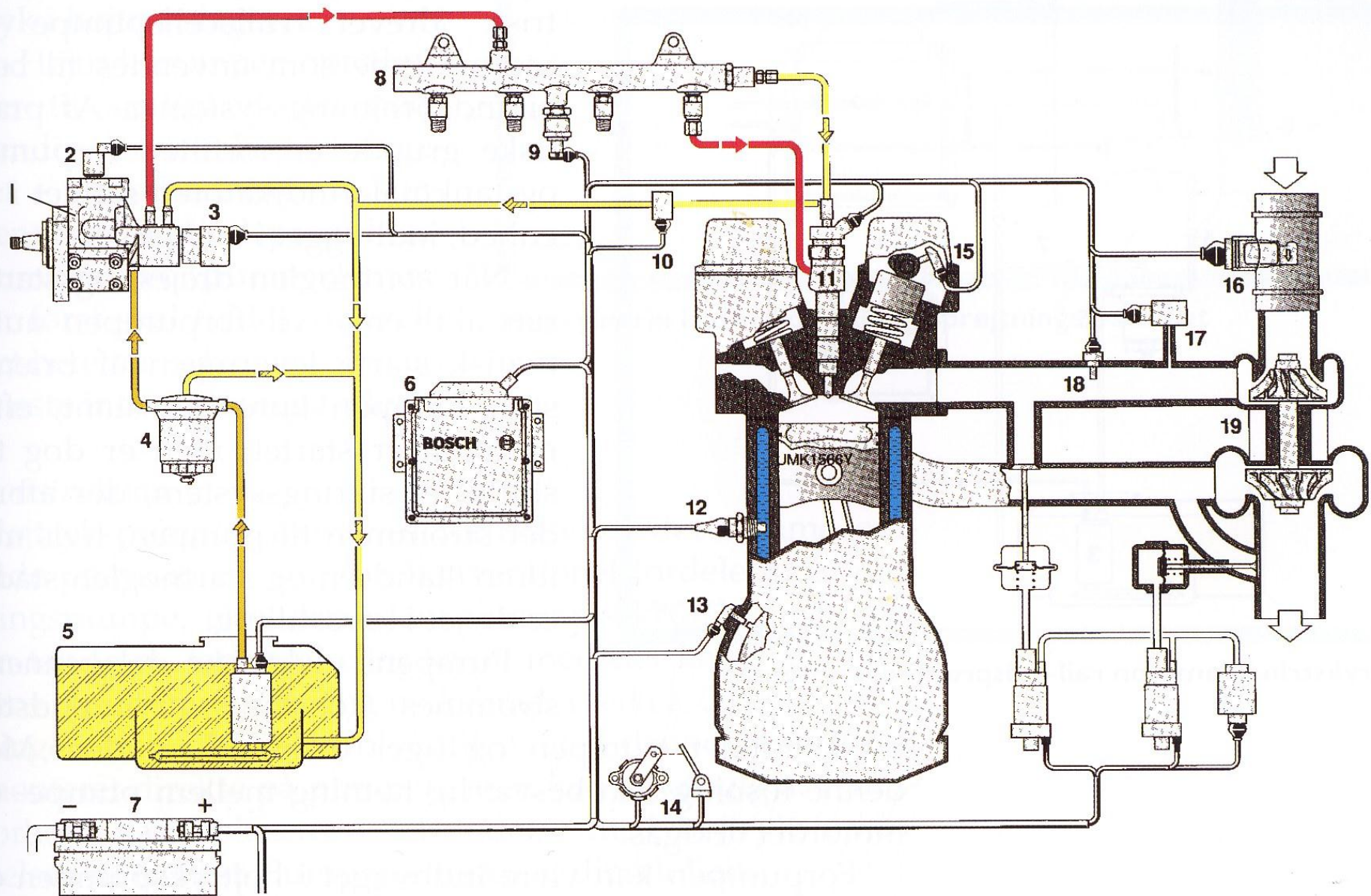


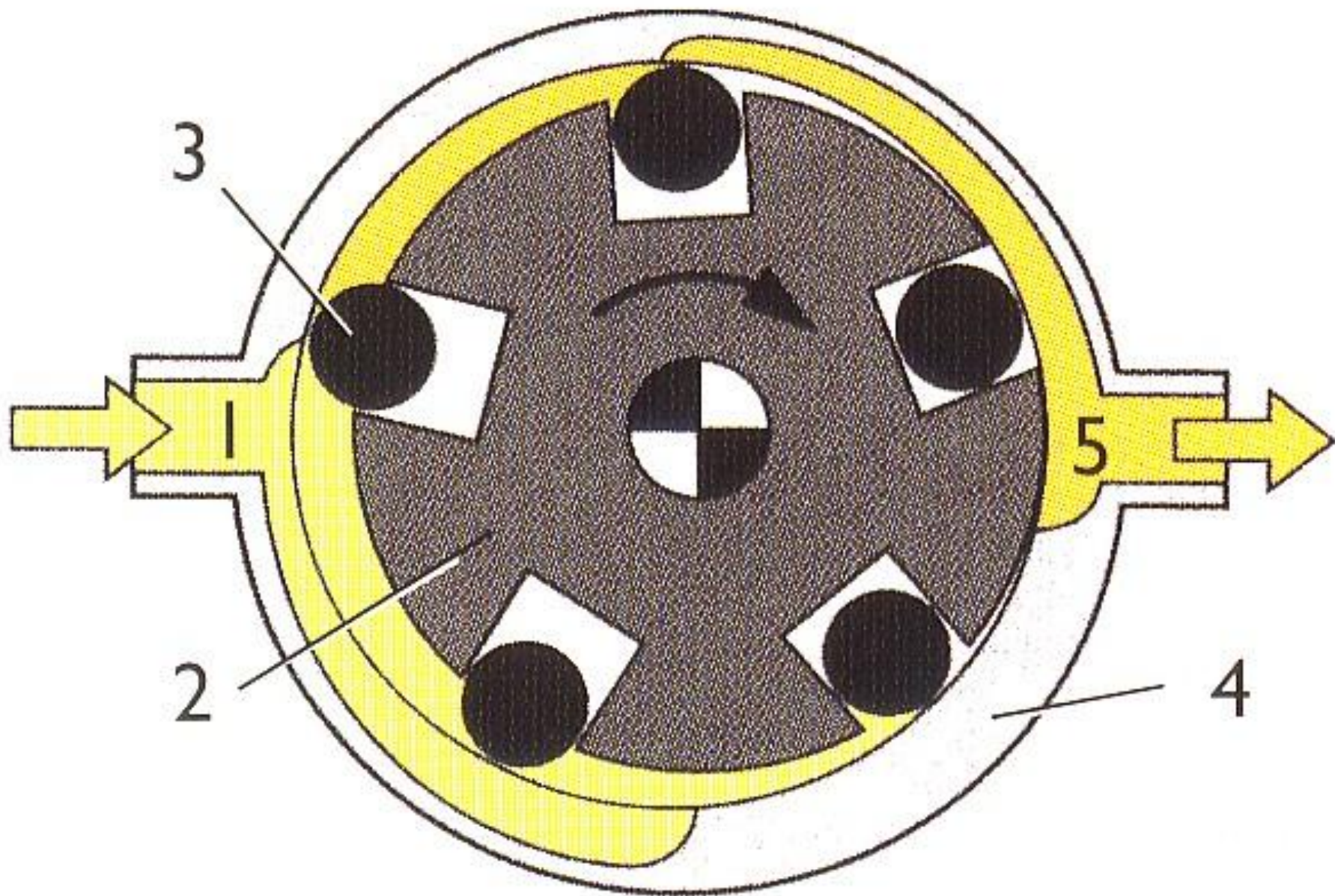


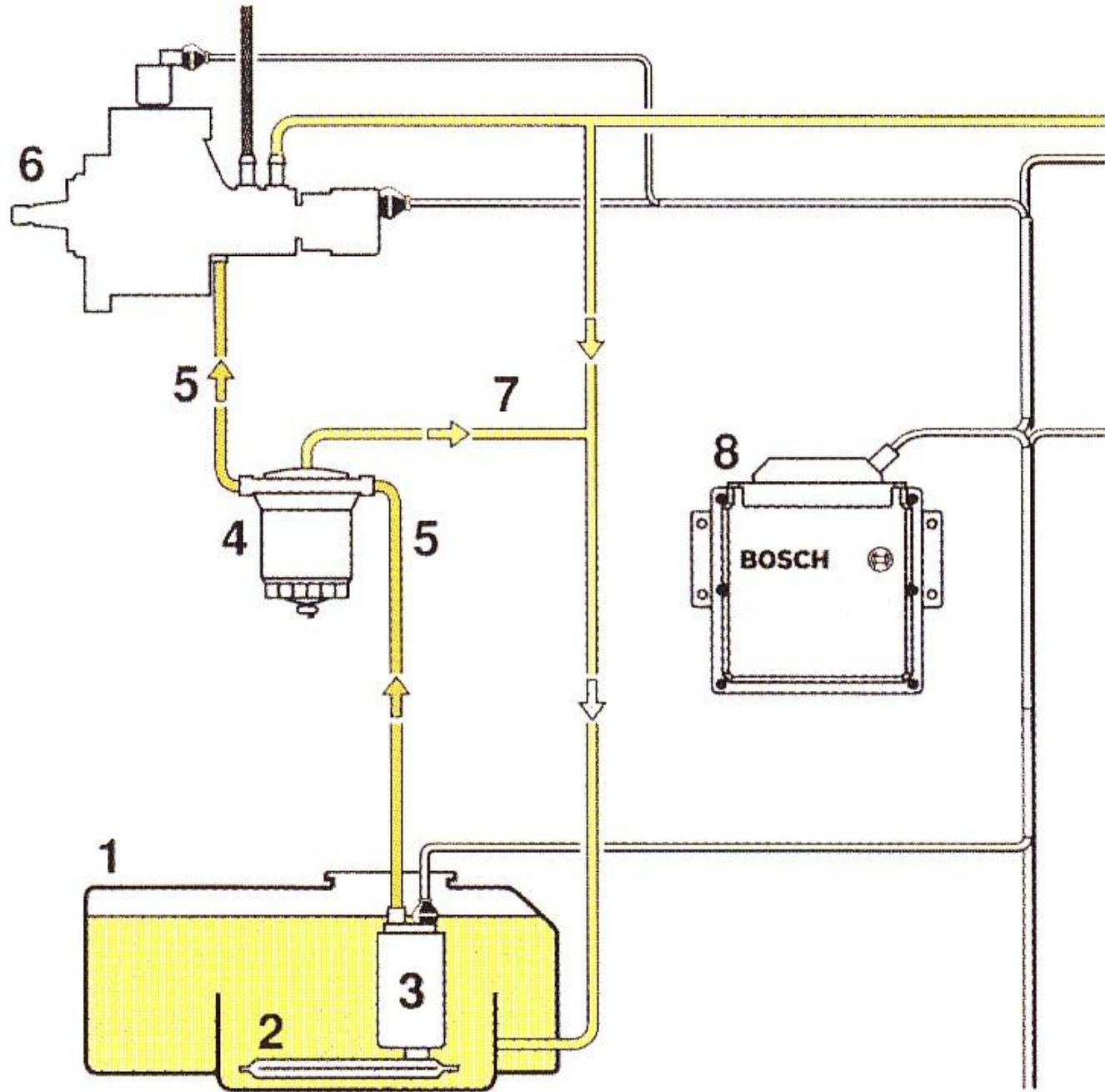
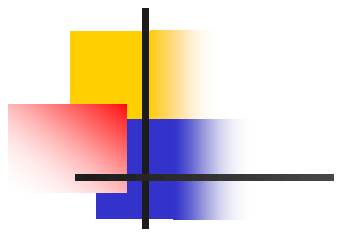


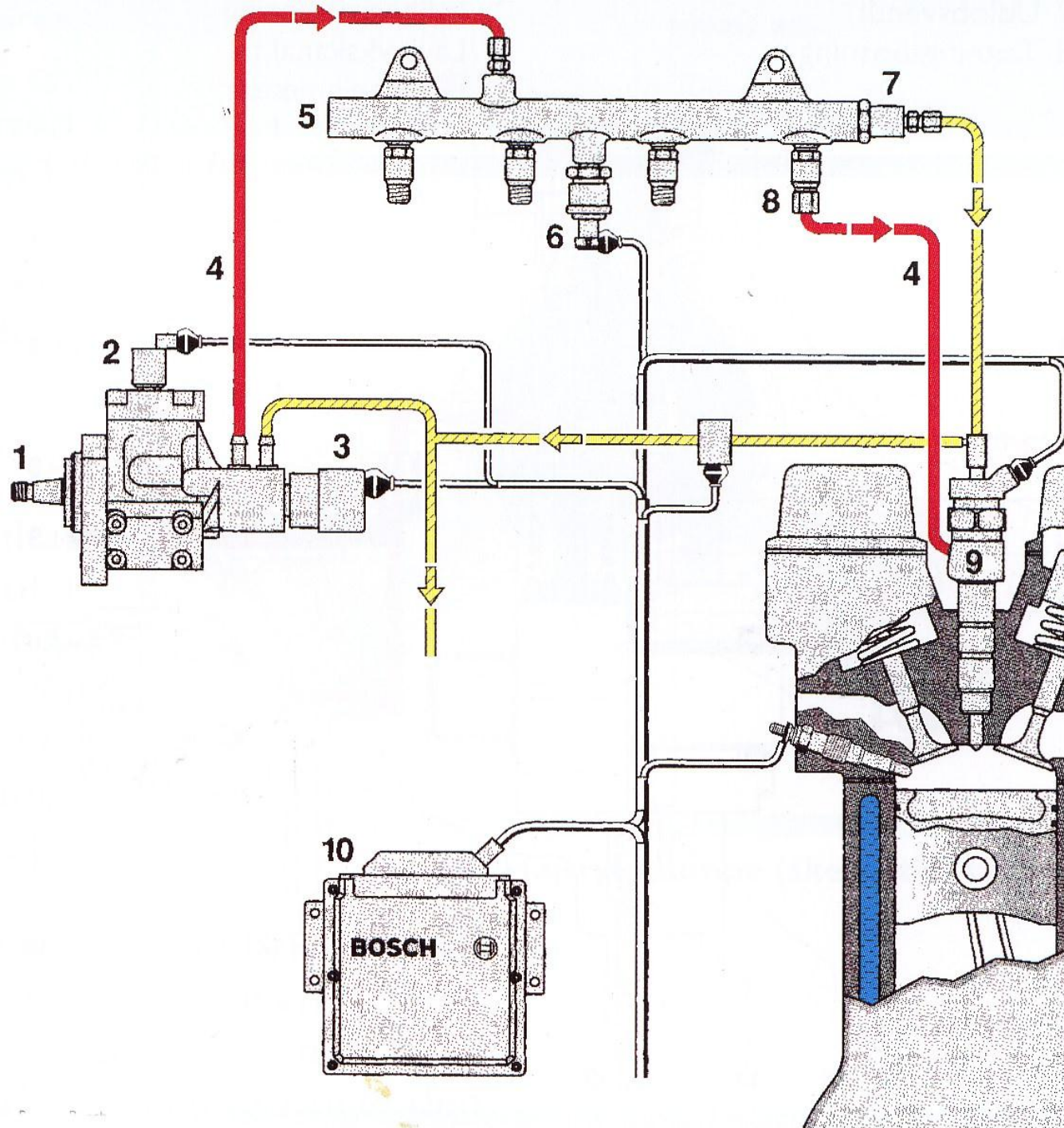
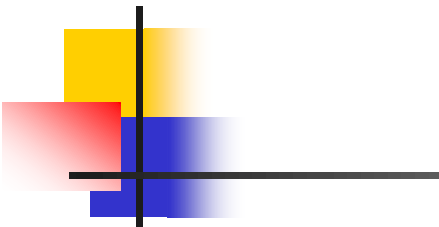


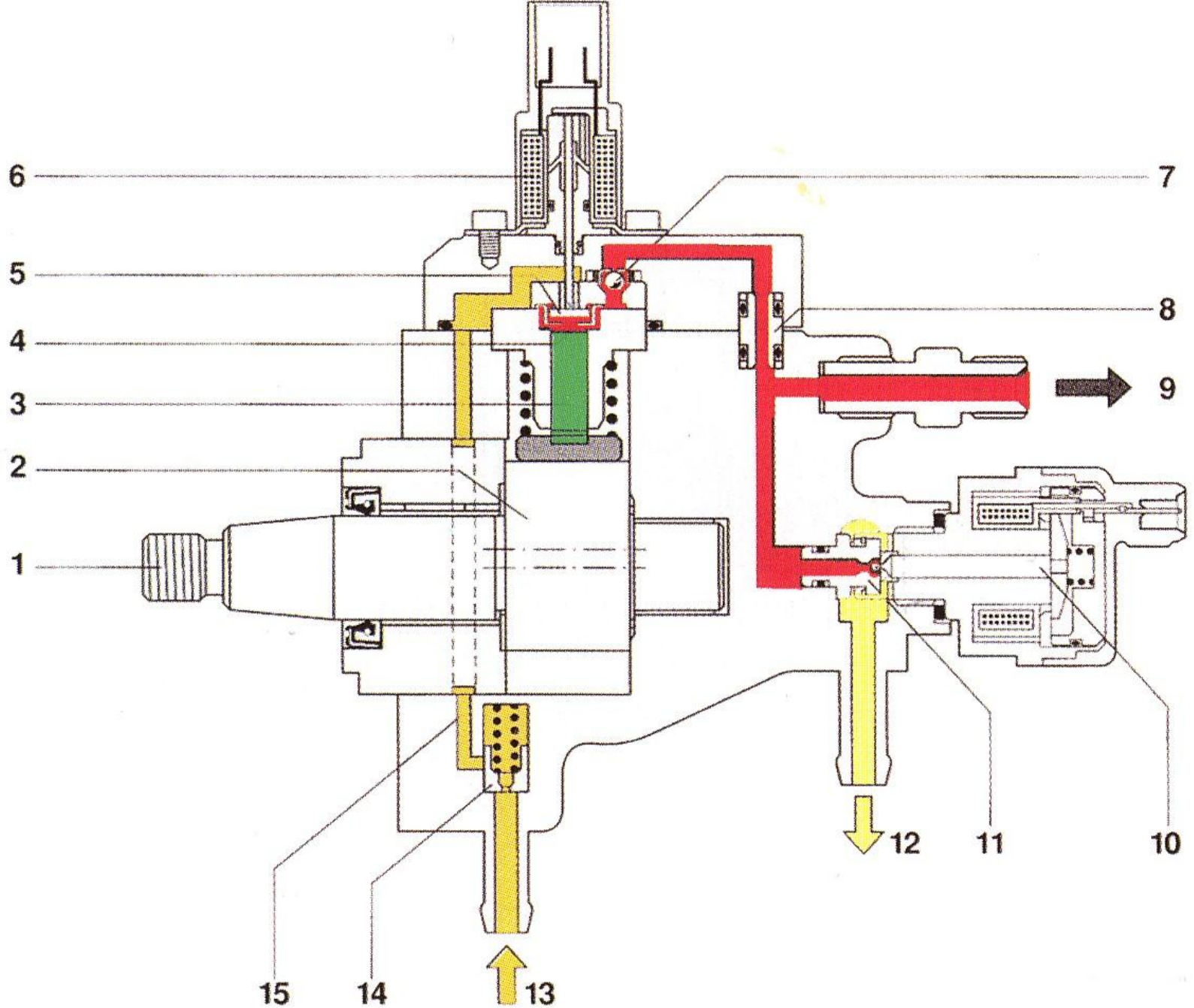




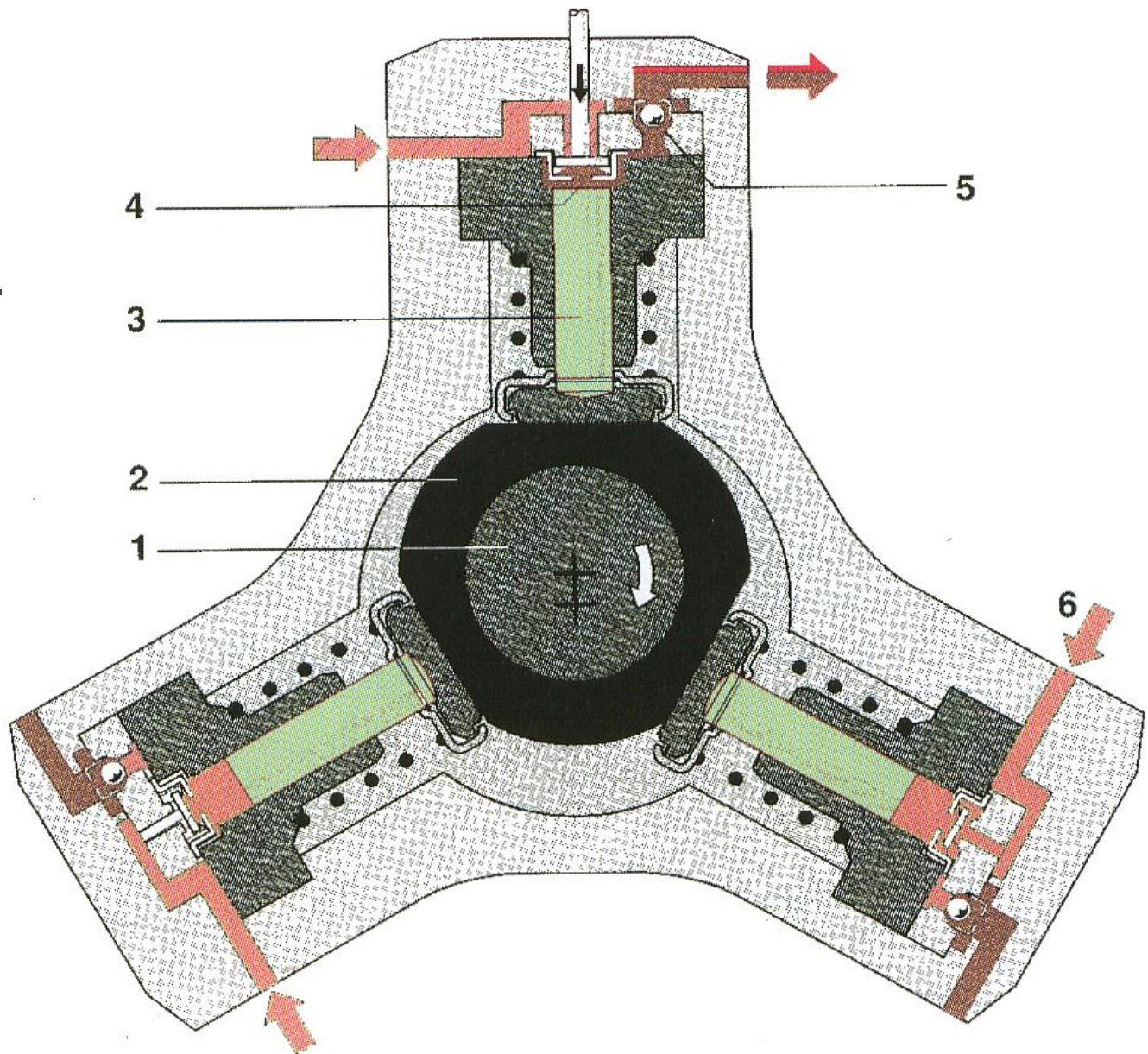


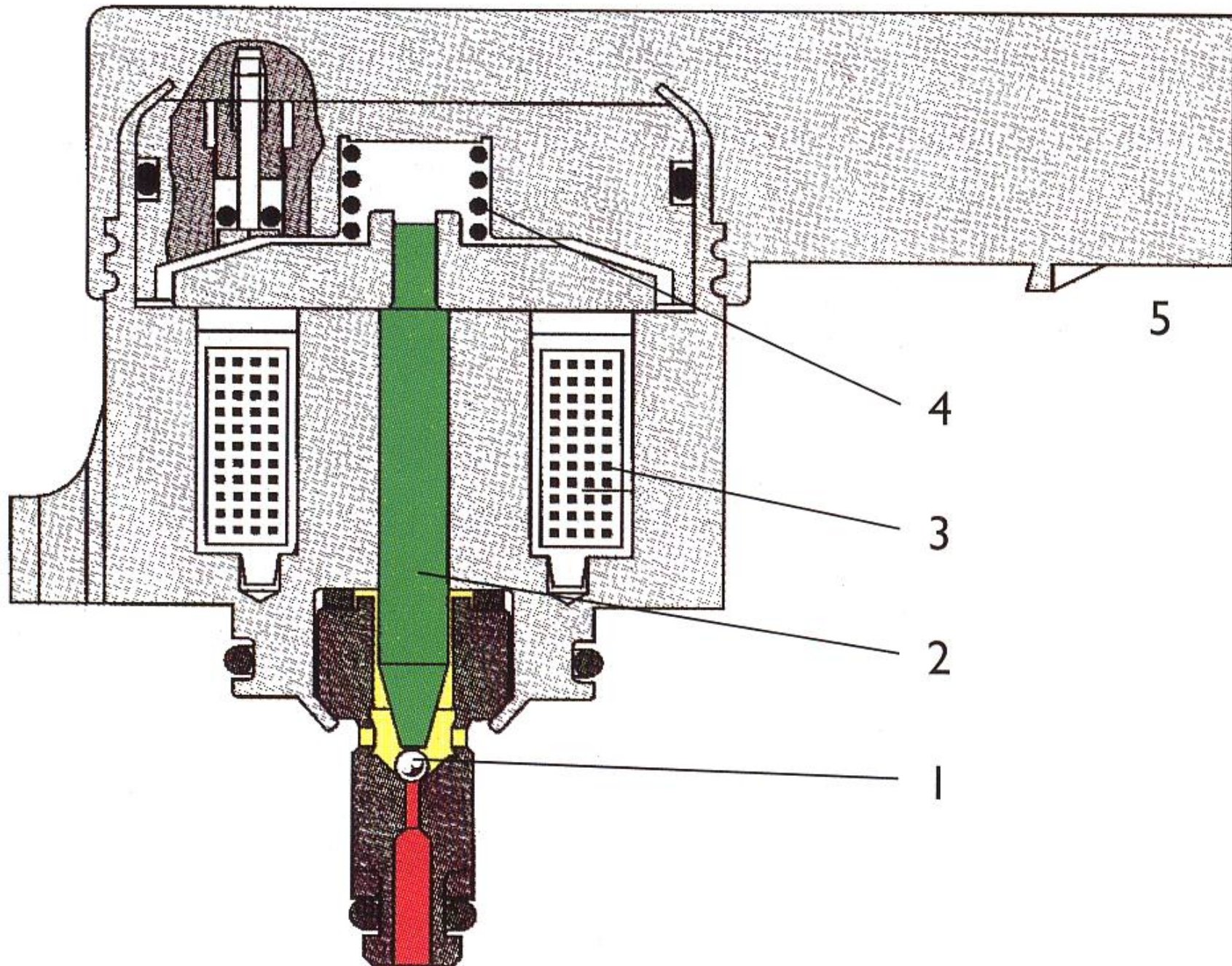




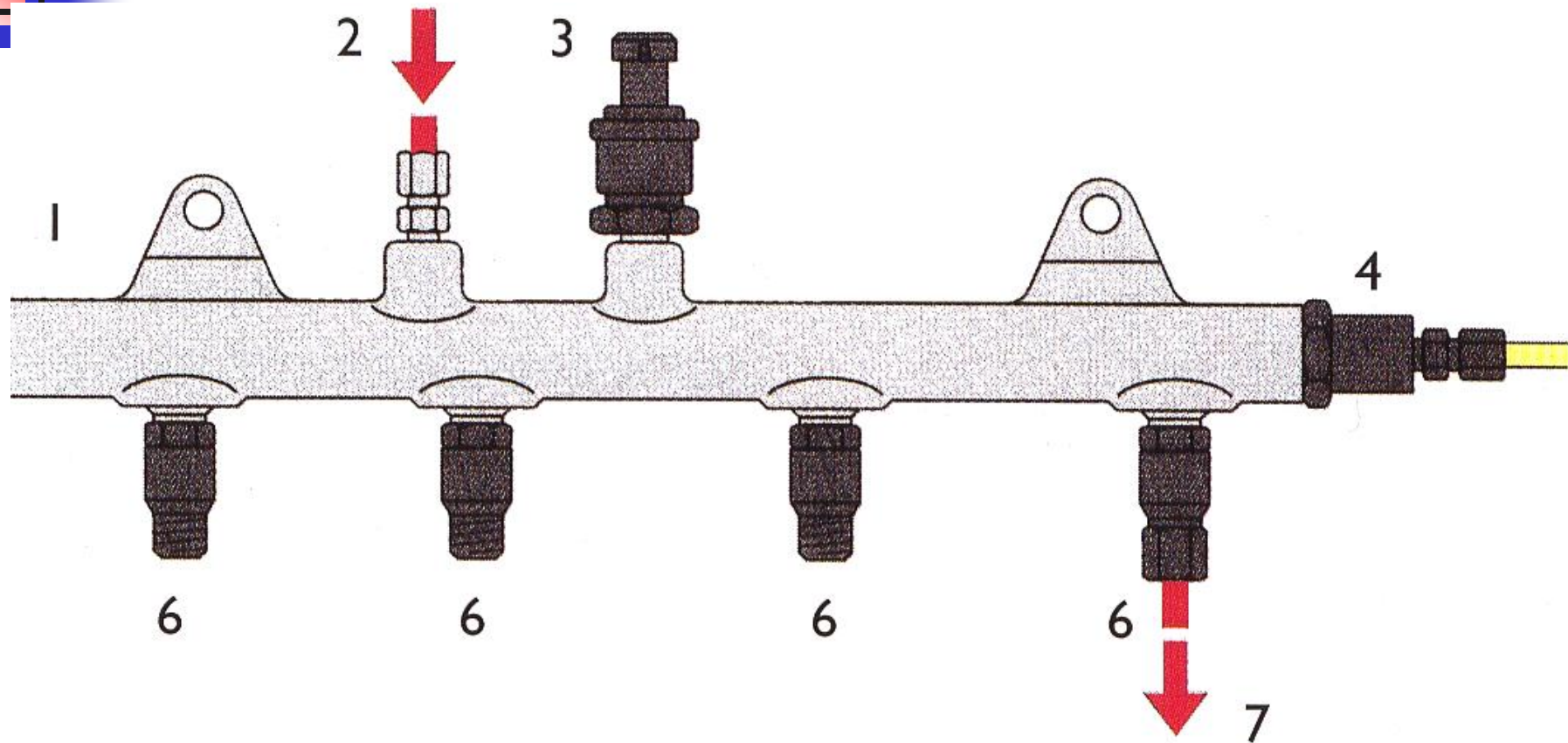


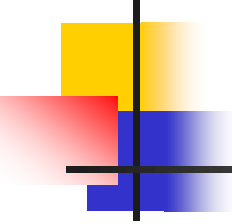
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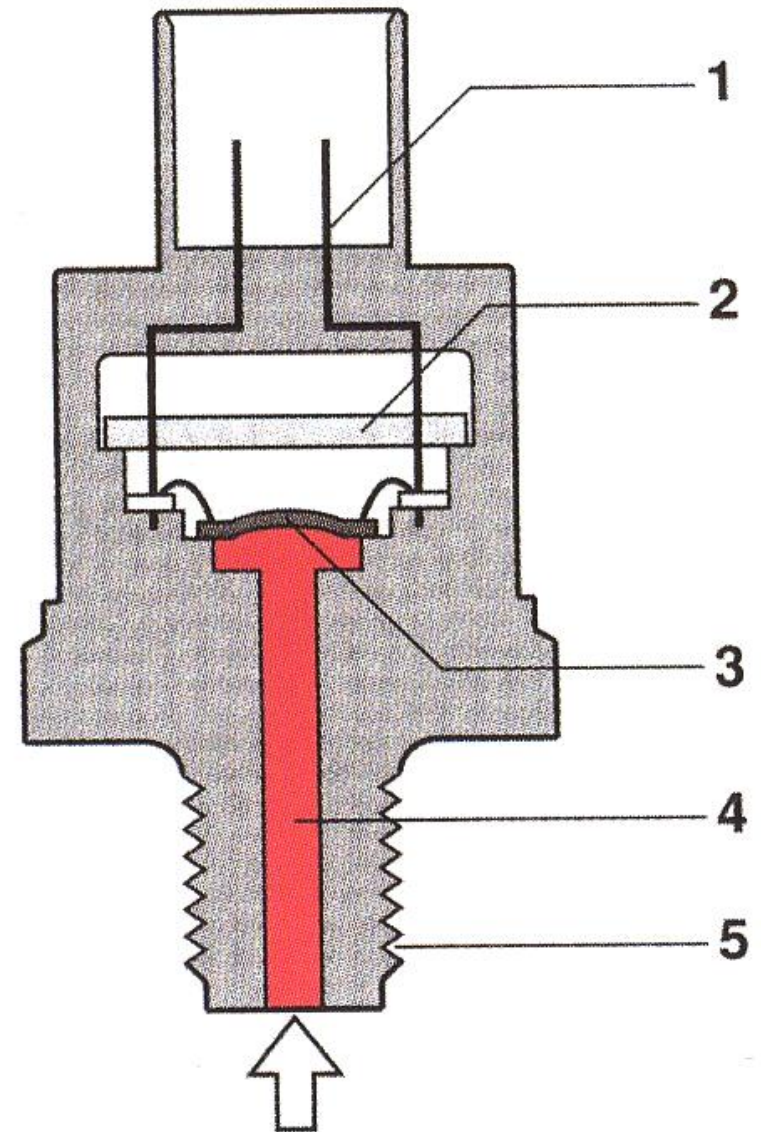


Deilirör á bls. 67

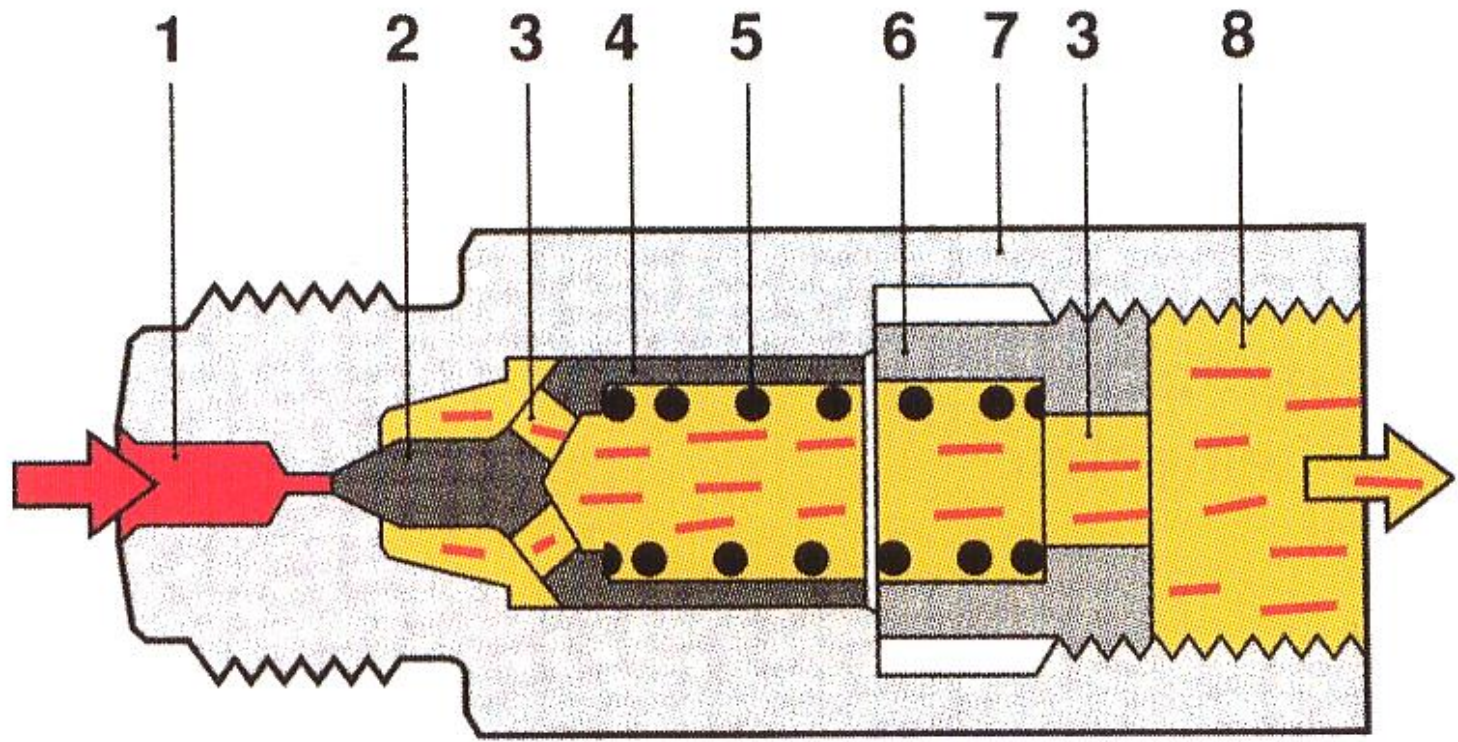




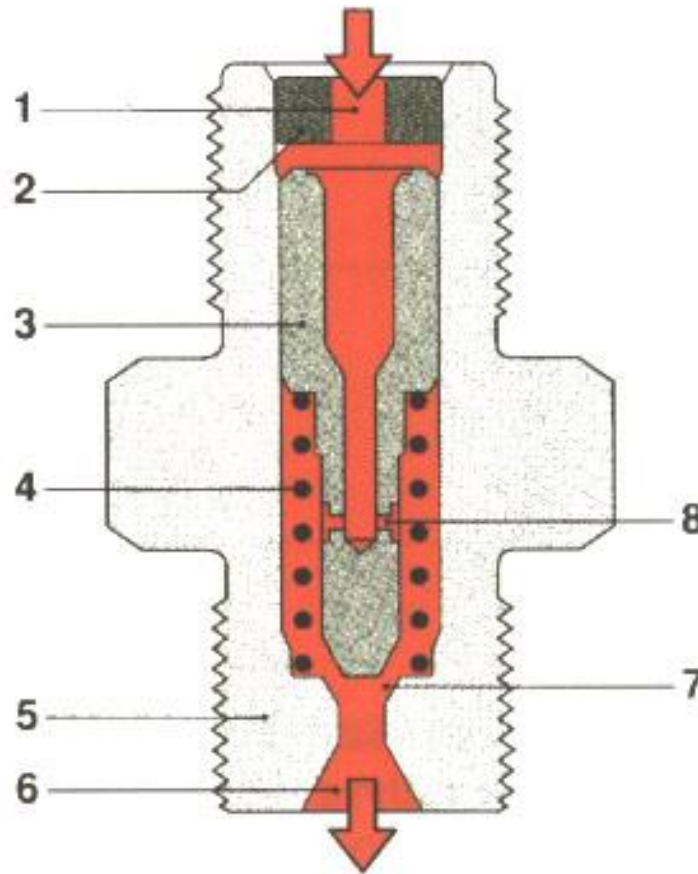
Stýrieiningin breytir
þrýstiboðum þindar í
rafræn boð.

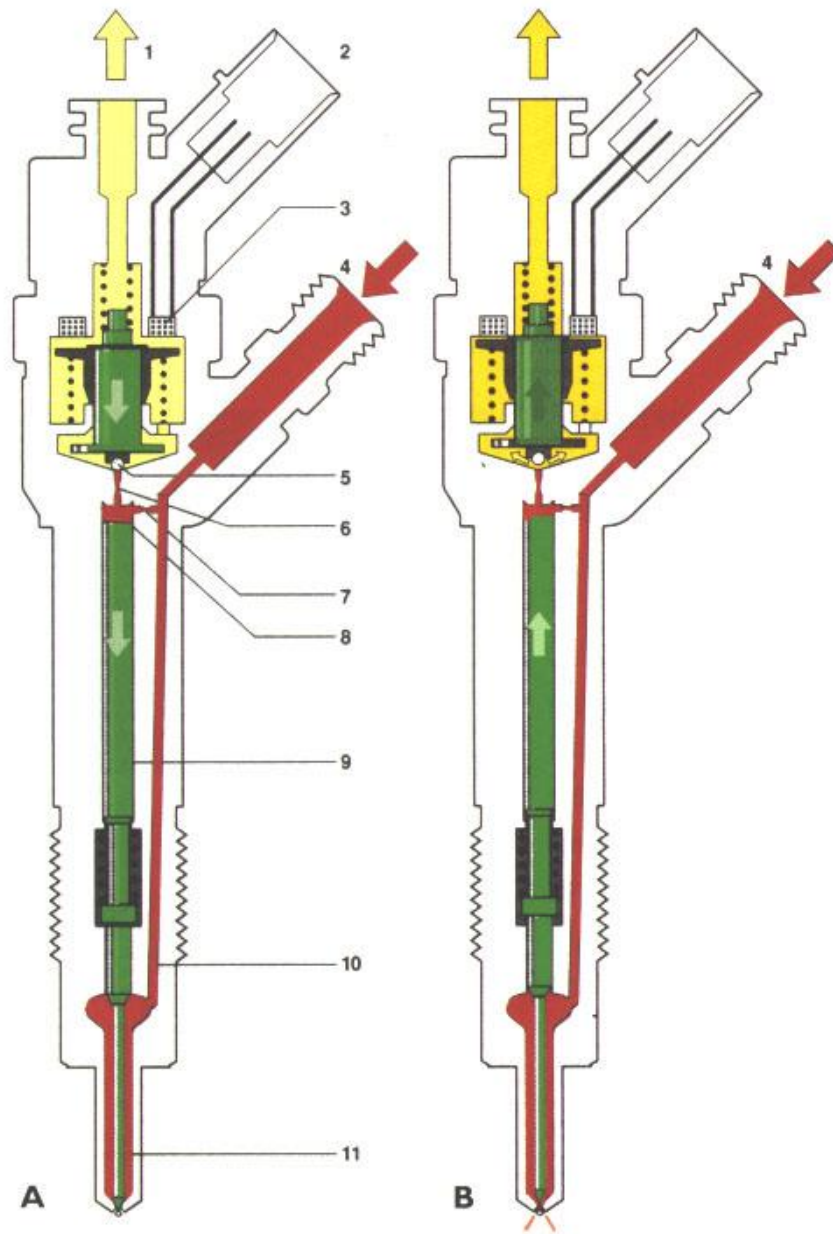
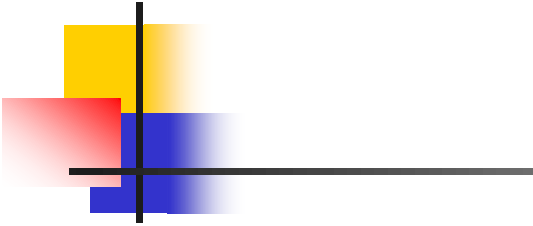


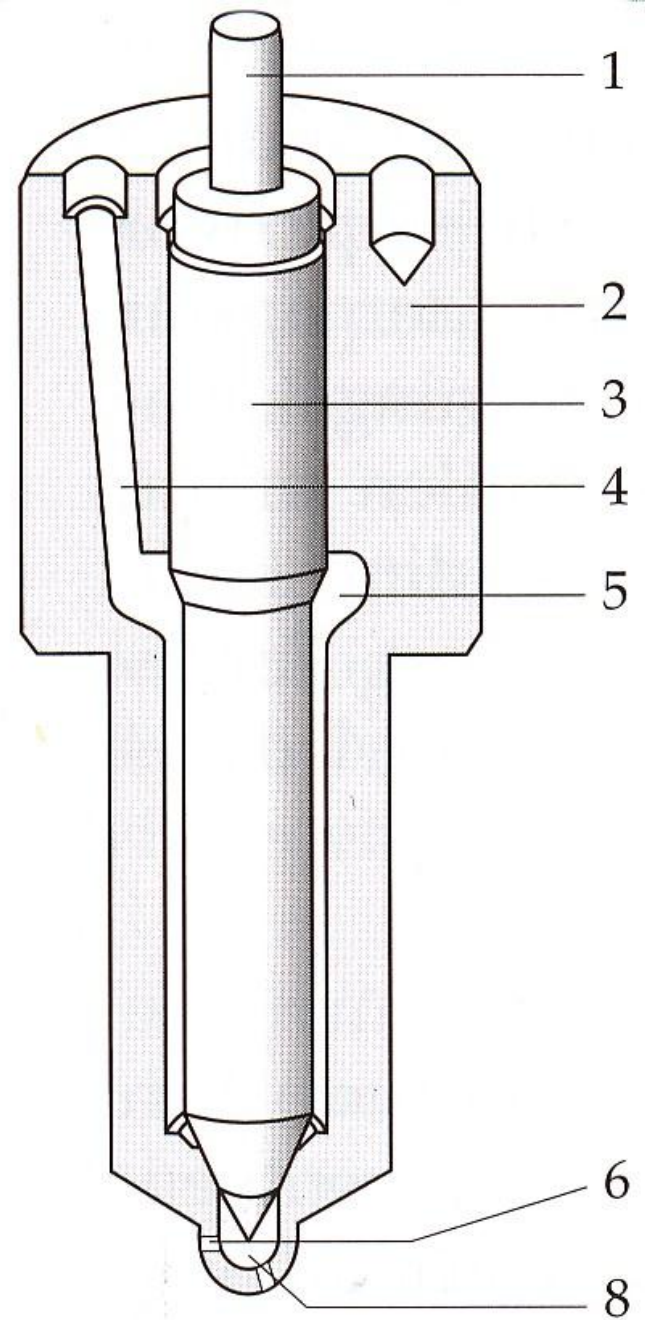
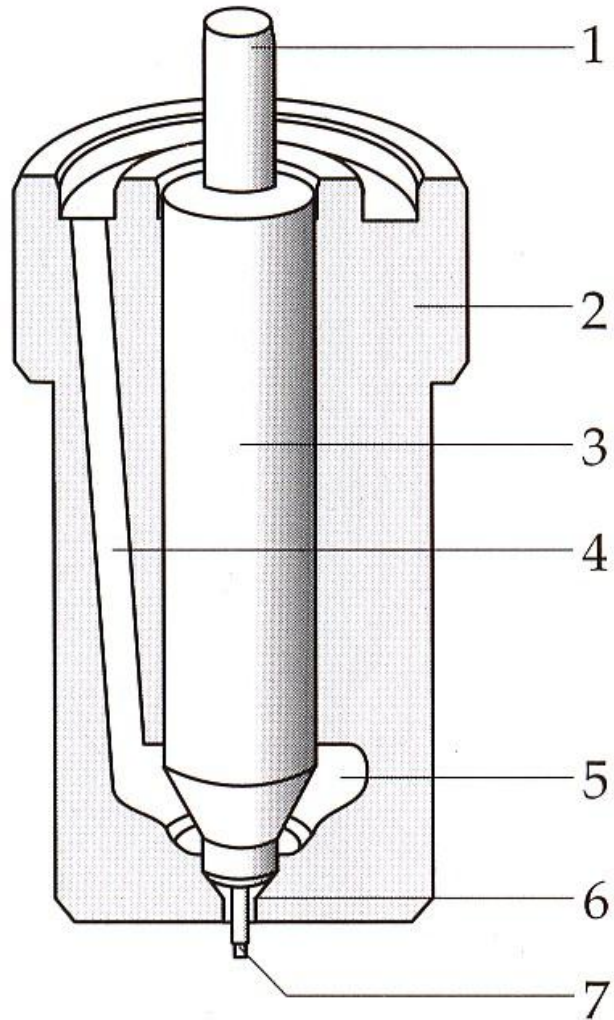
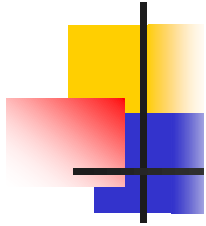
1500 bör og hann opnast



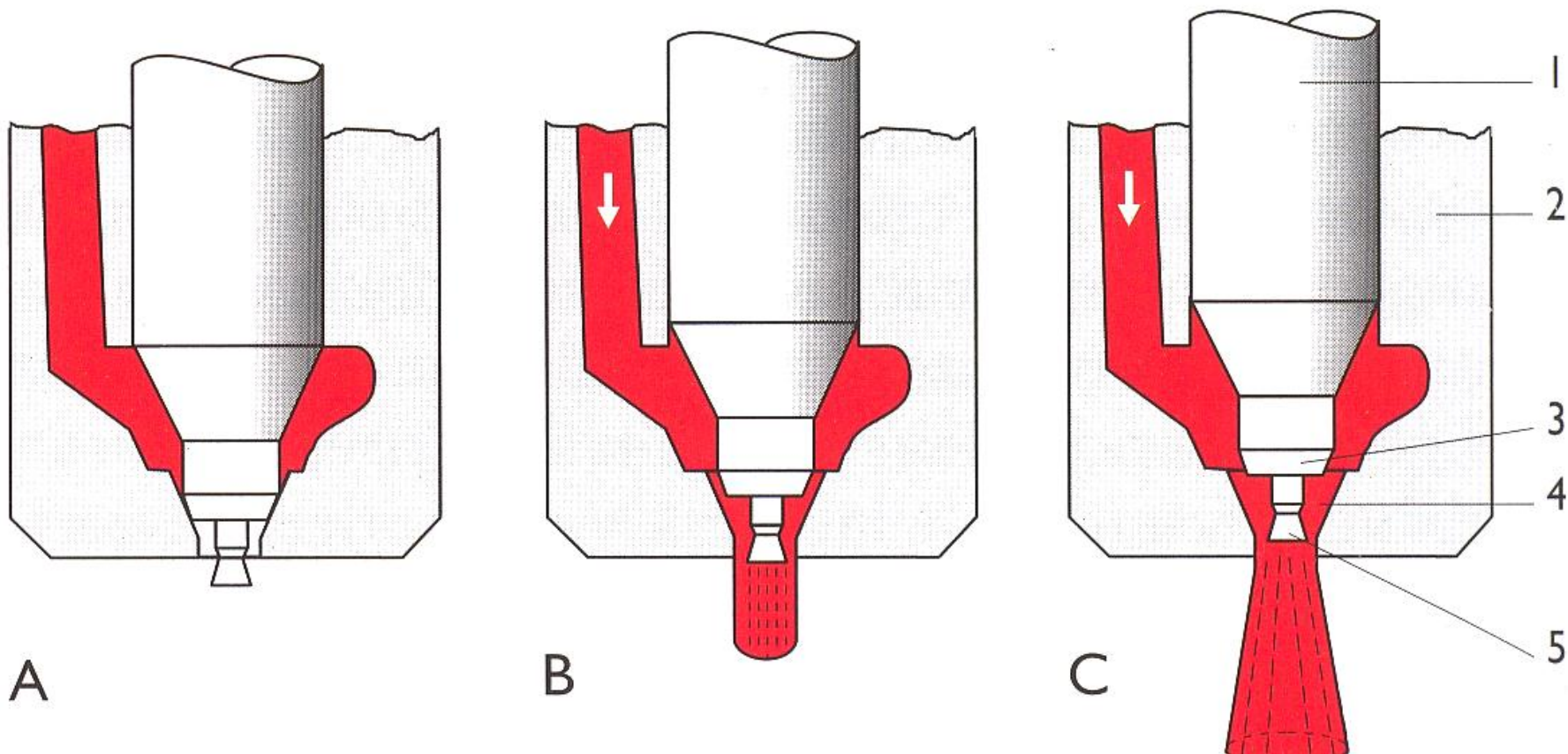
Streymistregða



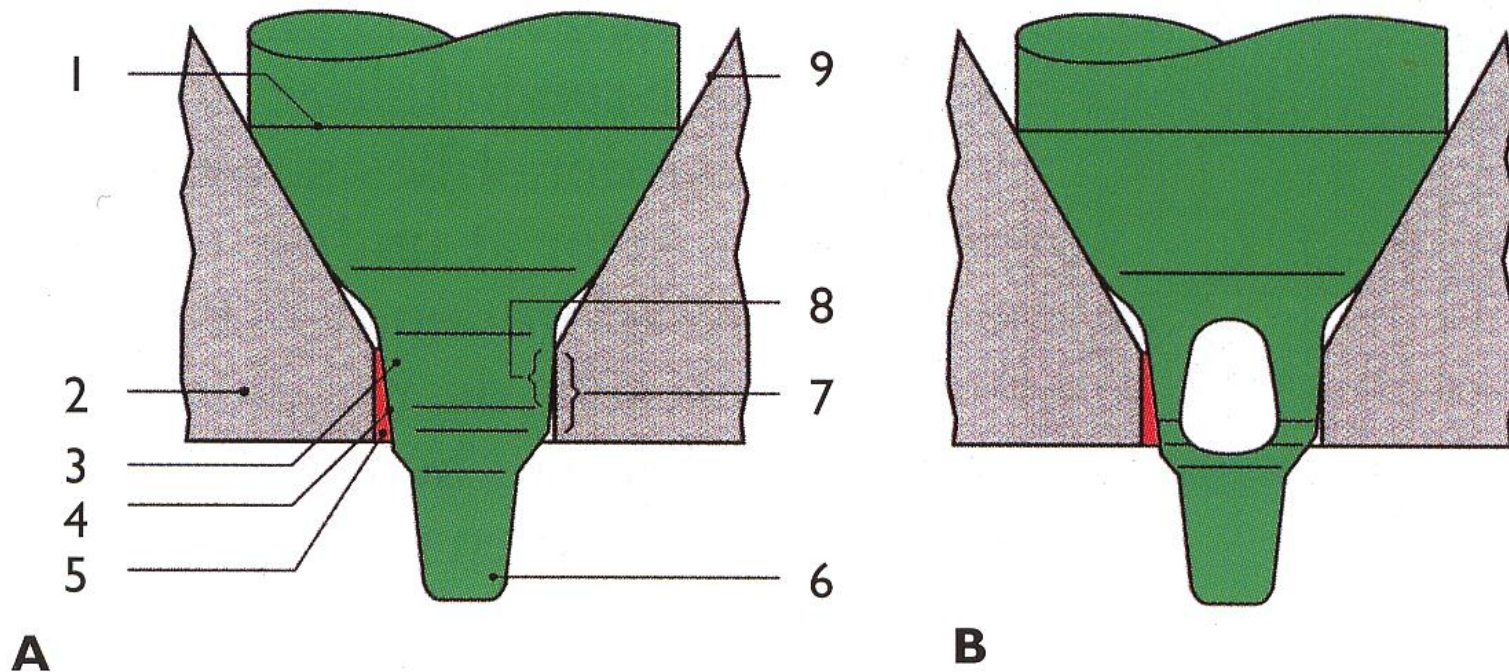


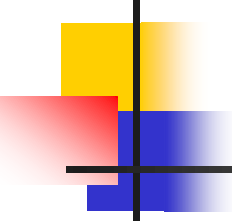


Upphaf – byrjun – fullopin

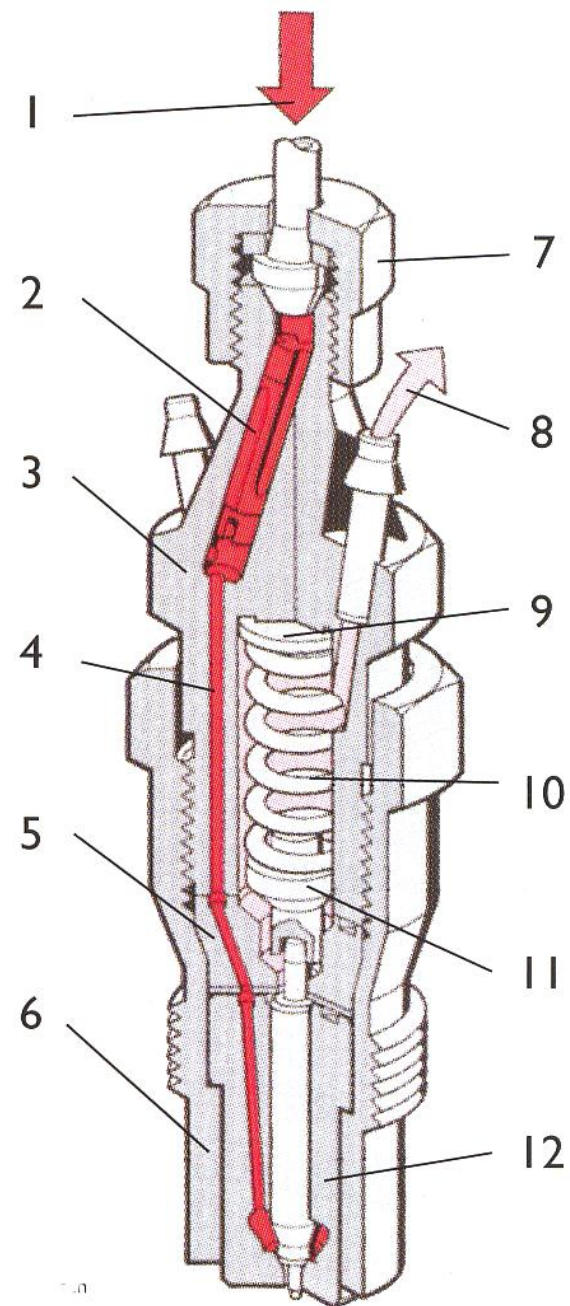


Tappadýsa með flötu sniði

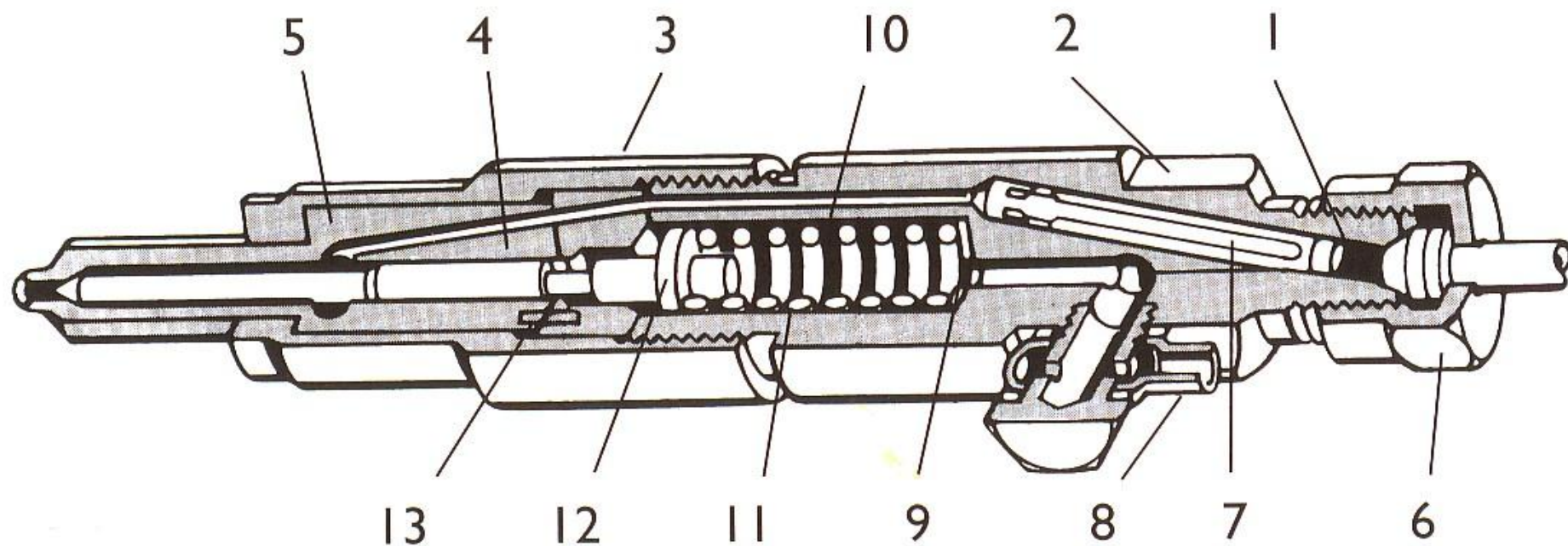




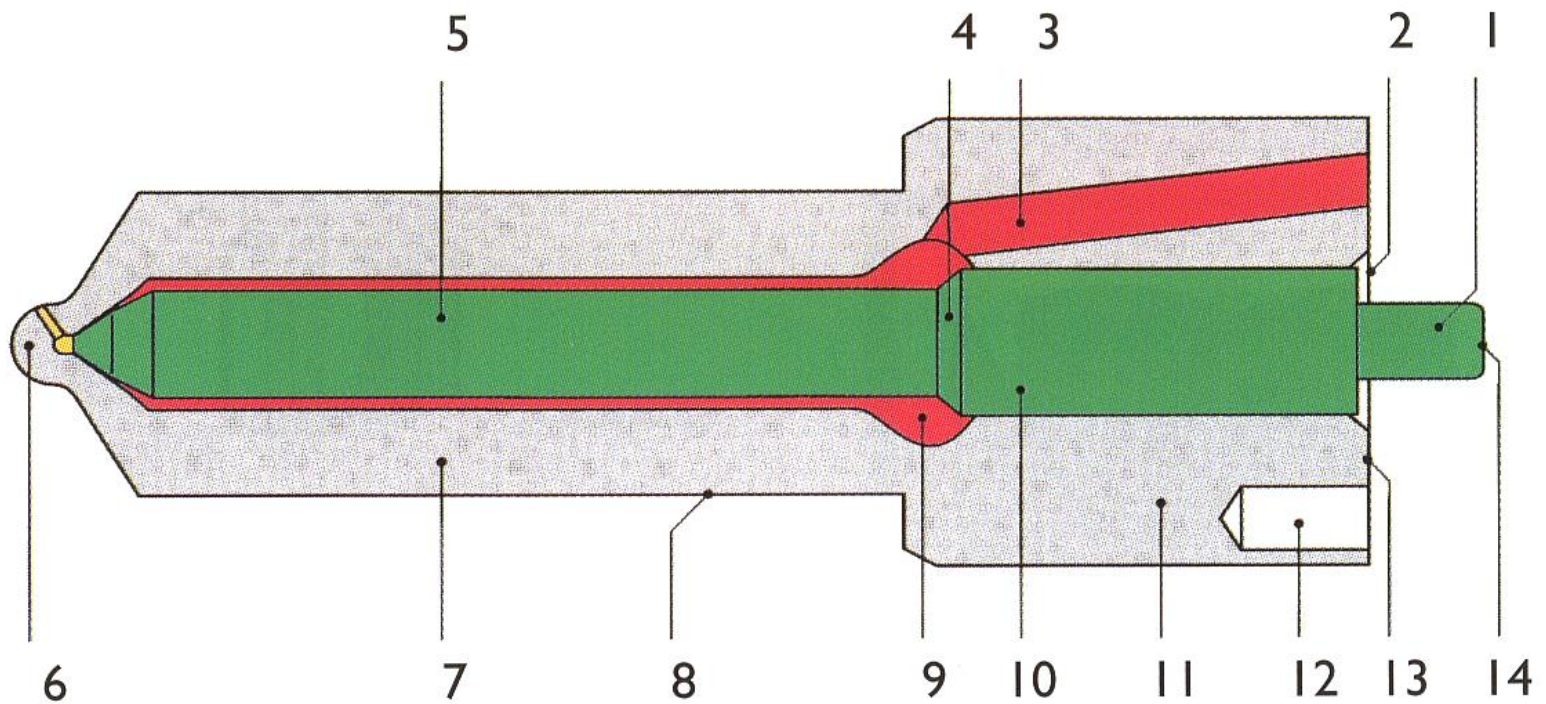
Hér er stýring með
vélrænum hætti.



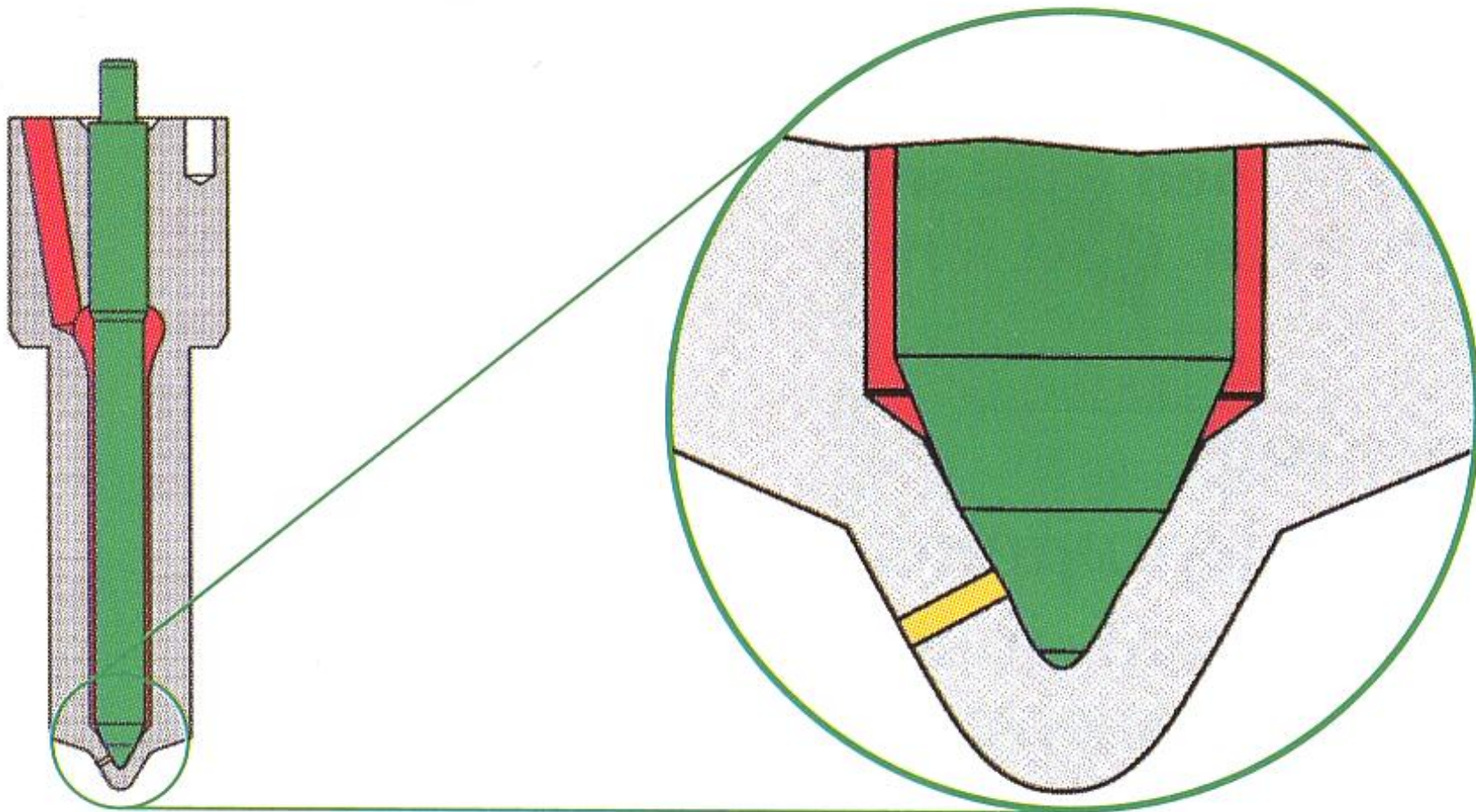
Spíss með holudýsu

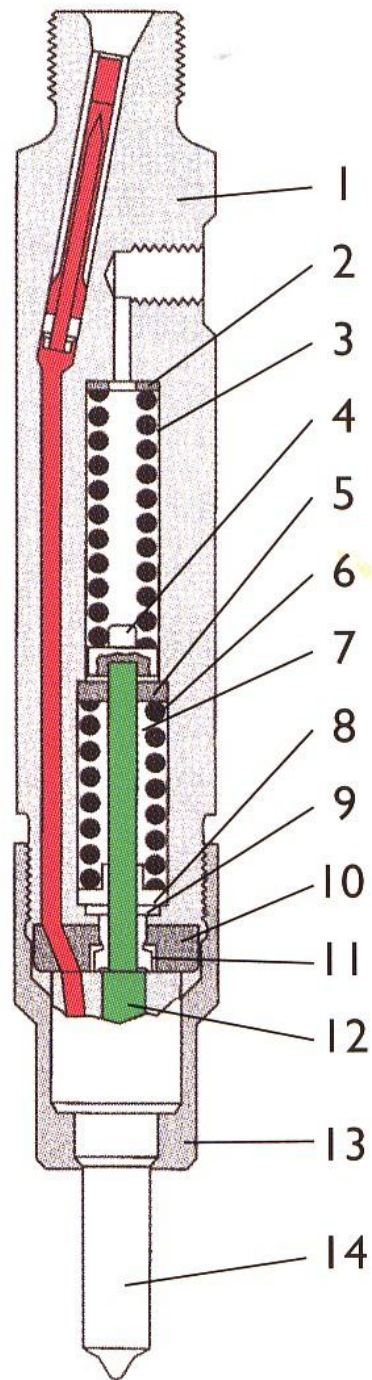
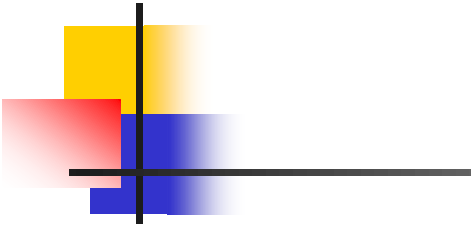


Dýsa með nálarými

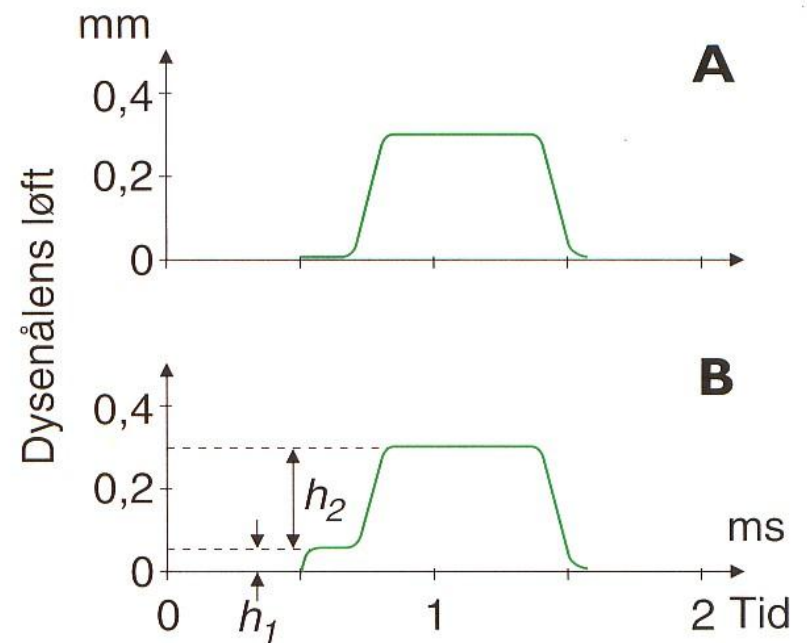
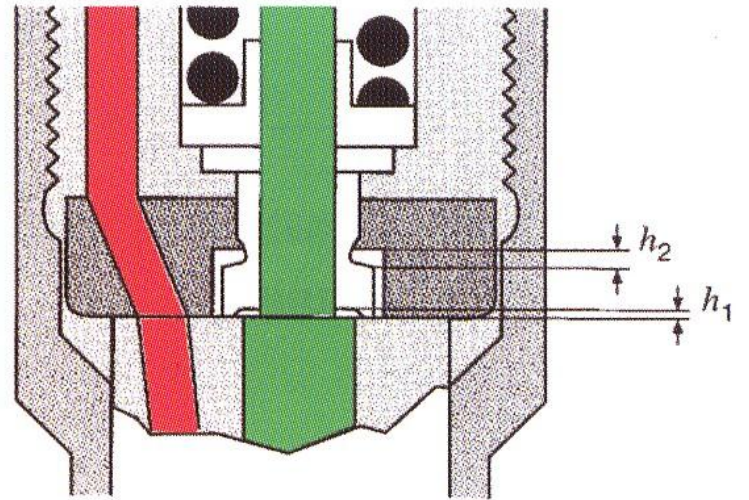


Sprautugat beint frá sæti



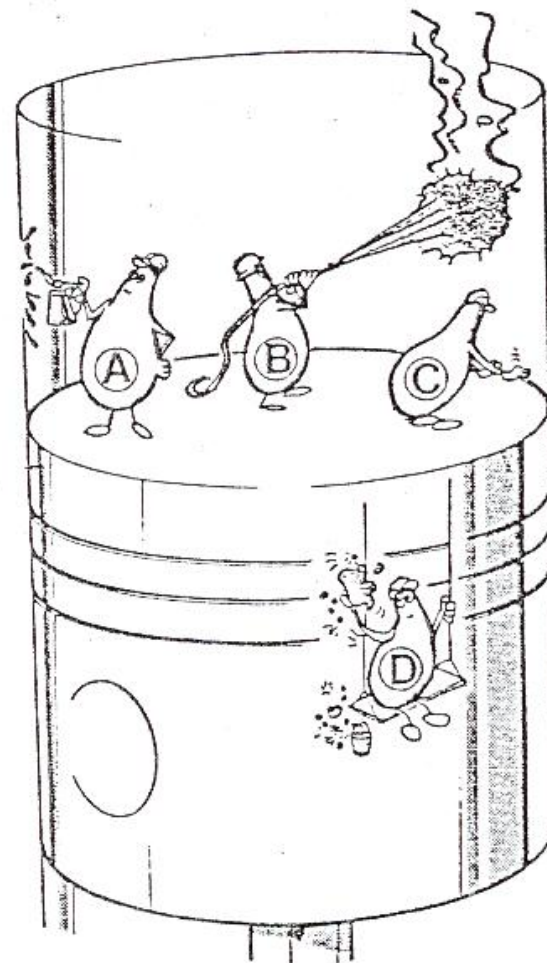


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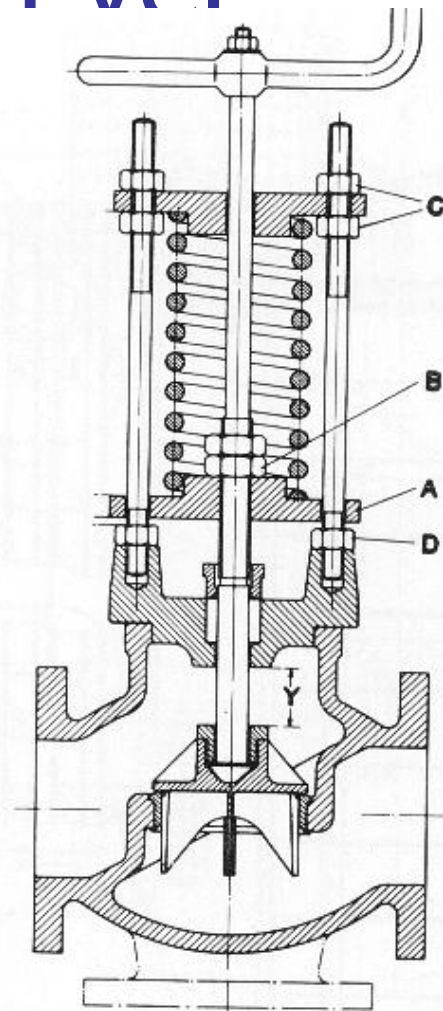
Hlutverk smurolíu

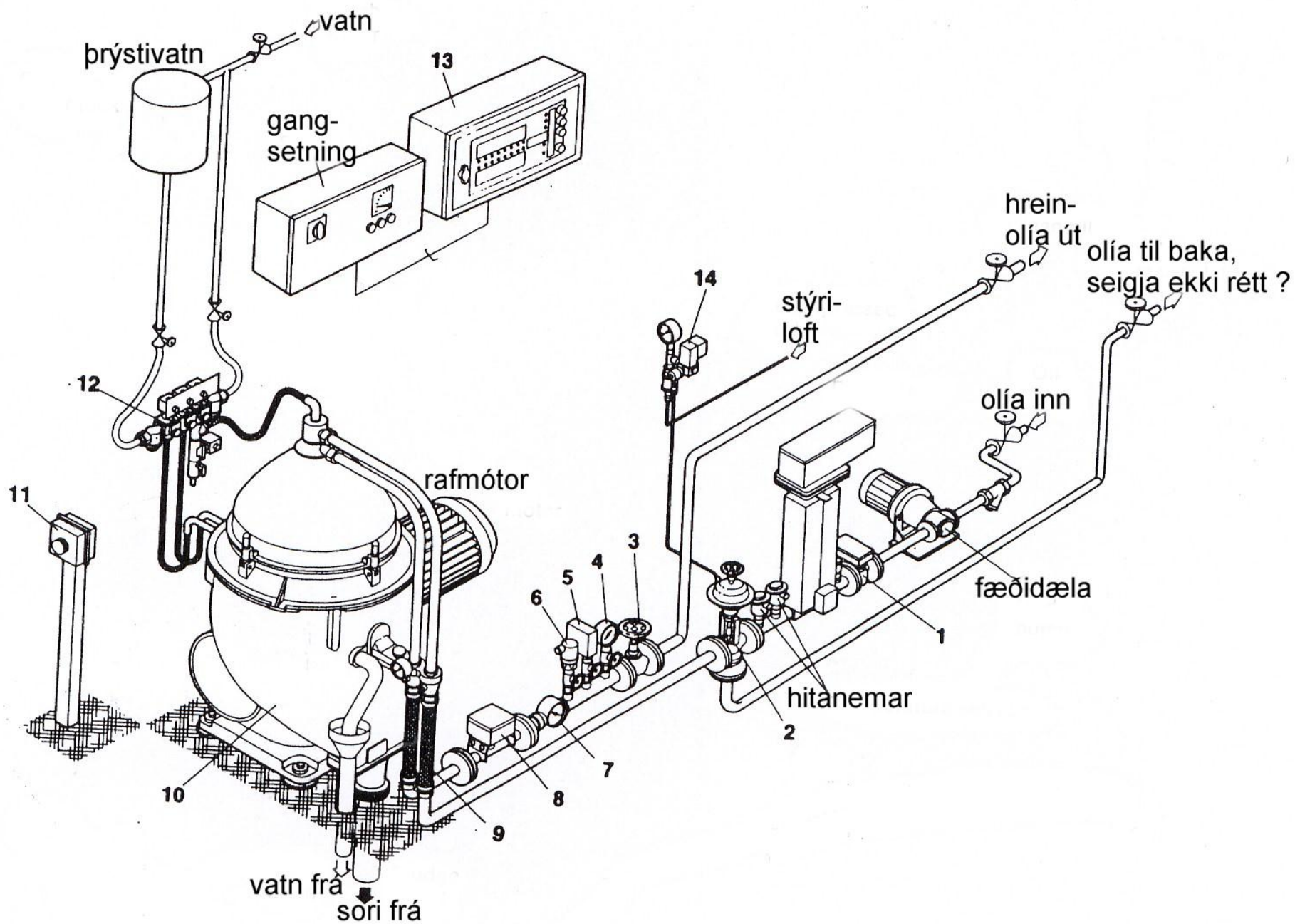
1. Smyrja
2. Mynda basa á
móti sýrum brunans
3. Kæla
4. Hreinsa
5. Þétta

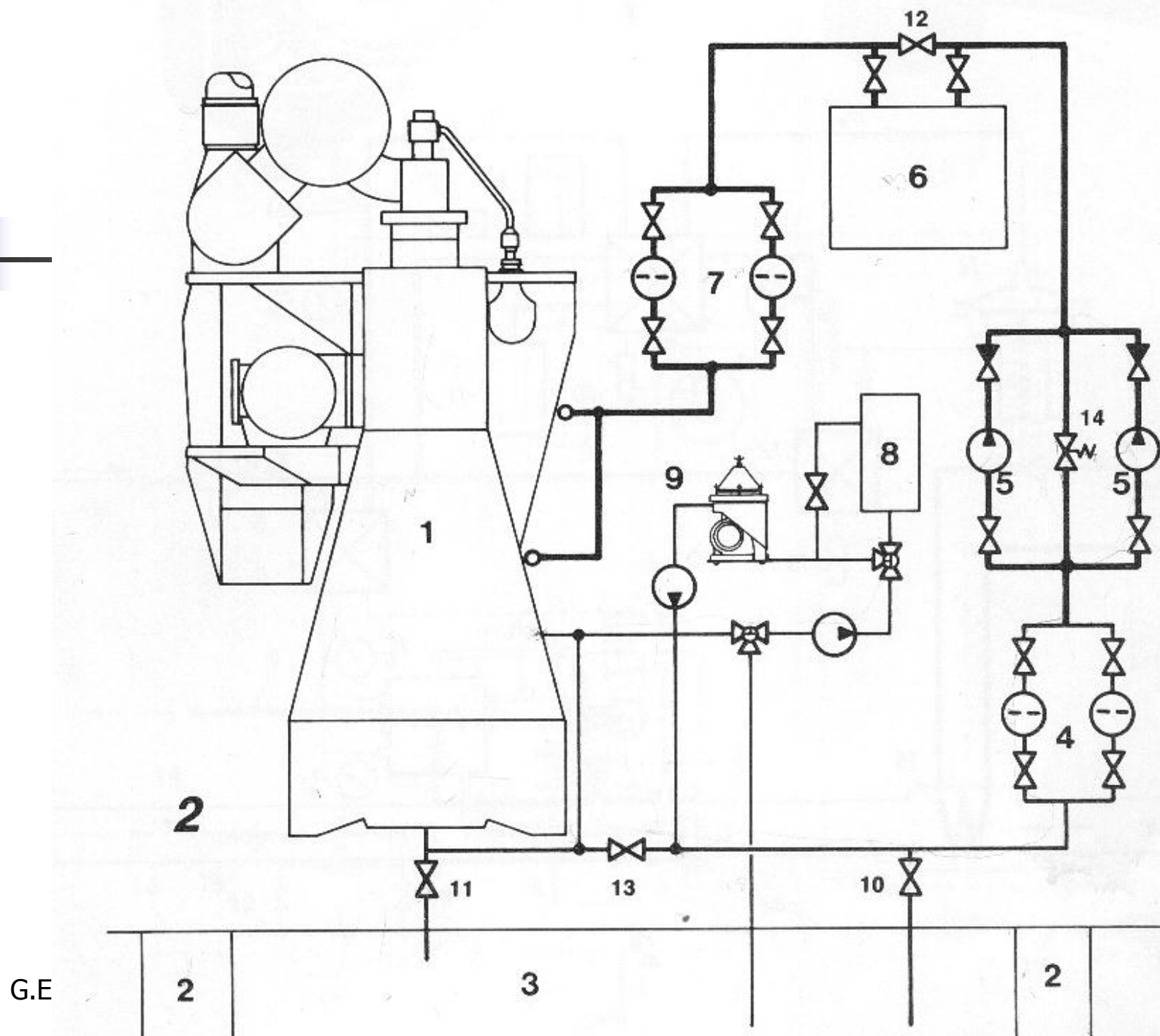
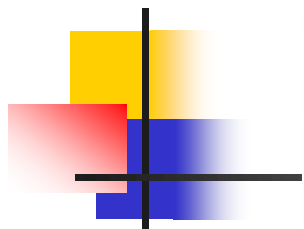


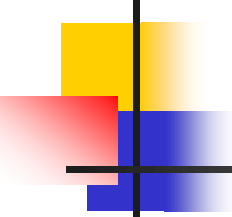
Þrýstistilliloki á stórri vél

- Þegar olía er köld, er spindillinn skrúfaður upp, síðan þegar olían fer að hitna stjórnar gormurinn þrýstingnum.



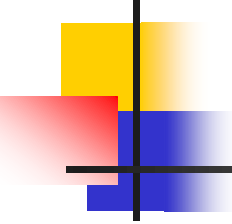






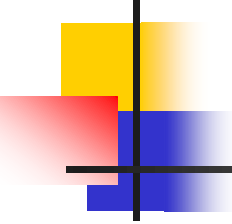
Hvernig er vitað um sýkingu?

- Til eru mælitæki sem finna bakteríur.
- Setja skal prufur í sótthreinsað ílát og senda til rannsóknarstofu.



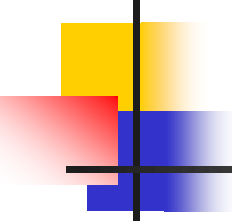
Bakteríur þrífast best:

- Ef vatn er undir 50 gr. C.
- Ef vatn er í olíunni.
- Þegar næringarefni eru til staðar, t.d. kolvetni.



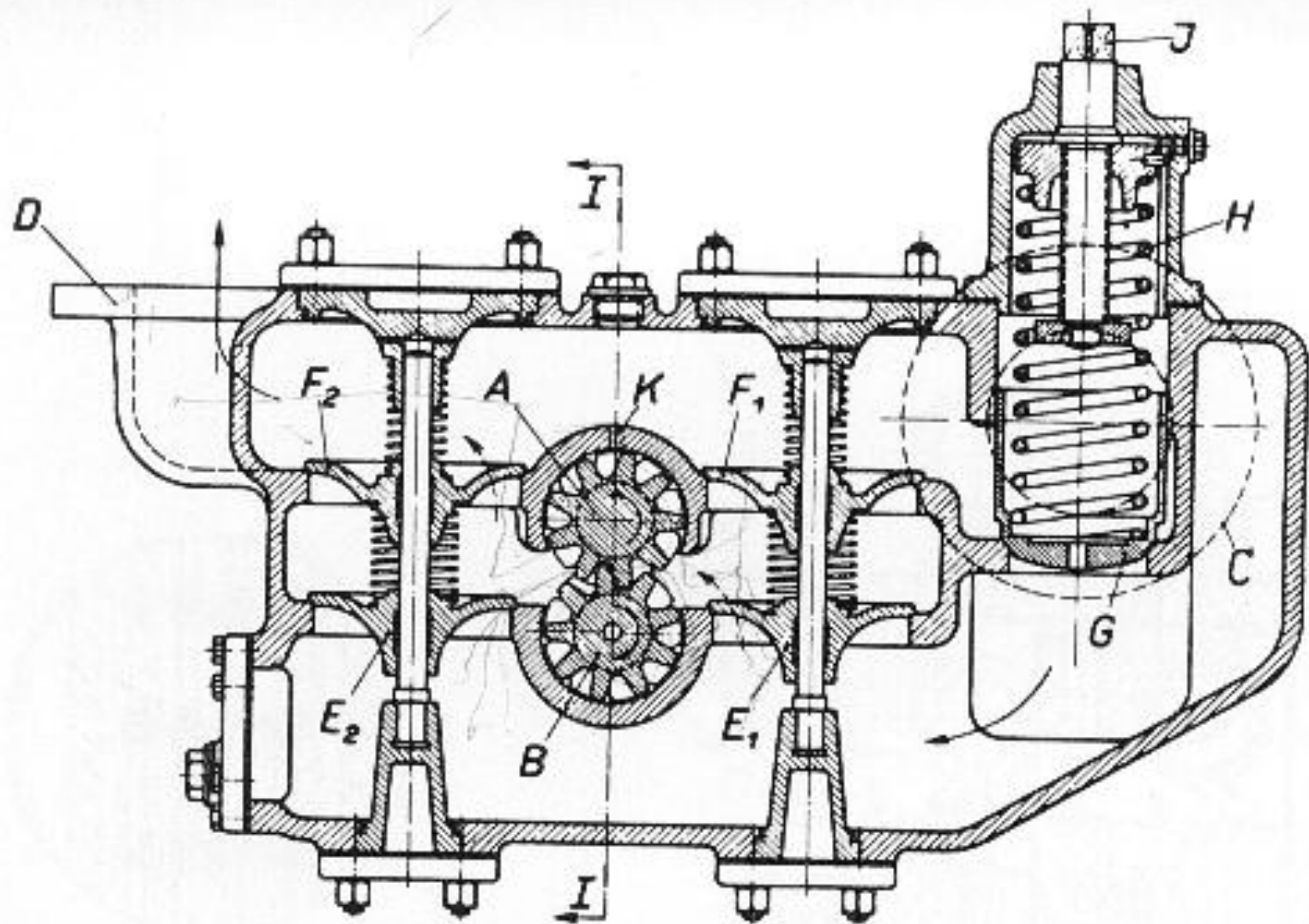
Ef bakteríur finnast í smurolíu og öðrum olíum

- Leita aðstoðar hjá Olíufélaginu.
- Tappa allri smurolíu af og farga henni.
- Skola allt kerfið með bakteríudrepandi efni.
- Athugið að allar aðgerðir séu í samráði við sérfræðinga.

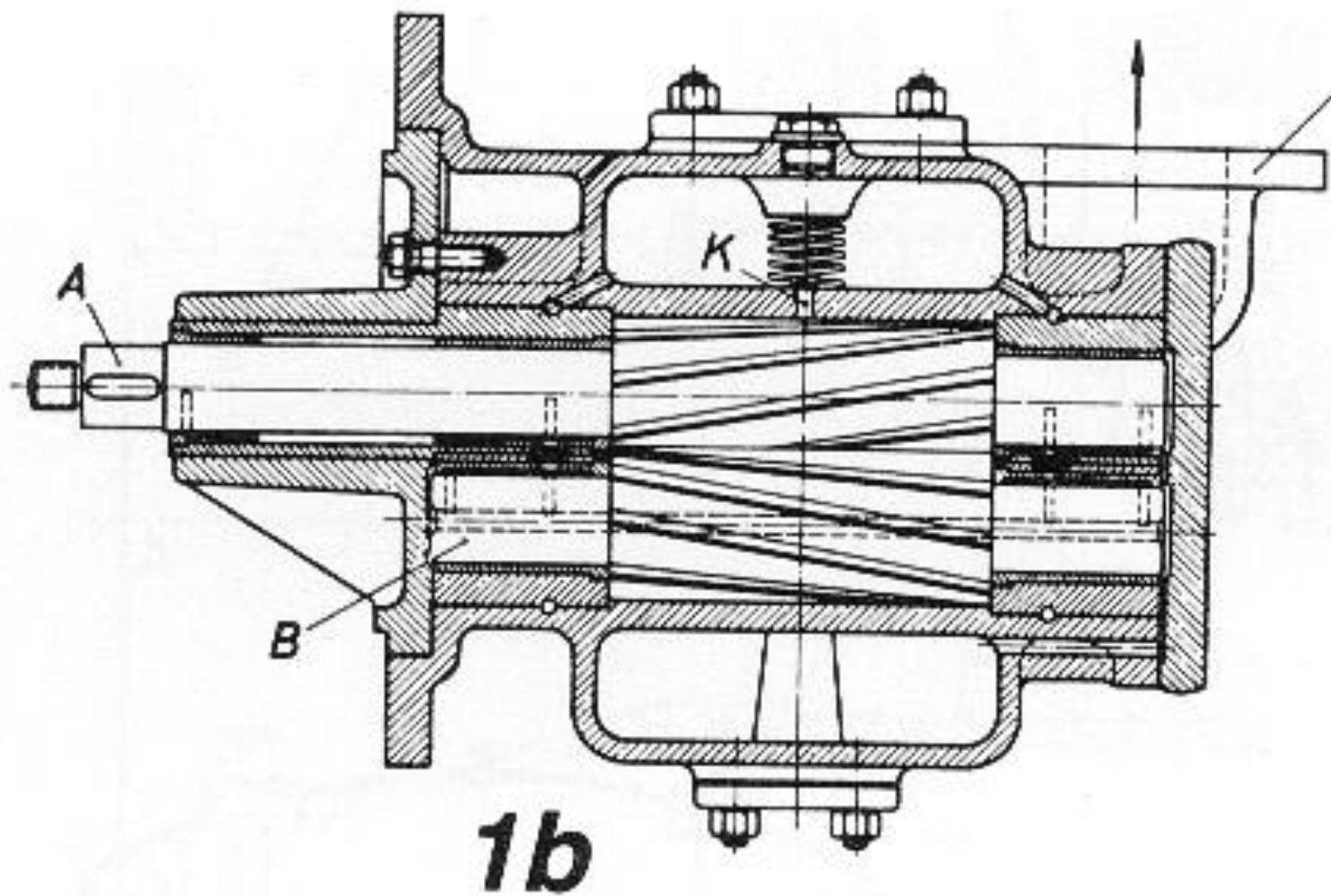


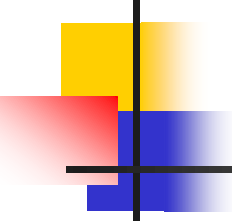
Einkenni bakteríusýkingar

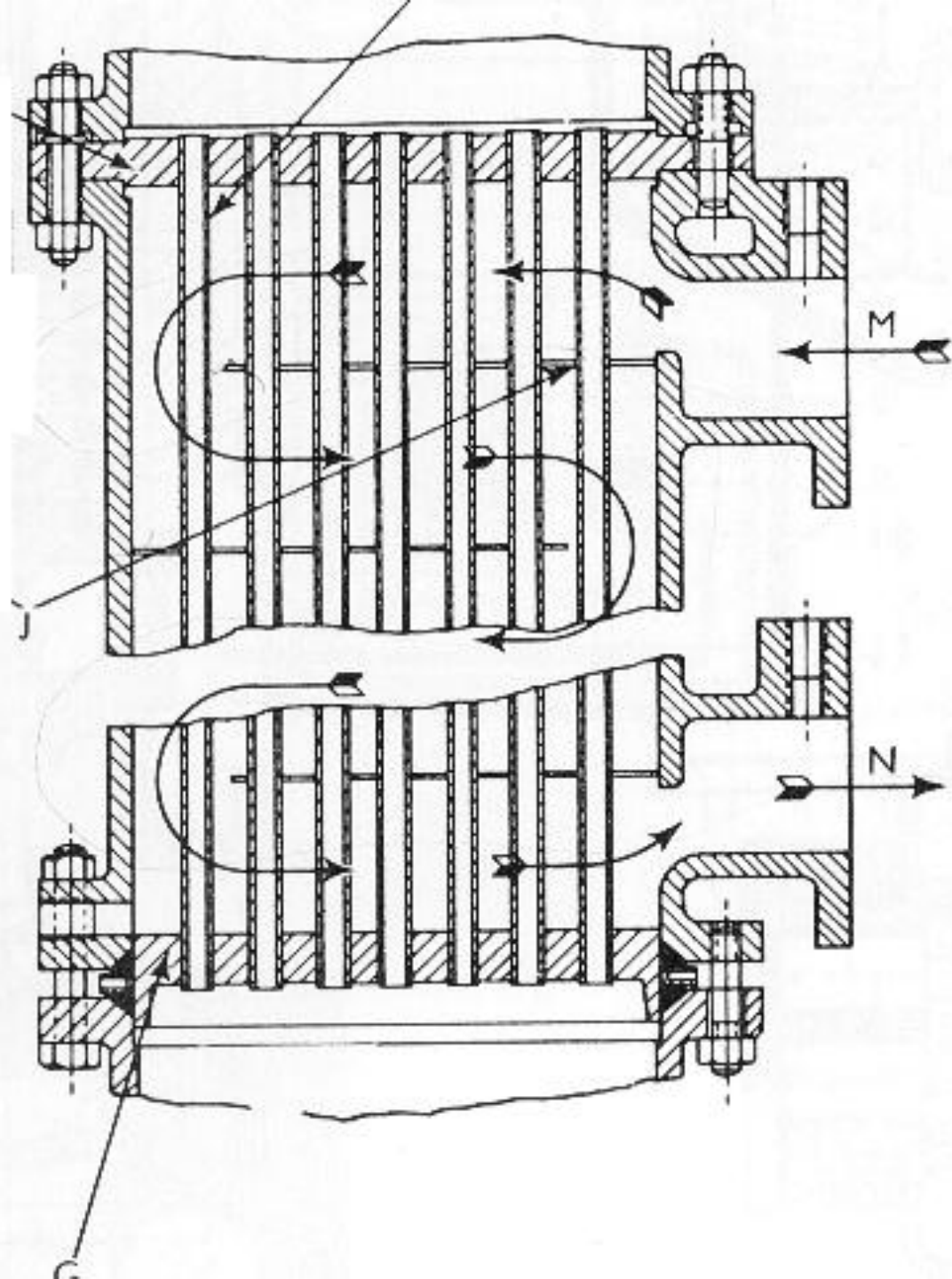
- Smurolían hefur breytt um eiginleika og leitast við að skipta sér
- Smurolían hefur slímugt útlit
- Súr lykt í sveifarhúsi
- Dökkir fletir á slípuðum flötum

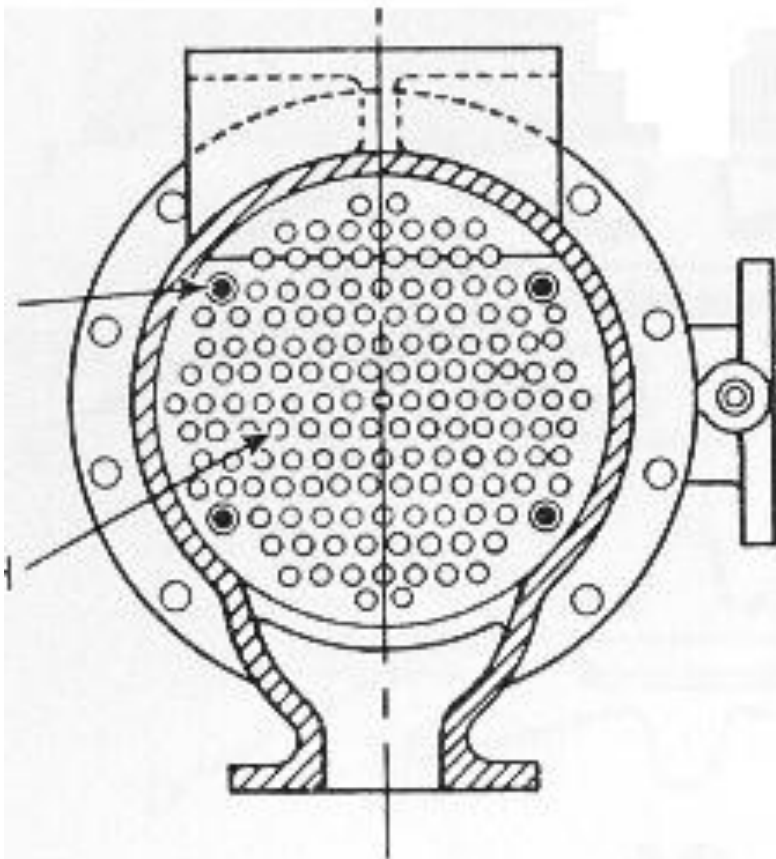


1a

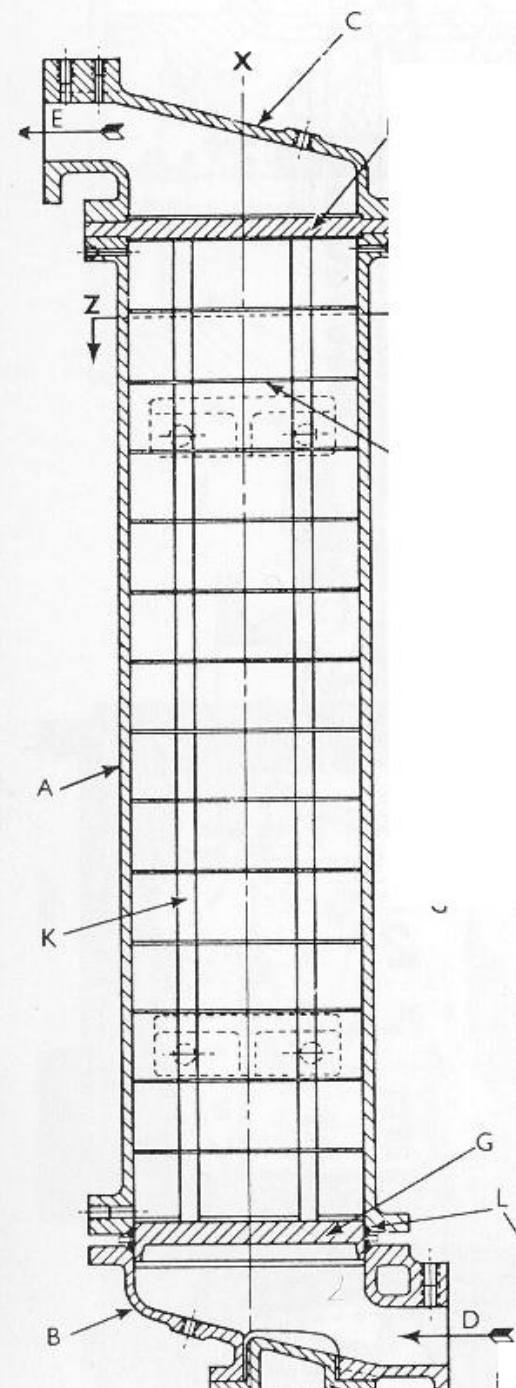


- 
- Smurolían er
 - utan við rörin.
 - Vatn eða sjór
 - kælir smurolíu





G.Einarsson



Rörakæli

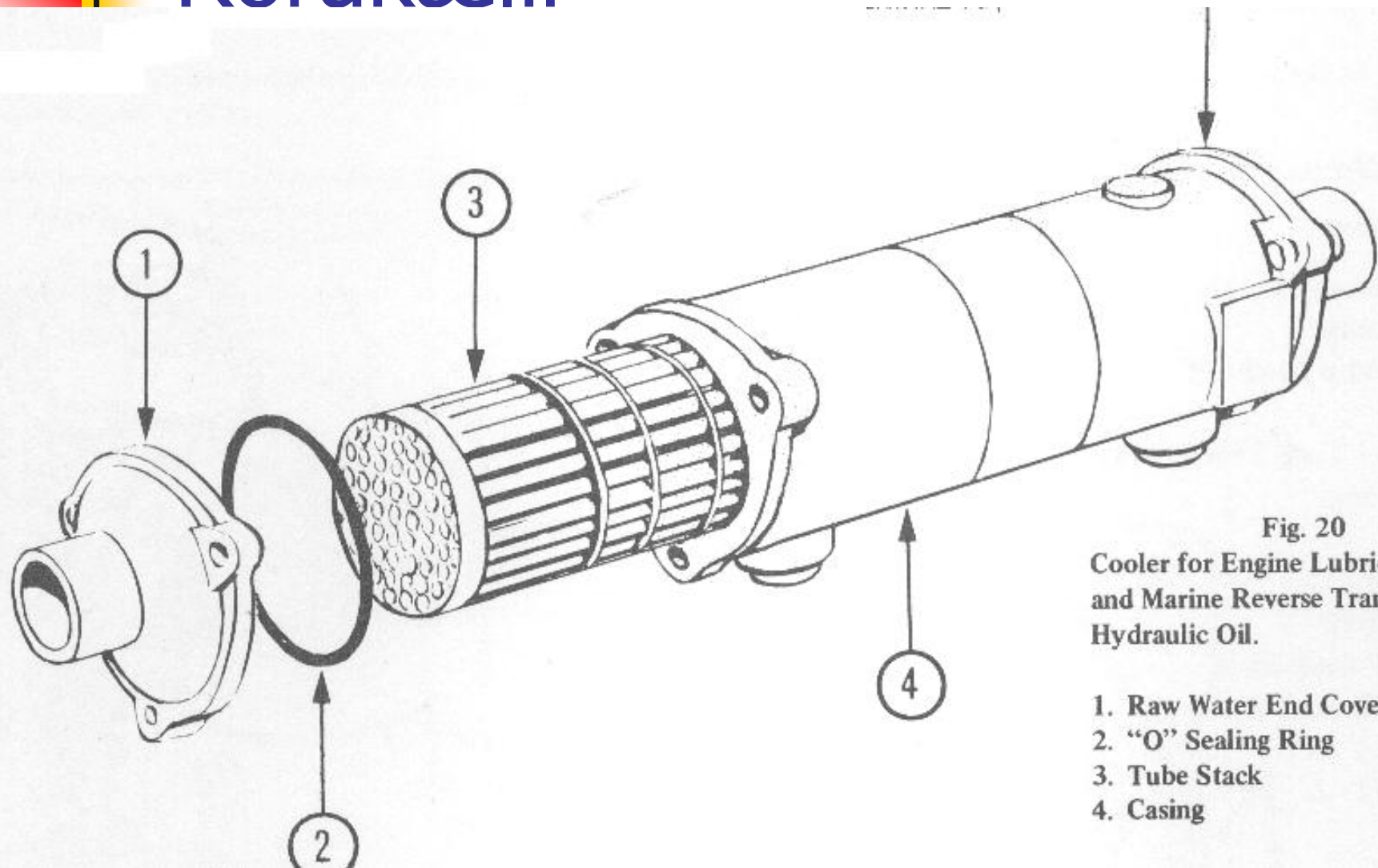
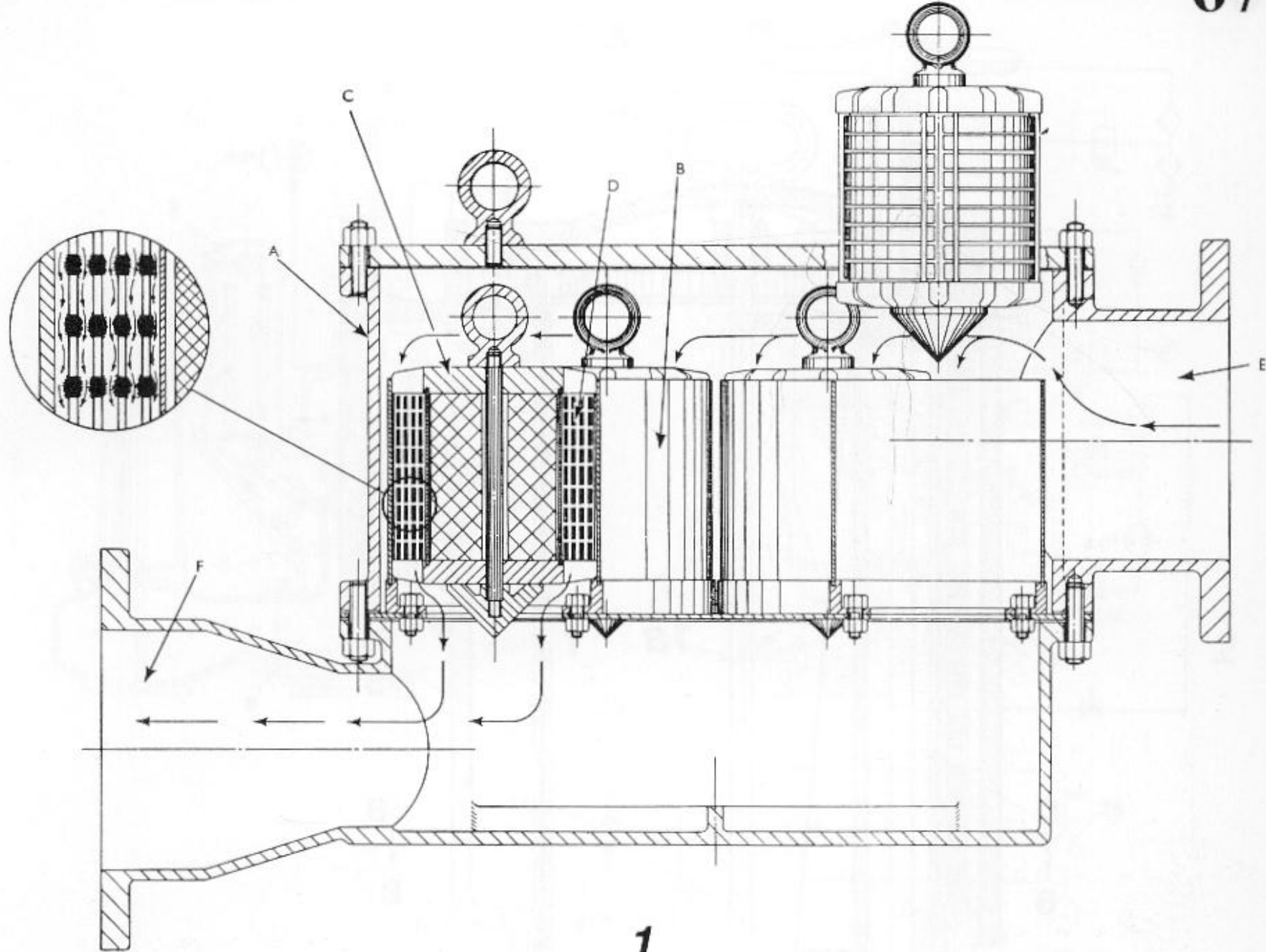
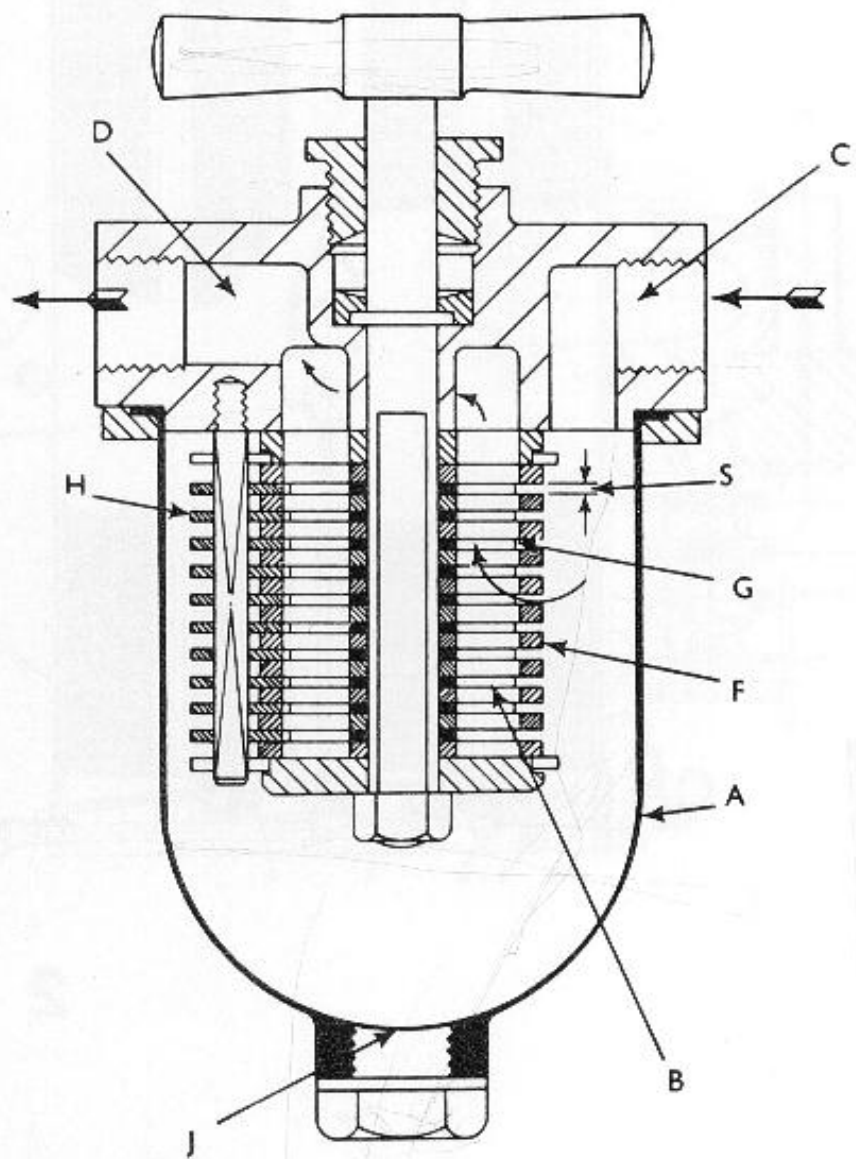


Fig. 20
Cooler for Engine Lubricating Oil
and Marine Reverse Transmission
Hydraulic Oil.

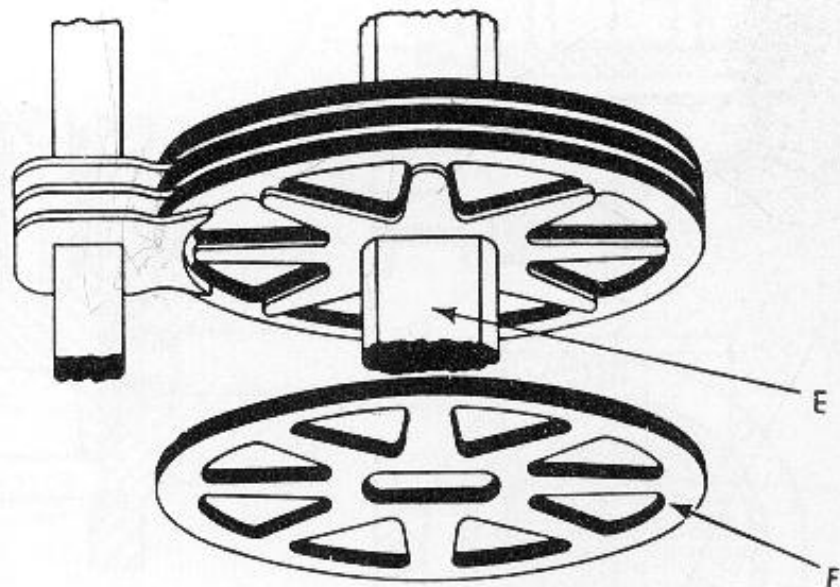
1. Raw Water End Covers
2. "O" Sealing Ring
3. Tube Stack
4. Casing



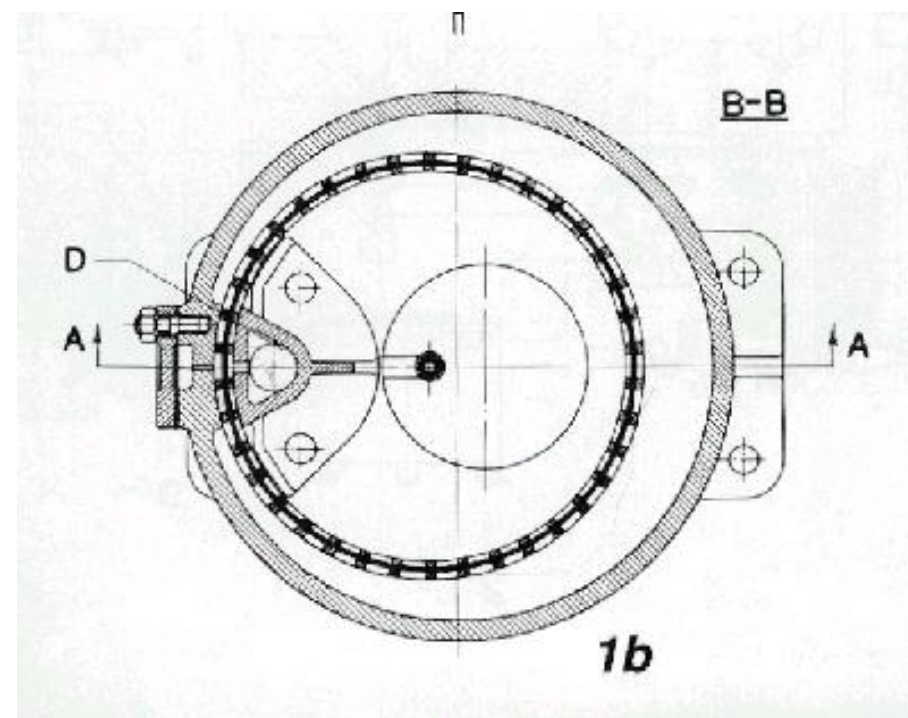
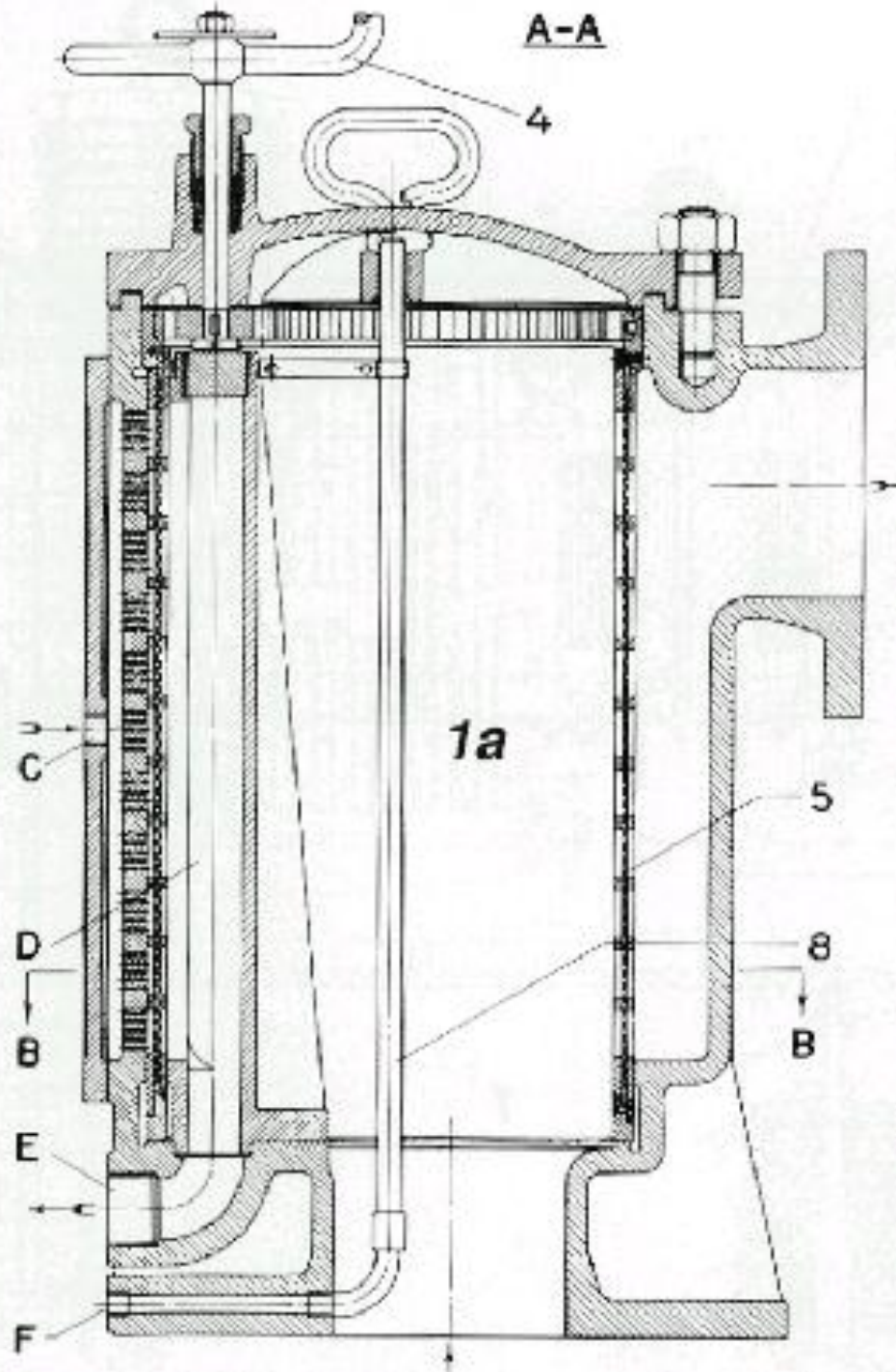


3a

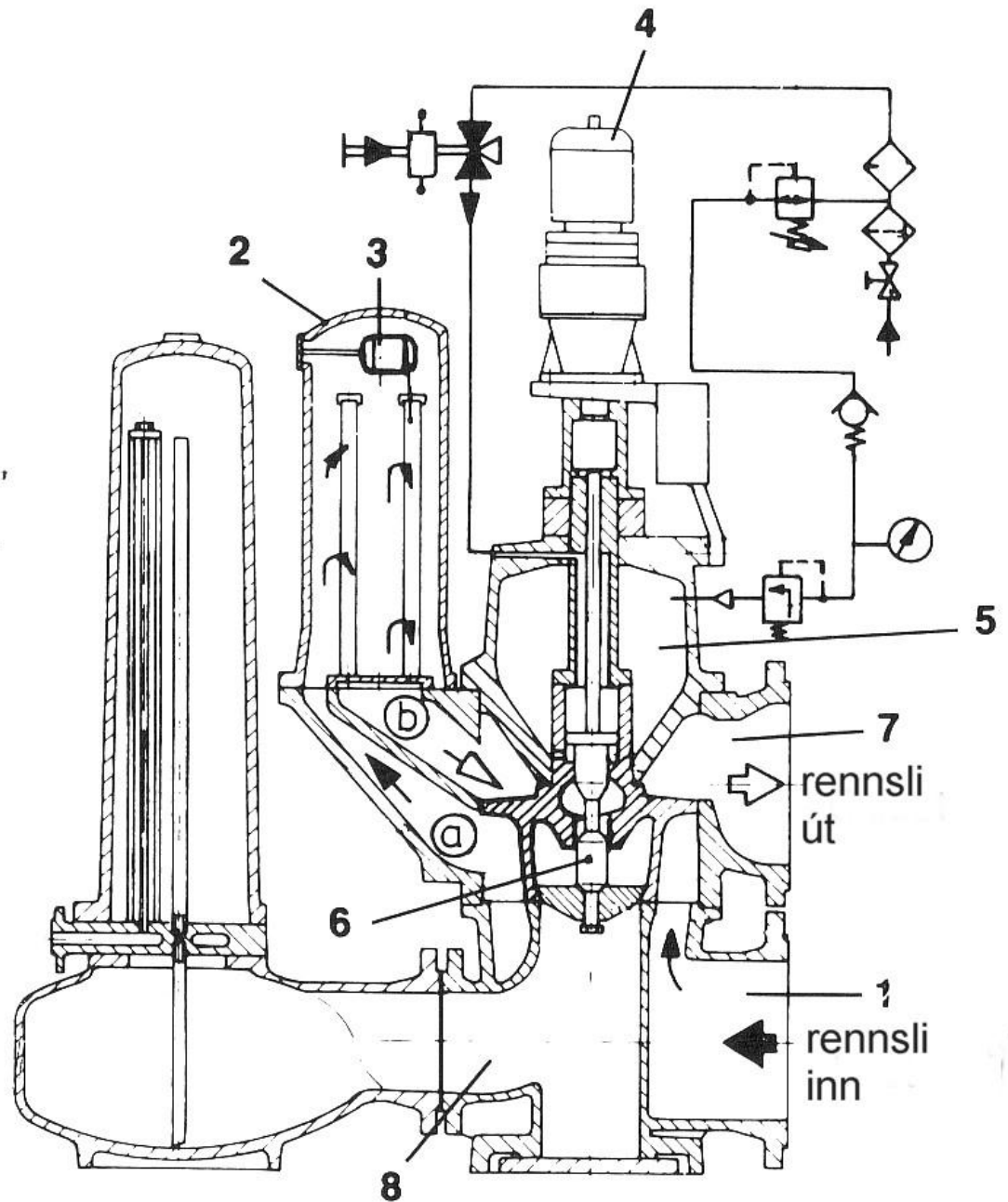
G. LINDSSON

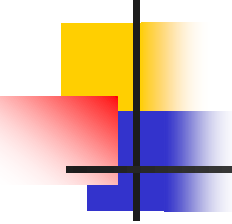


3b

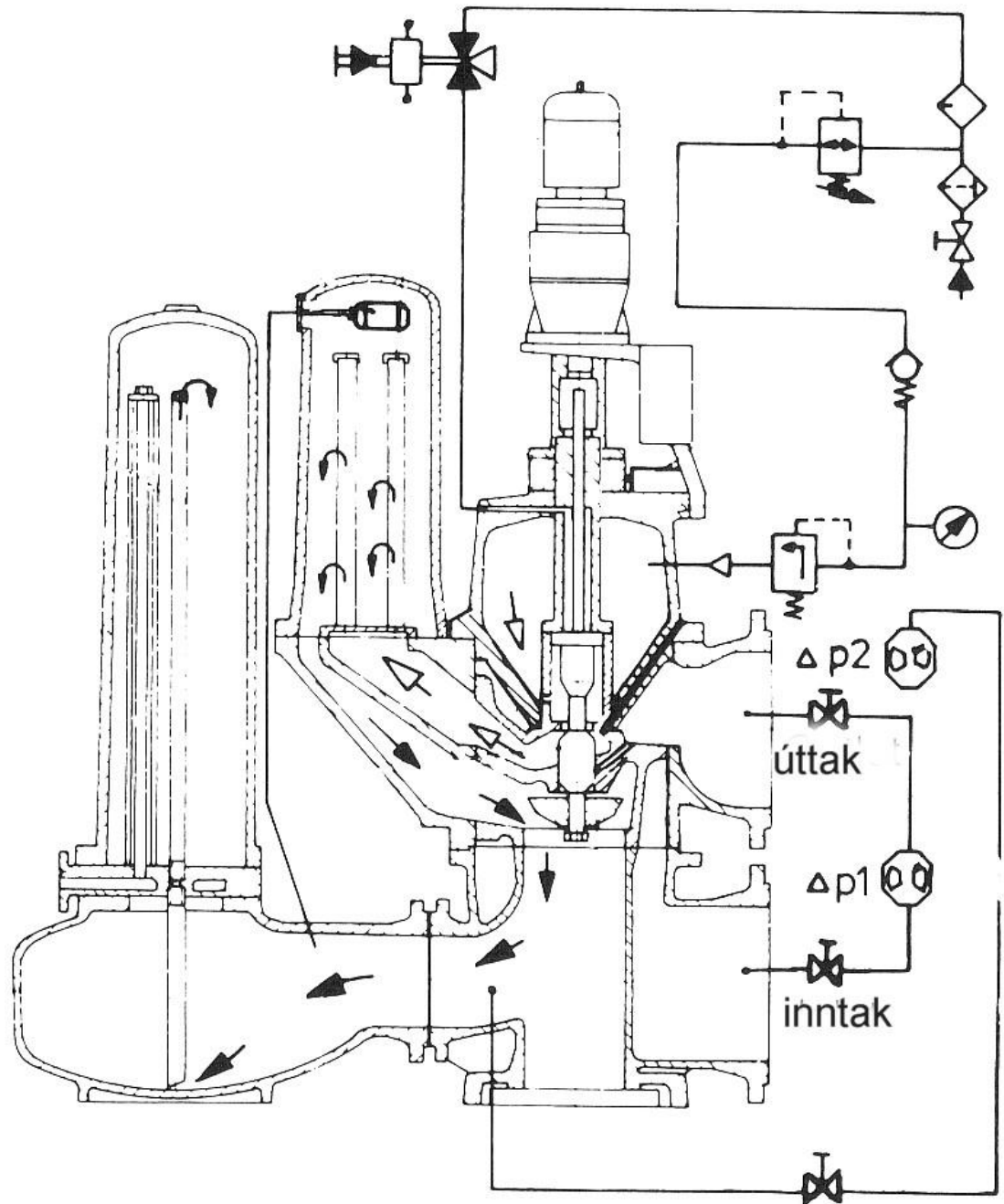


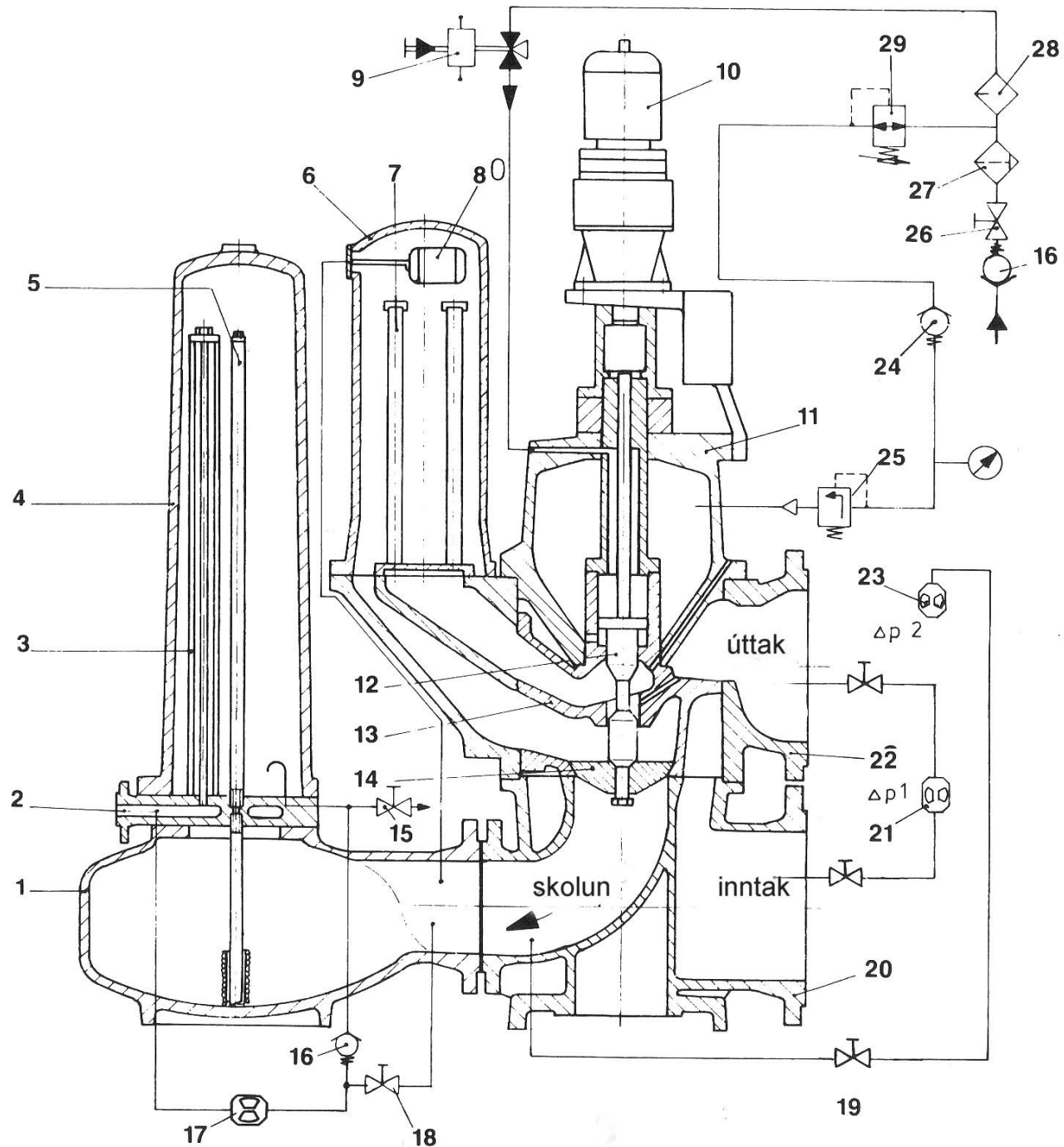
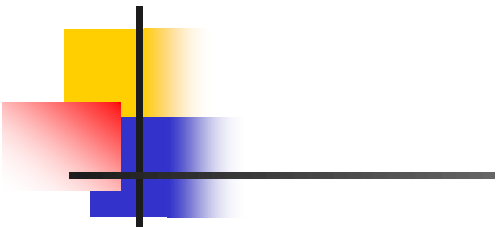
■ Síun

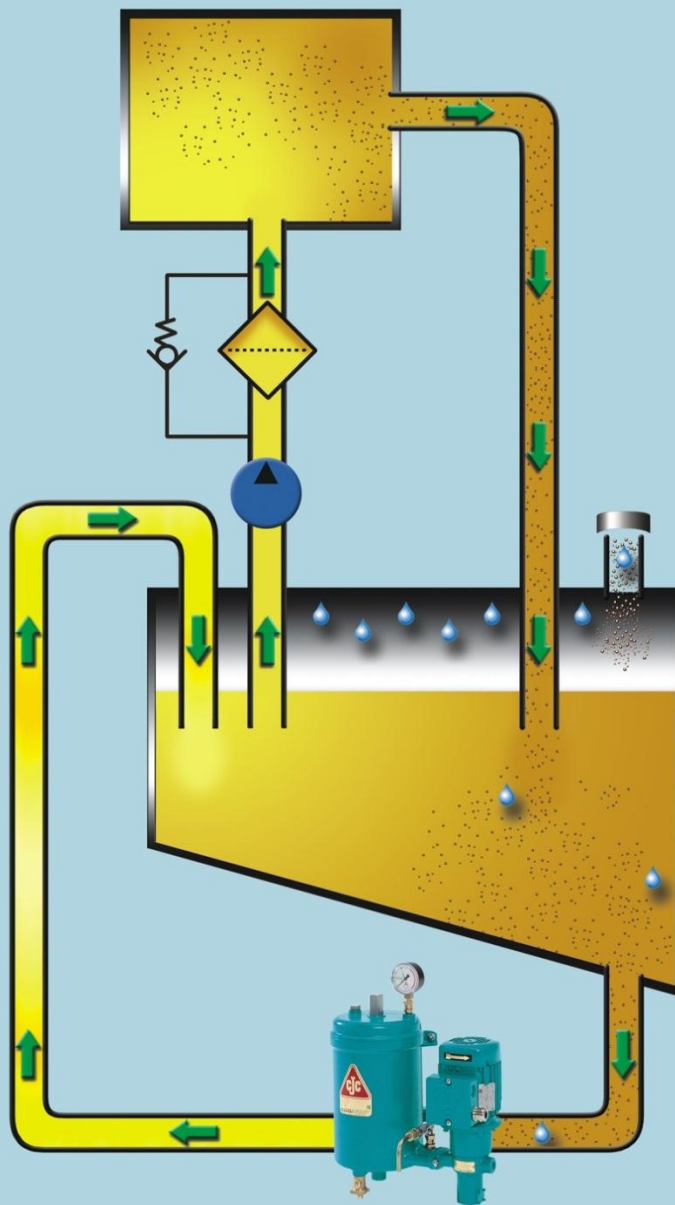
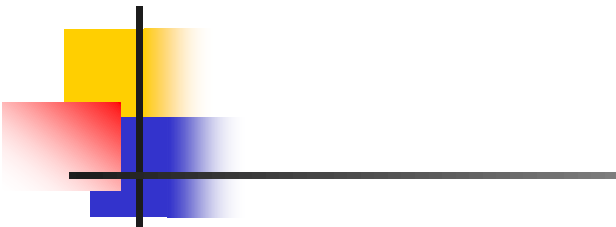




■ Skolun





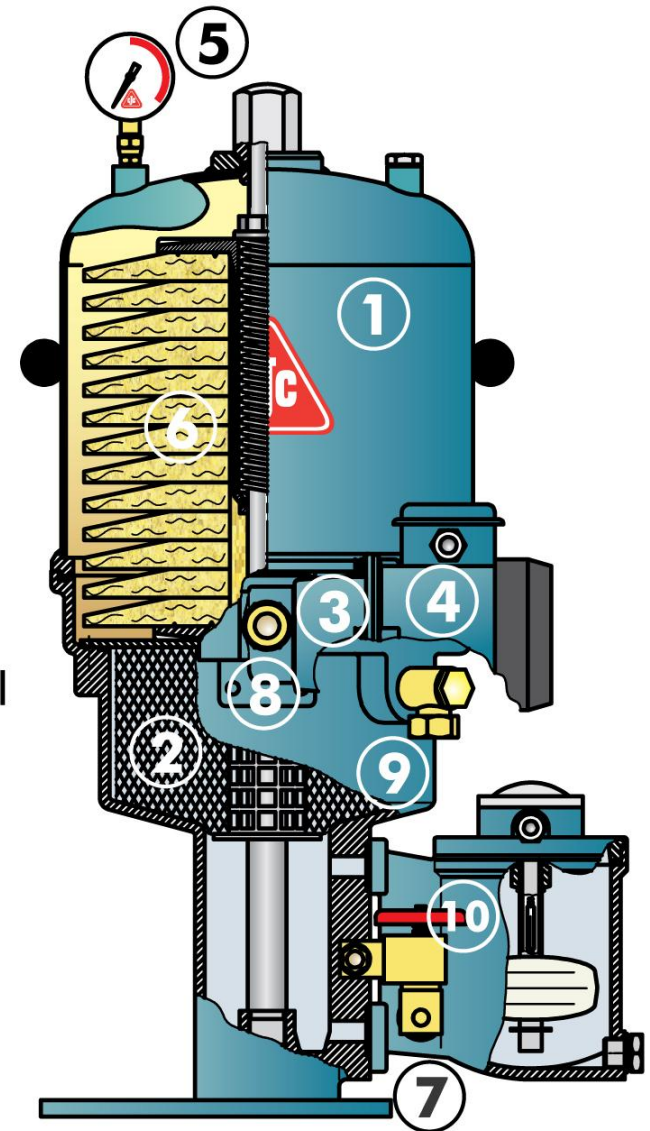


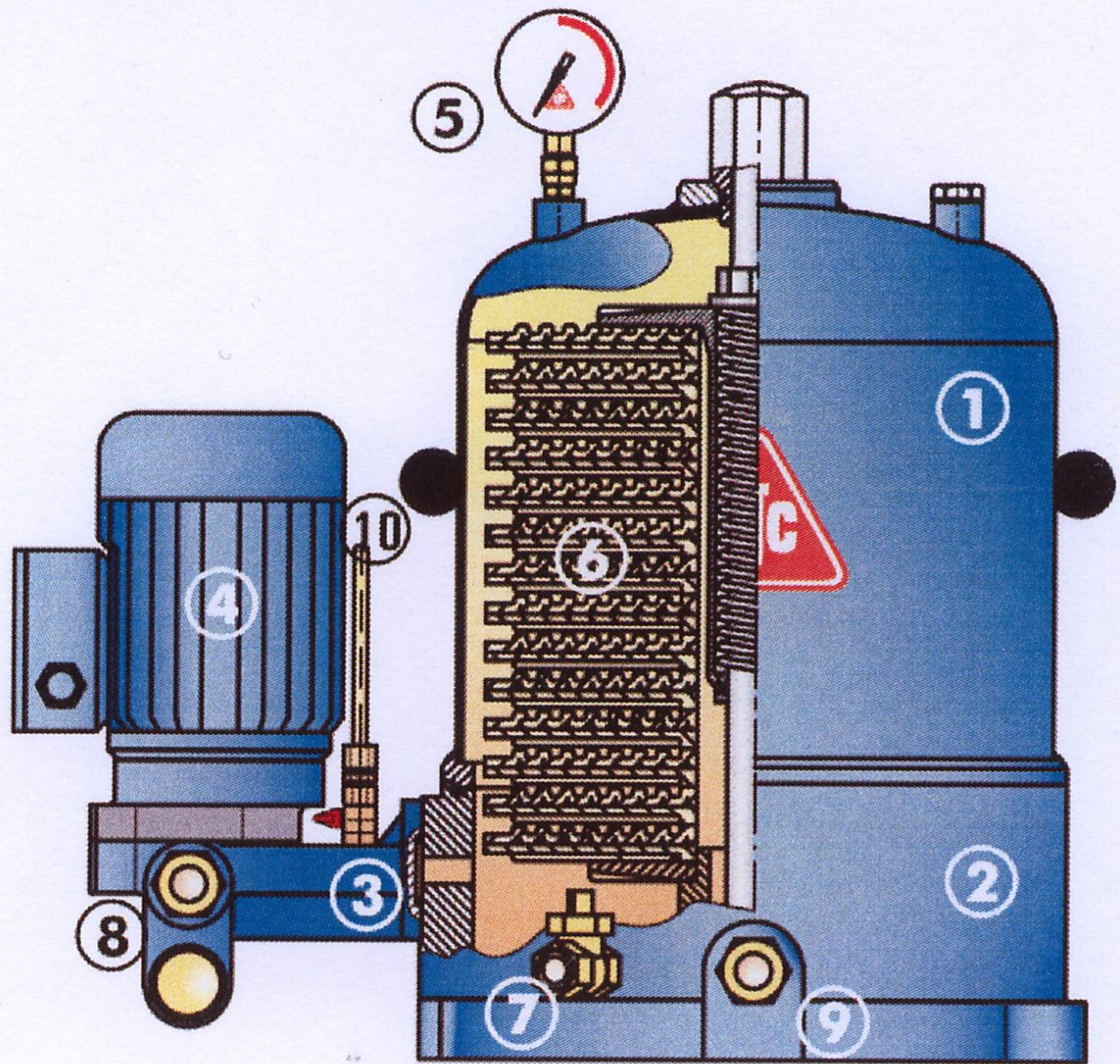
Hovedkomponenter

PTU2 27/27 Serie

■ Bls. 94

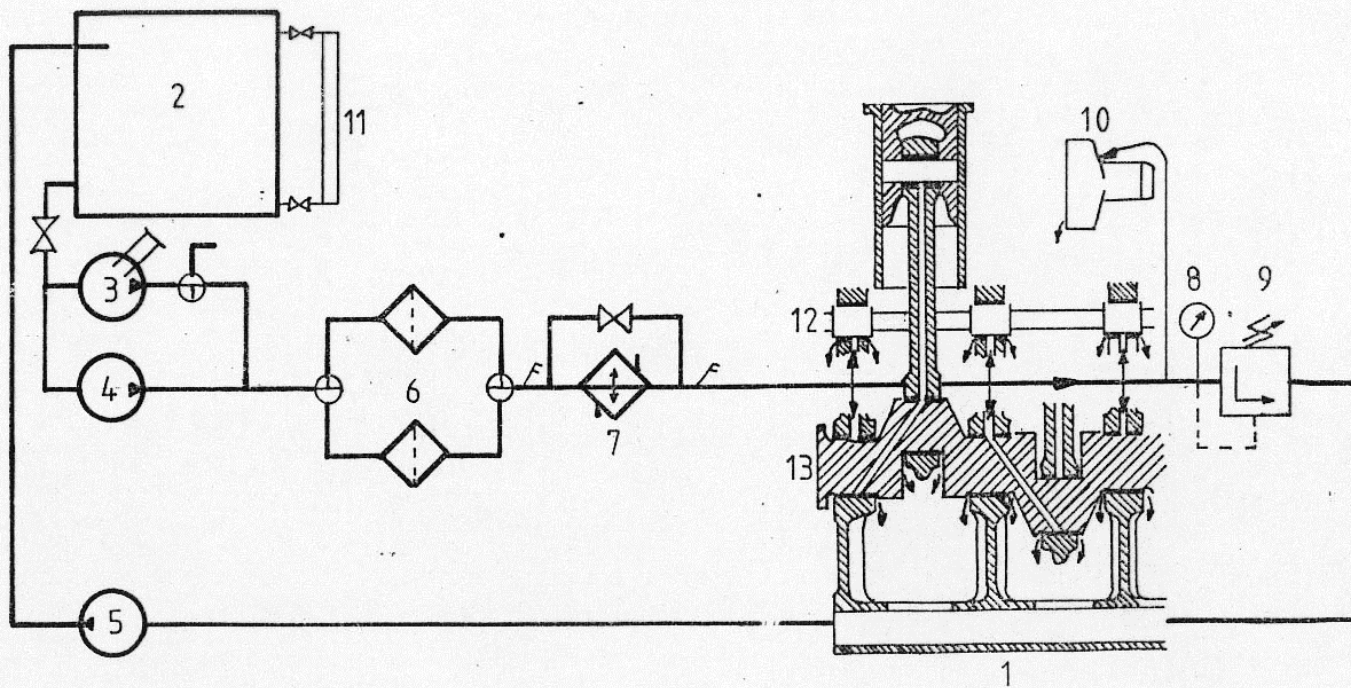
- ① Filterhus
- ② Coalescerhus
- ③ Pumpe
- ④ E-motor
- ⑤ Manometer
- ⑥ Filterindsats
- ⑦ Vandaftapningsventil
- ⑧ Olieindgang
- ⑨ Olieafgang
- ⑩ Vandudlader

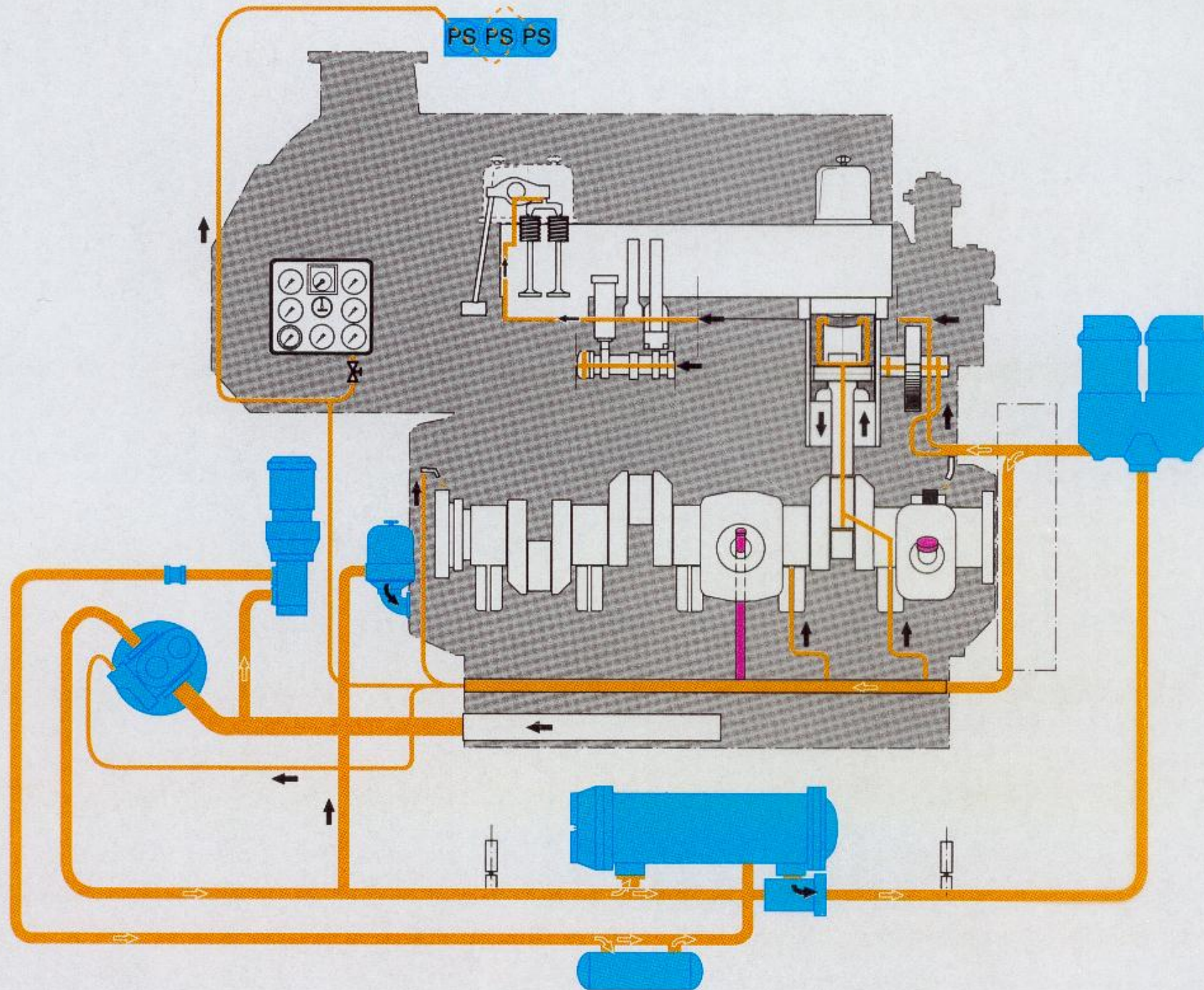


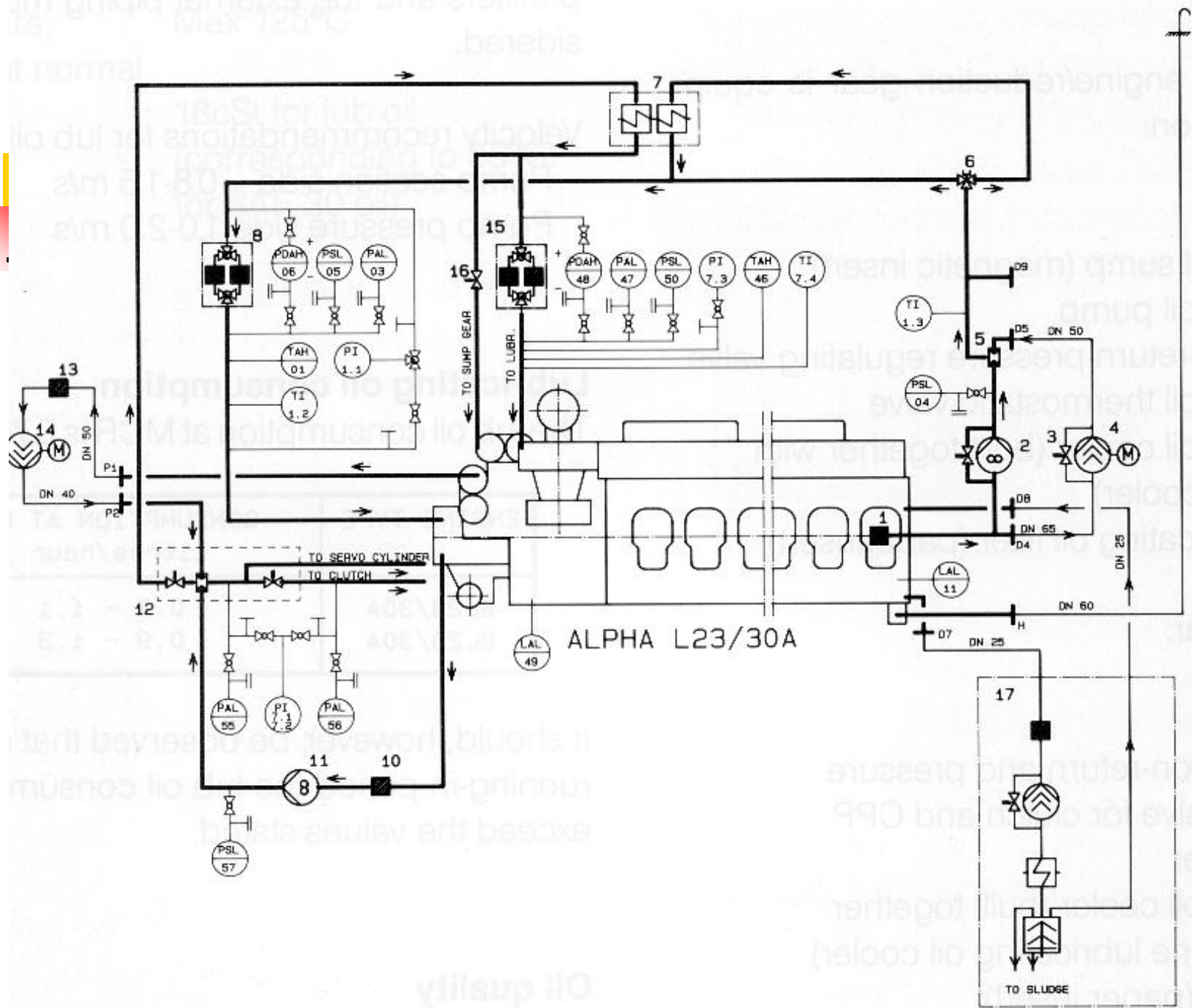


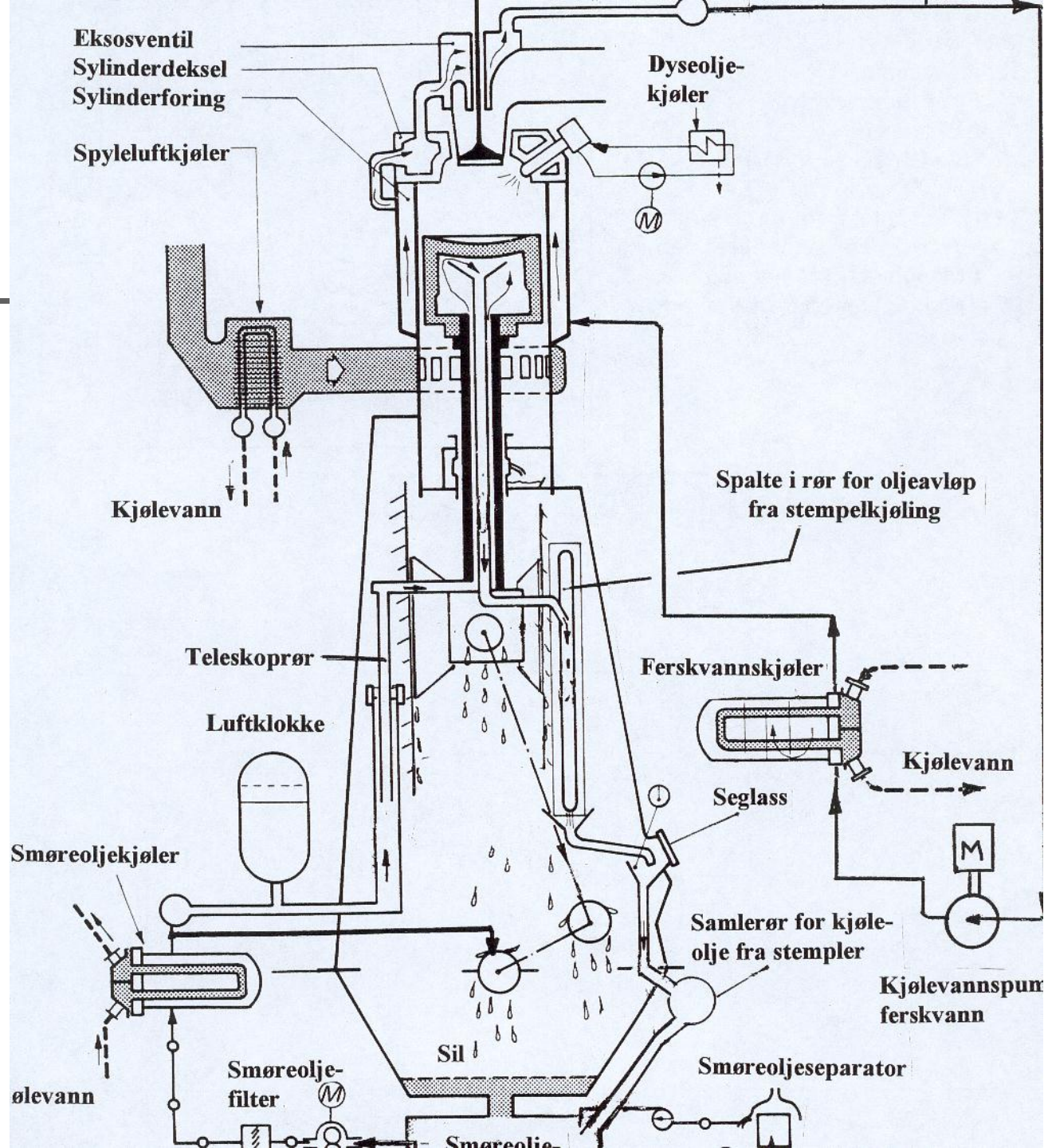
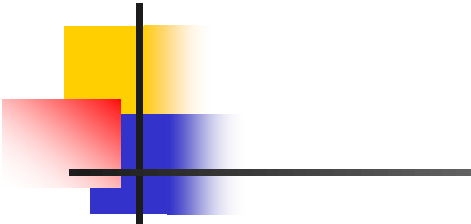
Mannheim

SMURKERFI MVM TRHS 526 S



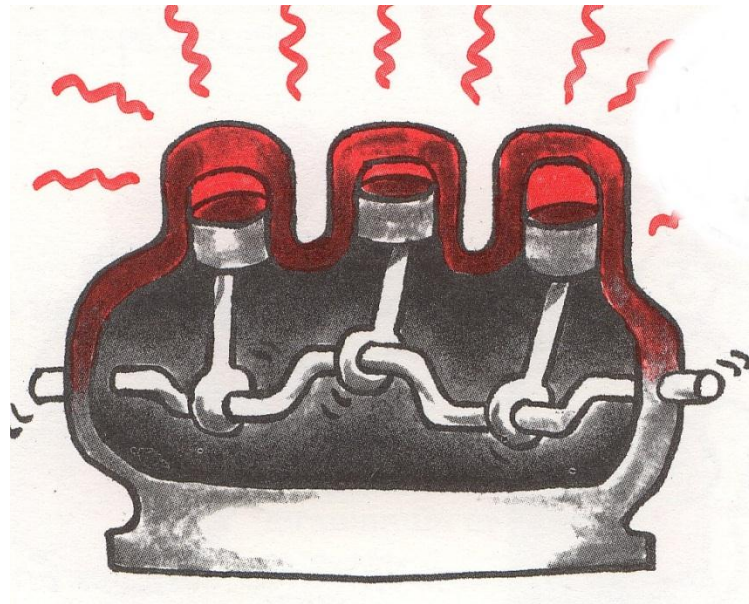


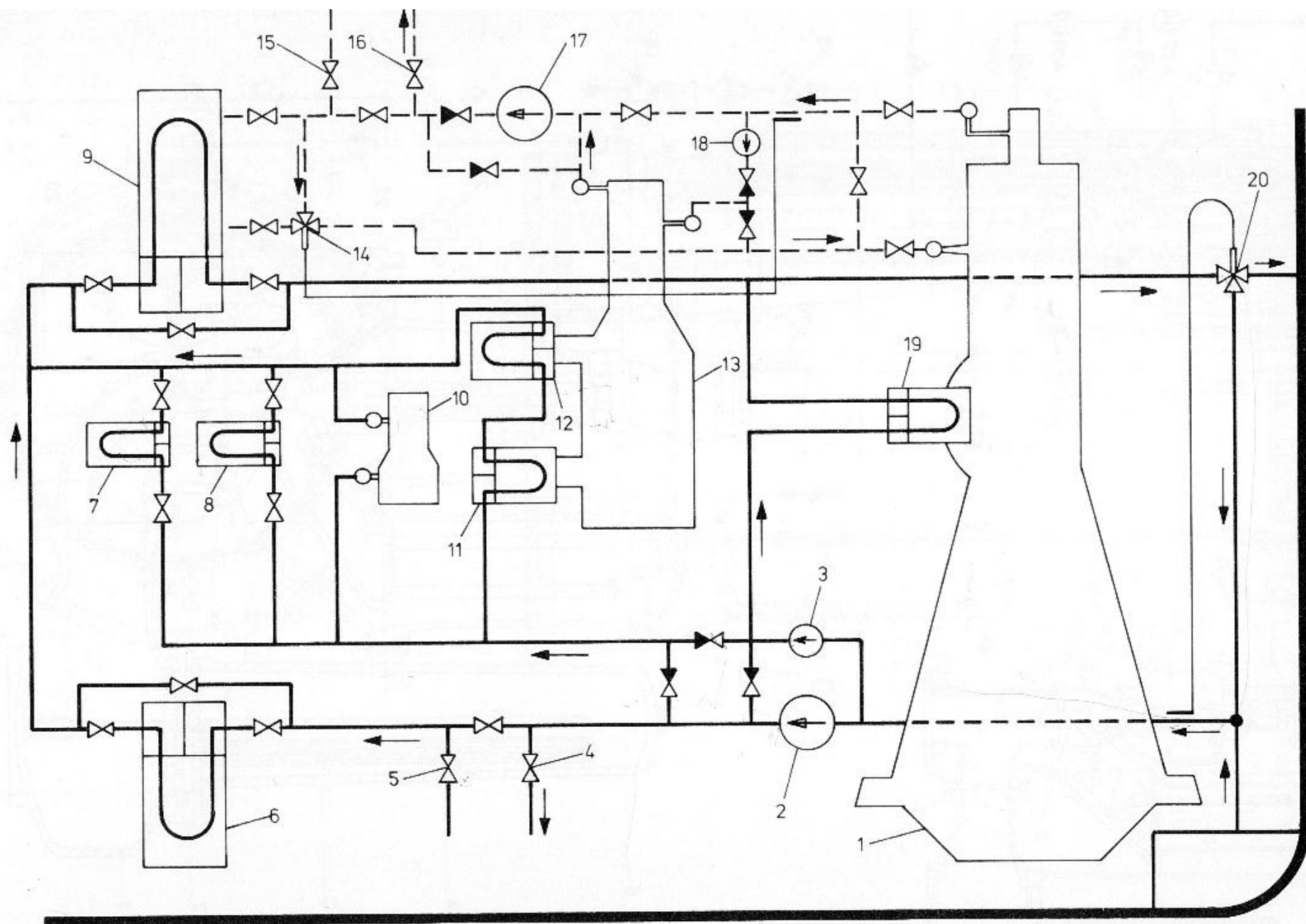


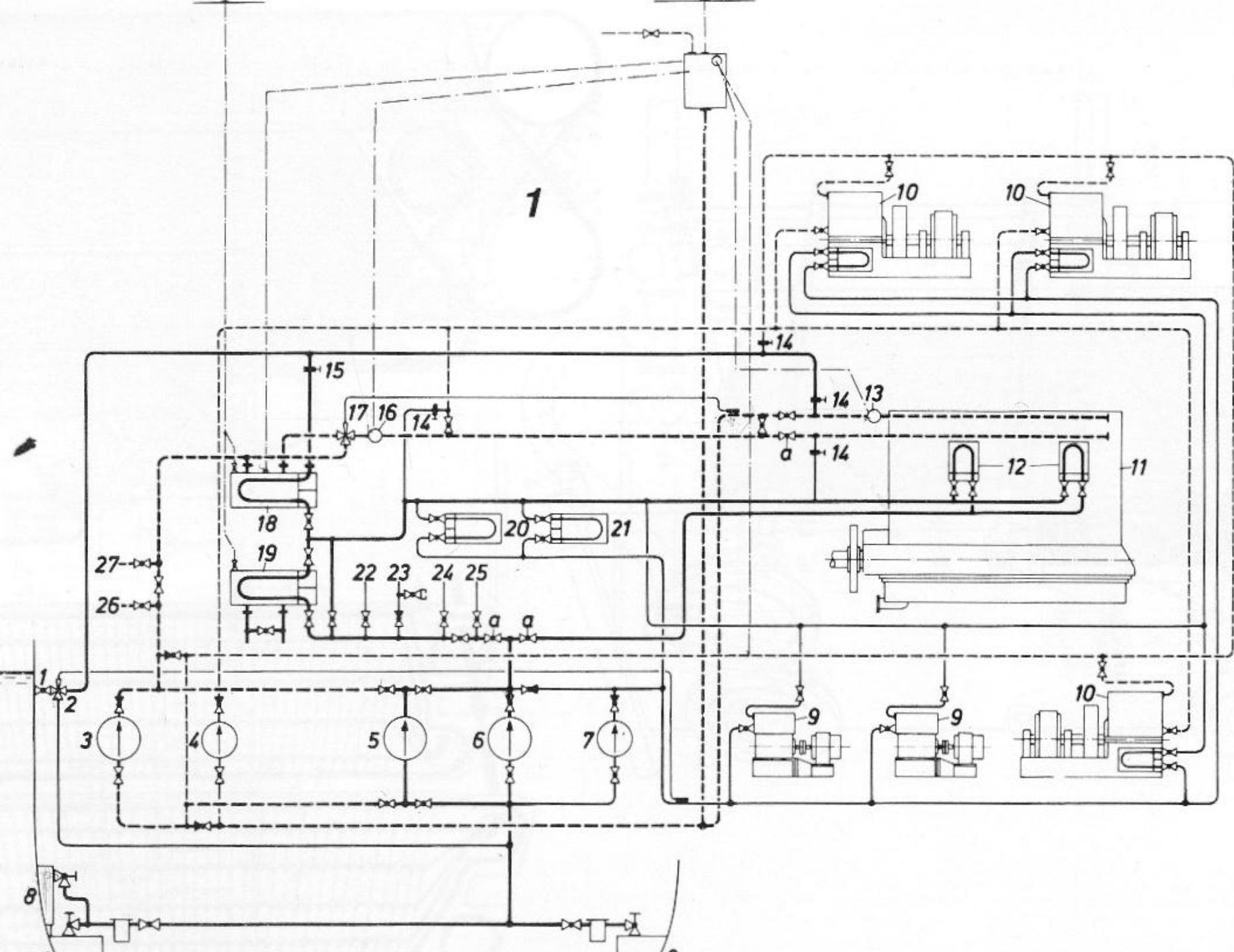


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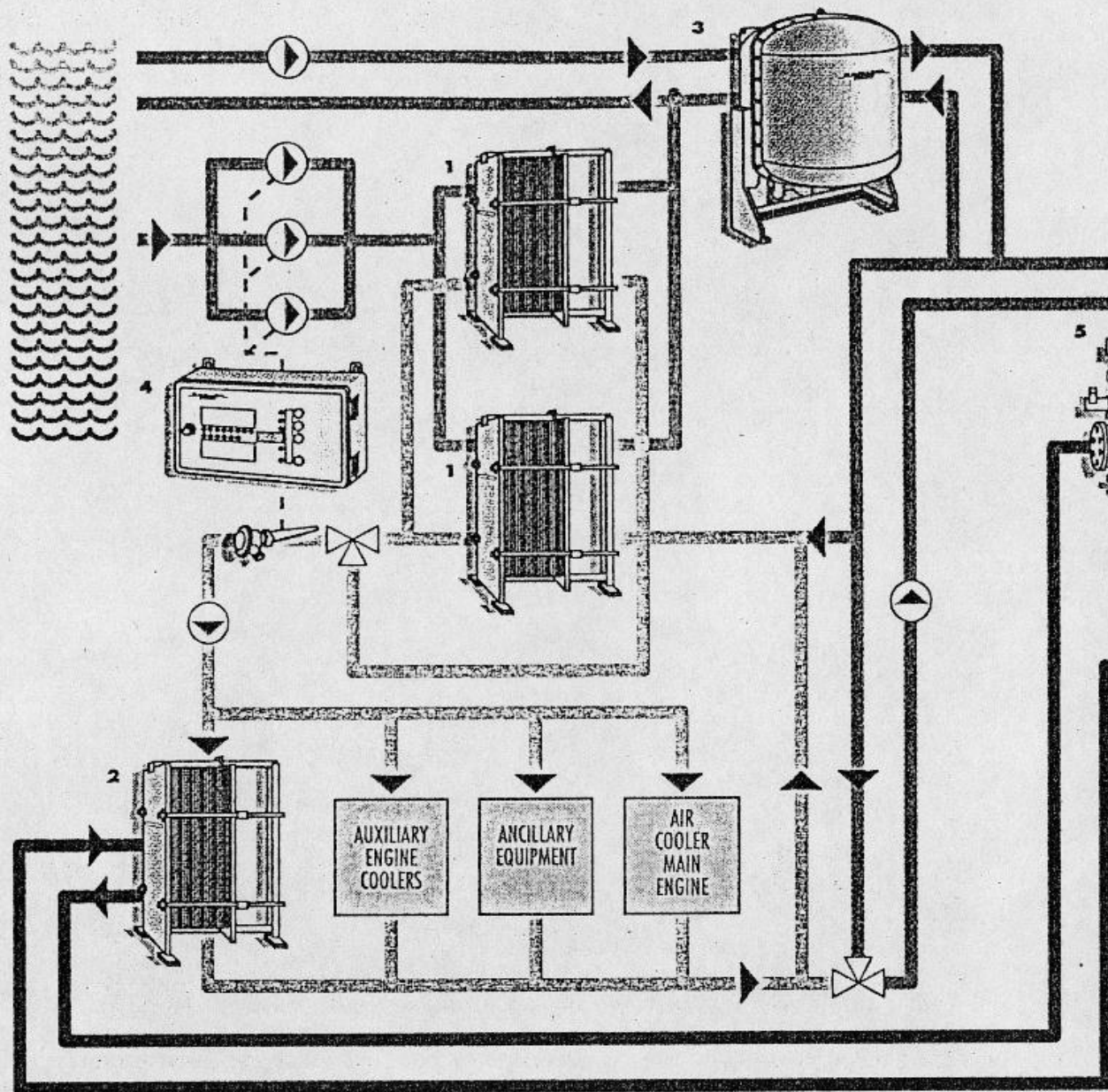
Kælivatnskerfi



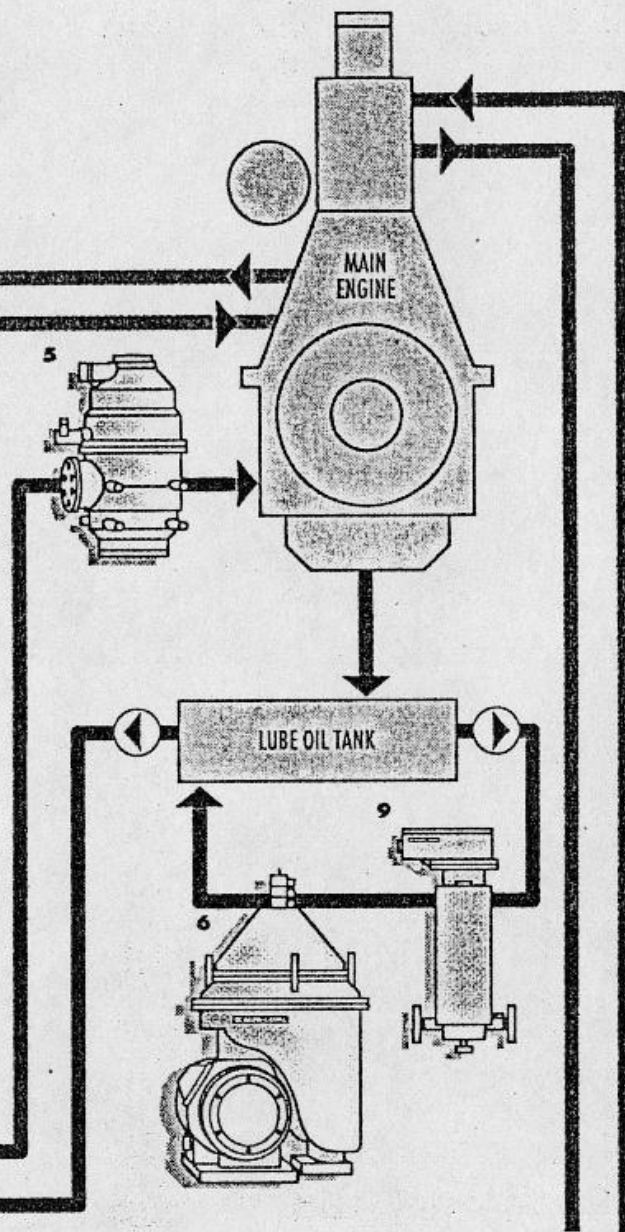


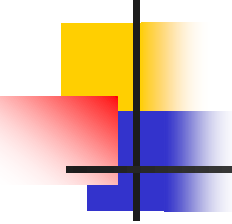


CENTRAL COOLING AND FRESHWATER PRODUCTION



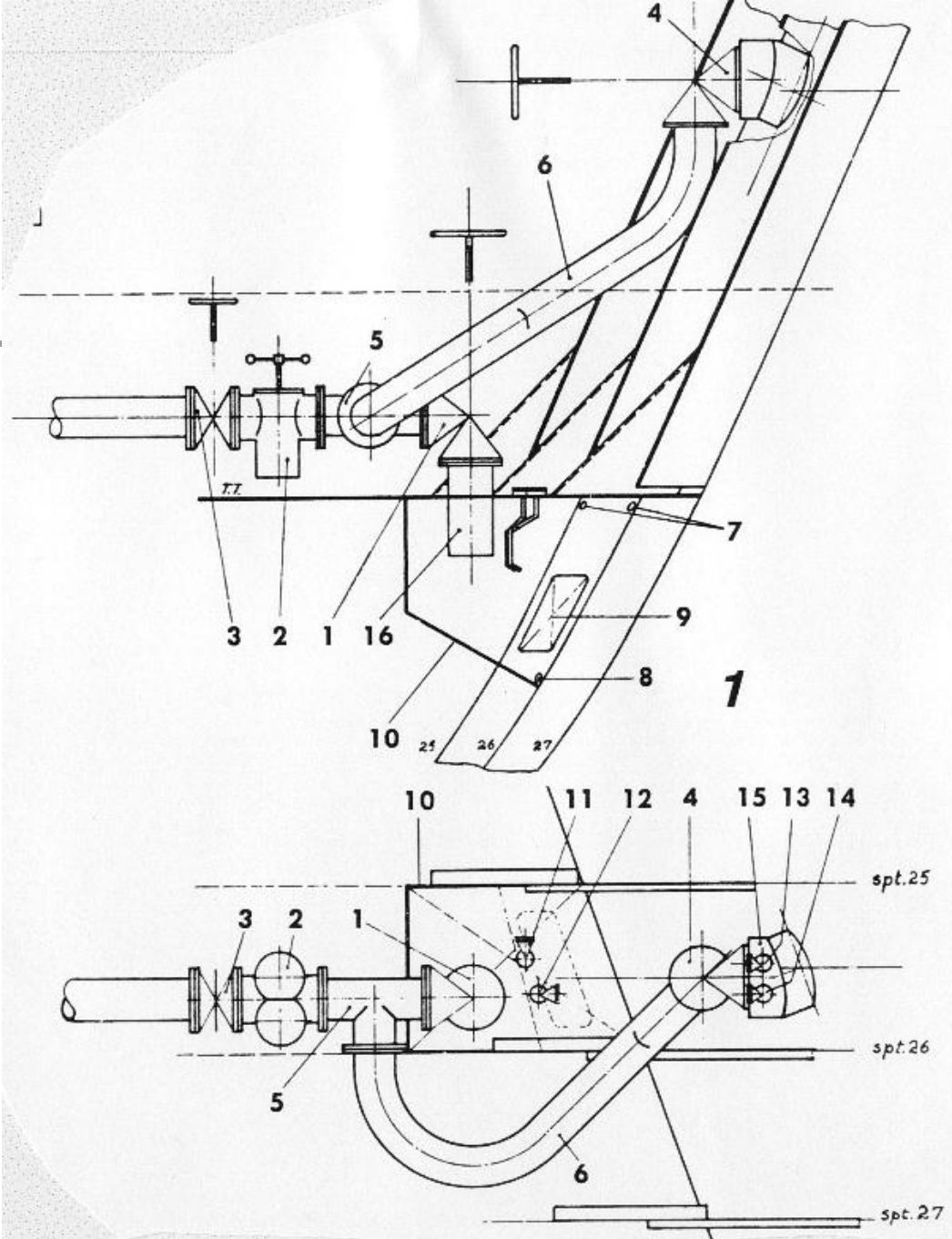
LUBE OIL TREATMENT

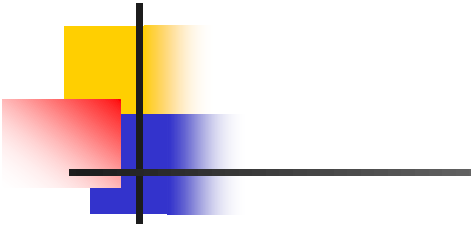




Gullnareglan

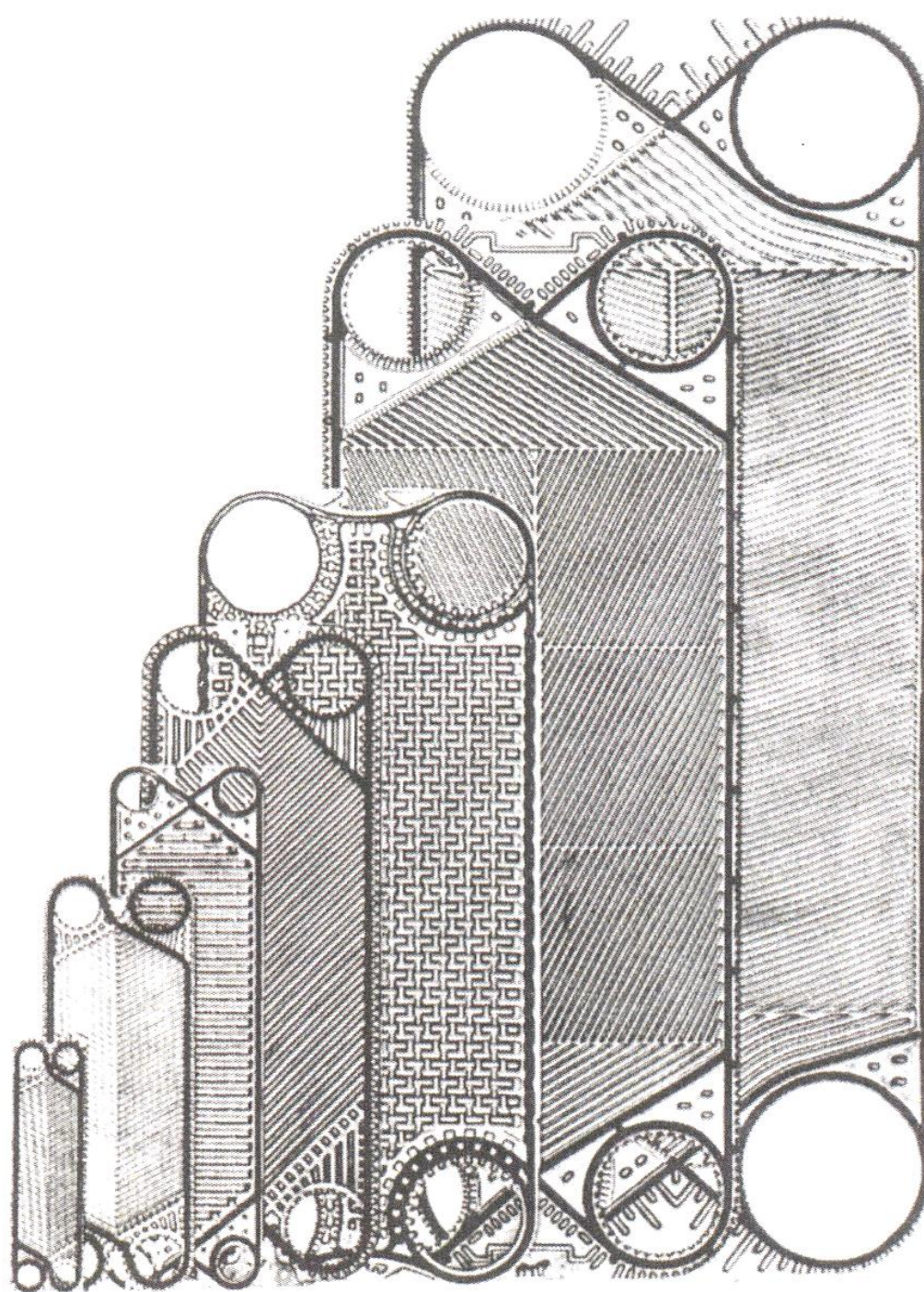
- Það má aldrei þvinga vatn í upphitun niður
- Þá geta myndast loftþúðar sem orsaka yfirhitun

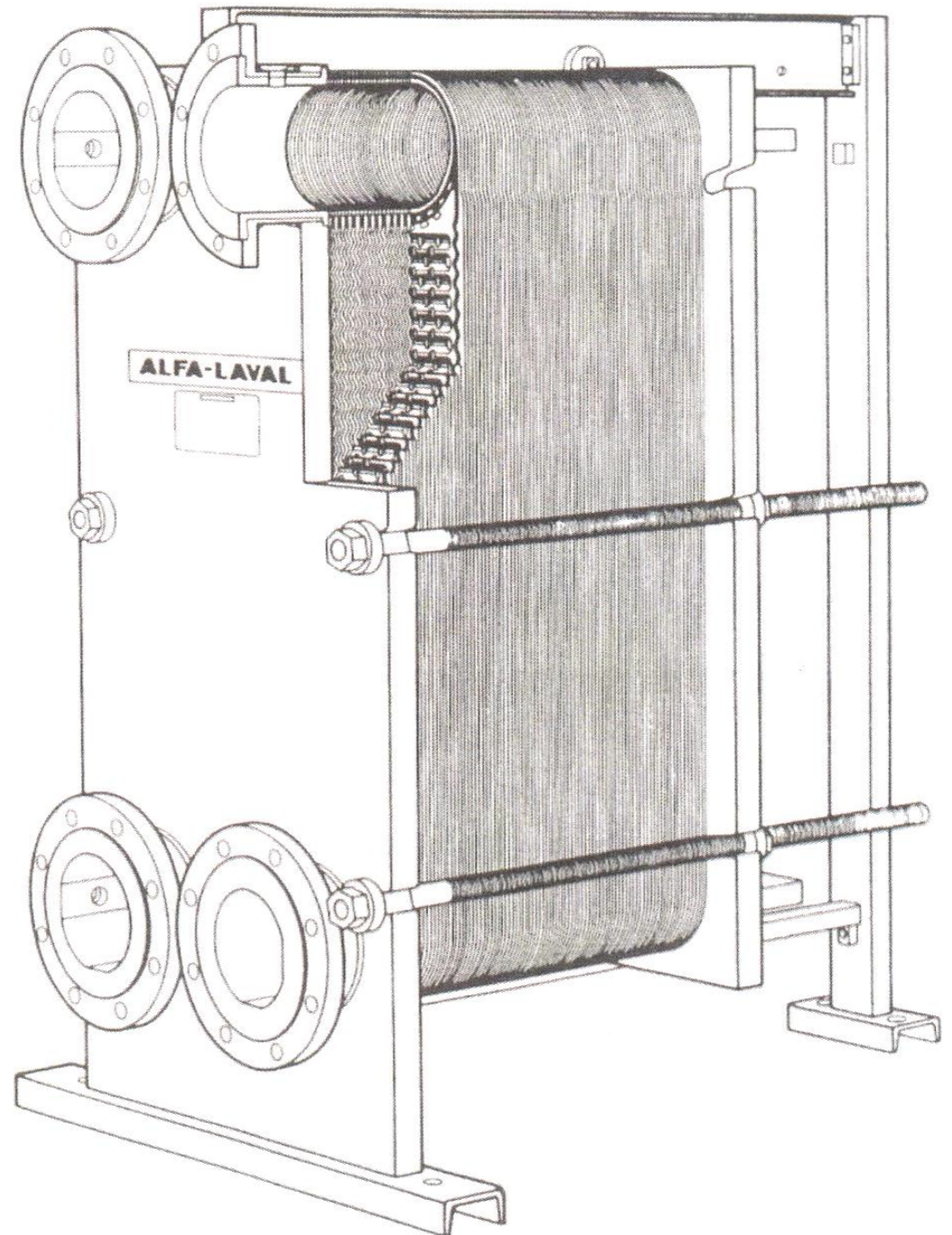


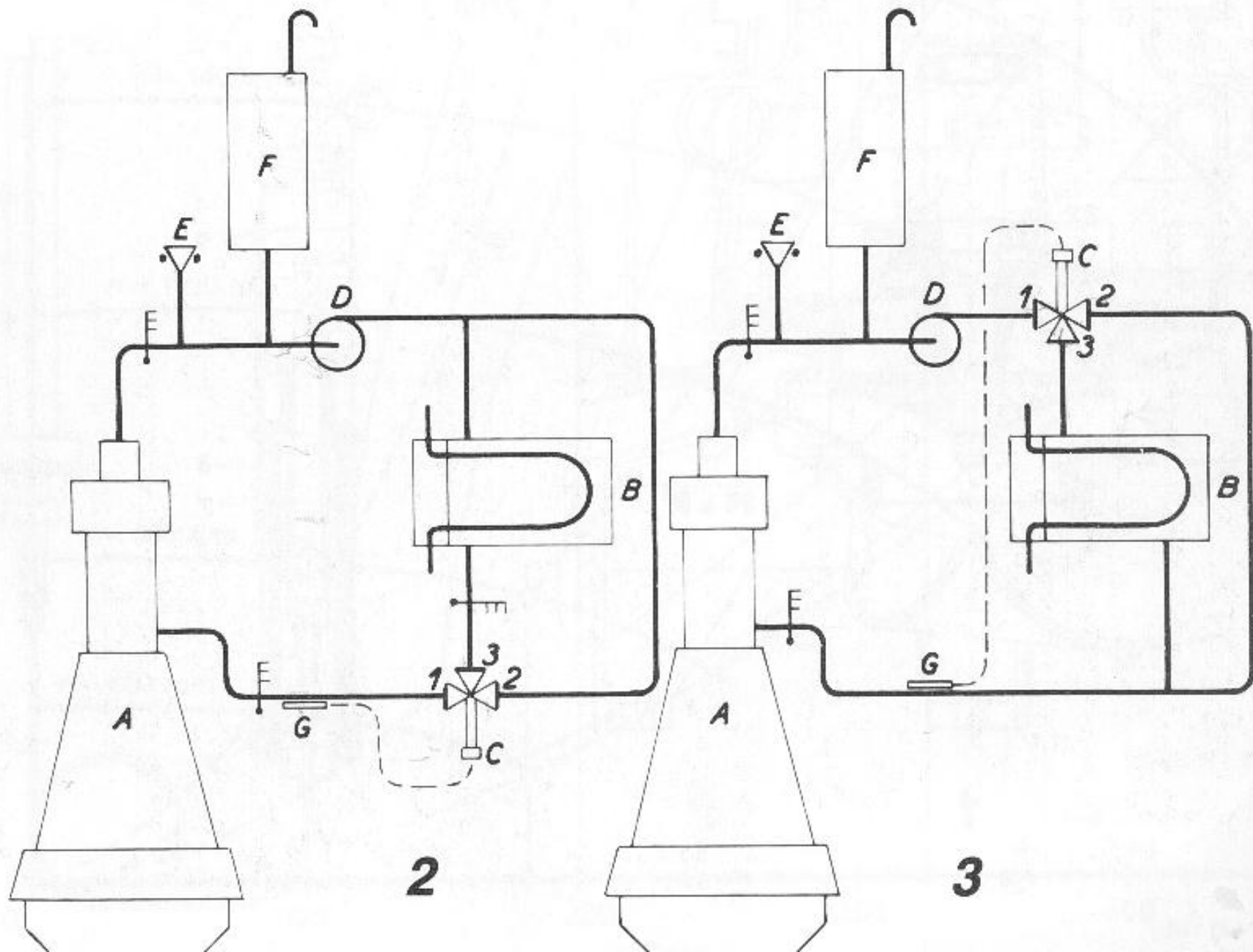


G.Einarsson

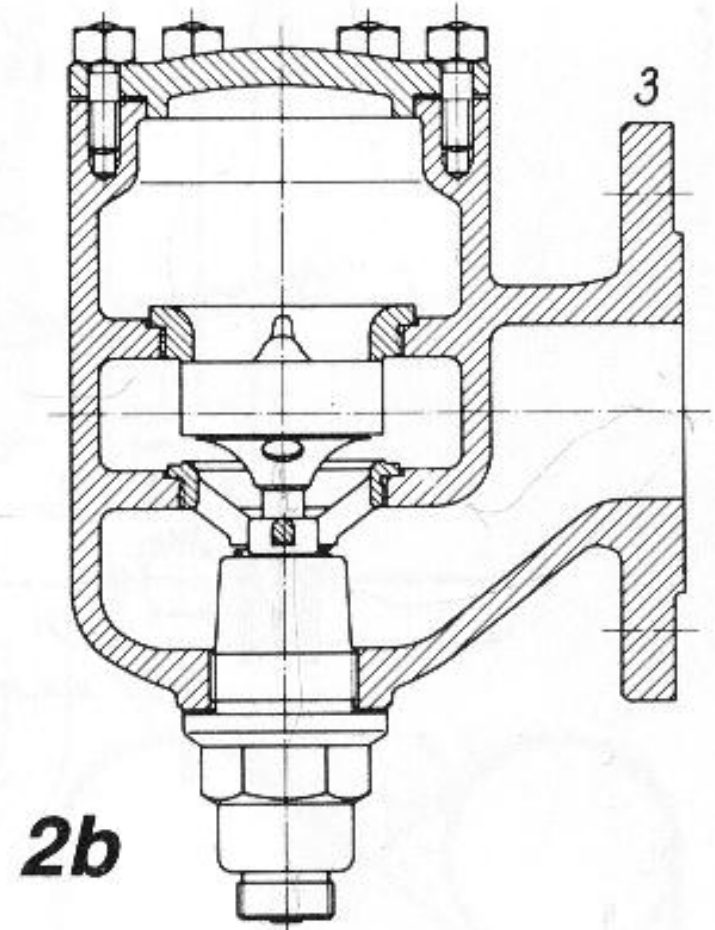
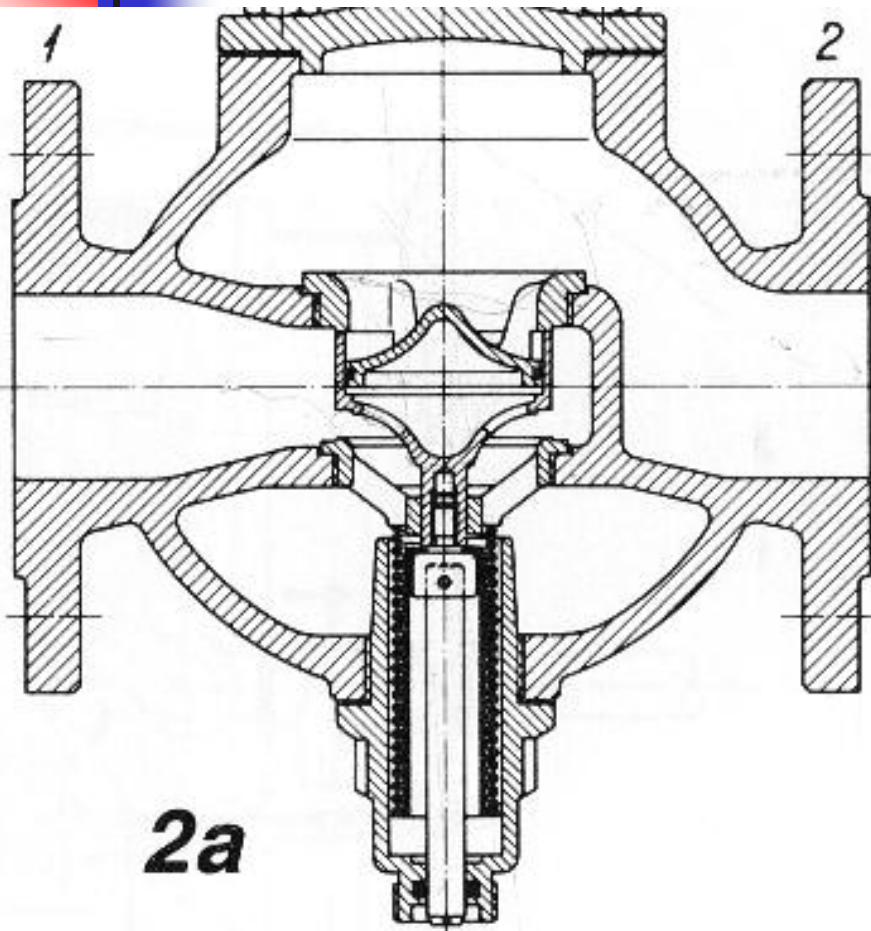
G.Einarsson

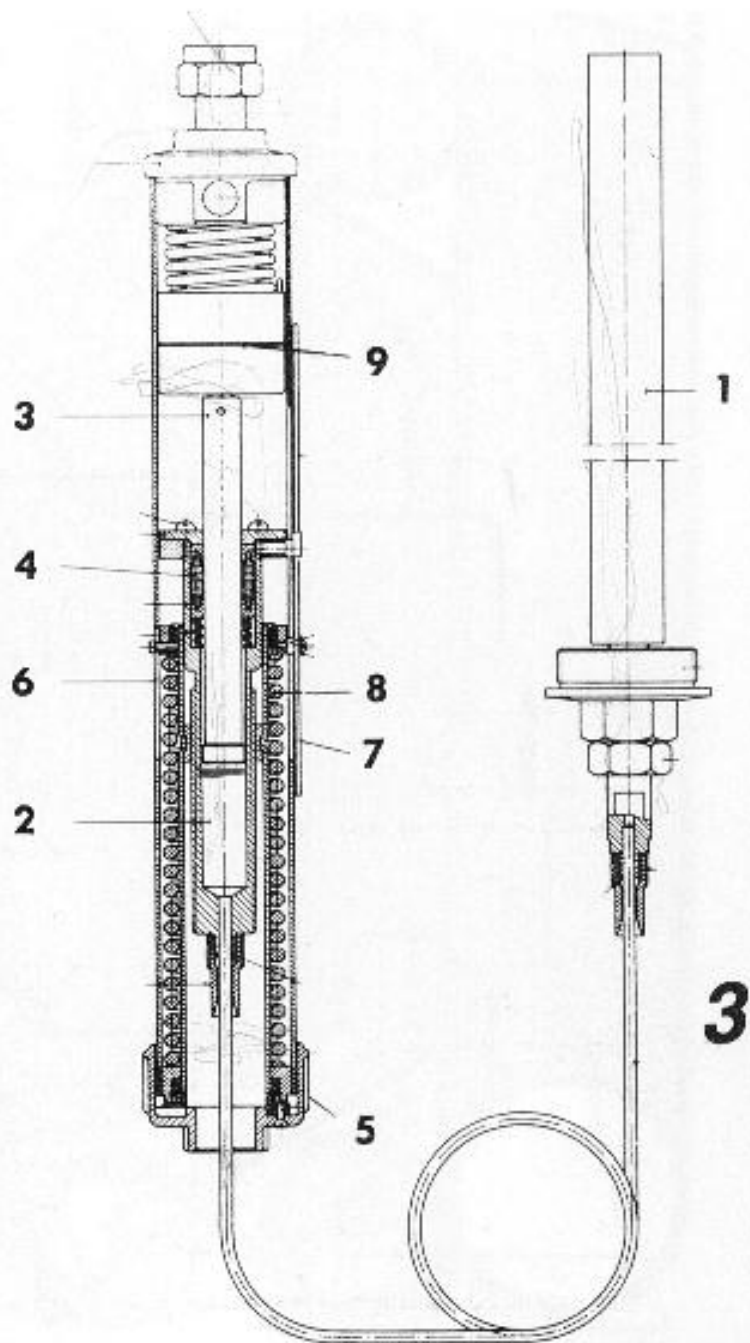
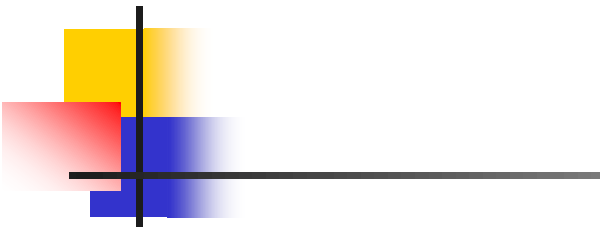


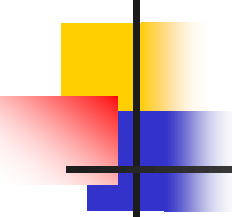




Clorius



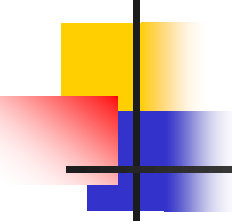




Ástand kælivatns

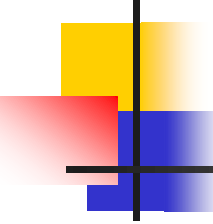
□ Meðhöndlun og eftirlit kælivatns

1. Hreinsa kælivatnsrými
2. Rannsaka vatnið um borð
3. Meðhöndla vatnið
4. Fylgjast með ástandi kælivatnsins



pH-gildi

- ❑ **pH-gildi gefur upplýsingar um hvort vatnið er súrt, hlutlaust eða basískt**
- ❑ Ef það er minna en 7 er kælivatn súrt
- ❑ Ef það er meira en 7 er það basískt
- ❑ Súrt vatn tærir

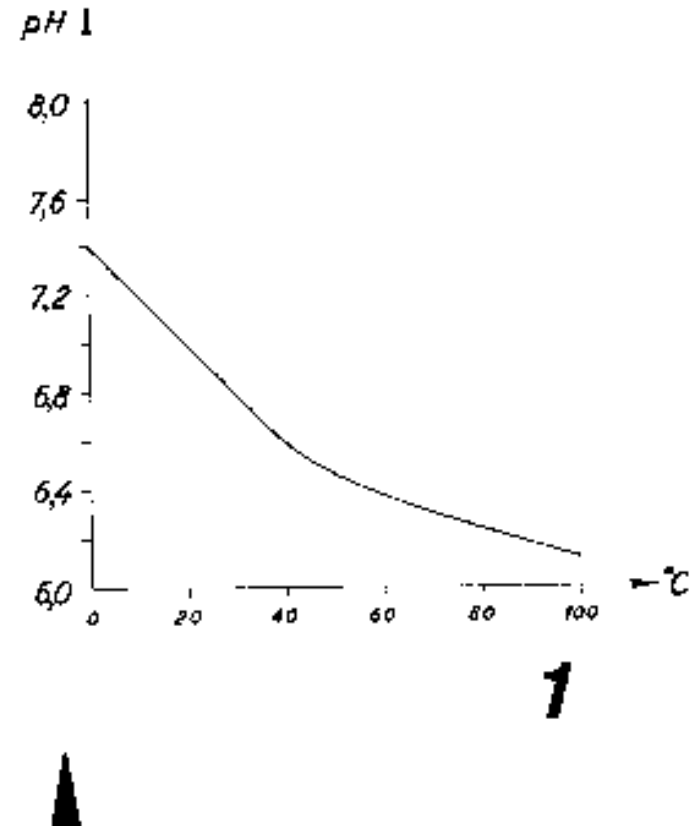


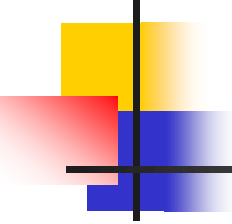
Vatn sem ekki tærir

- Harka skal vera yfir 6
- Klórsambönd mega ekki vera yfir 300 mg / ltr.
- pH-gildi skulu vera á milli 7–9 við 20°C
- pH-gildi lækkar við aukinn hita

pH-gildi

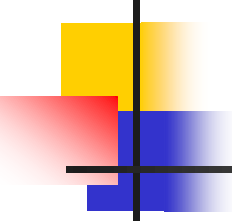
- pH-tala gefur upplýsingar um hvort vatnið er súrt, hlutlaust eða basískt.
- pH-tala lækkar við hækkandi hita.
- Sjá línurit





Tæringarvörn

- Setja tæringarvarnarefni
- Nota zink eða ál
- Zinkið þarf að vera 99,99% hreint
- Nota rafhrif., sérstakan tækjabúnað



FrostsKemmdir

- Sem frostlög á stór vélkerfi, er oftast notað efni sem heitir glýkól.
- -15 C frostþol er glýkól 30%
- Á minni vélar er notaður venjulegur frostlögur. Hlutföll 50%
- Ath. að bæði efnin geta súrnað
- Súr efni tæra

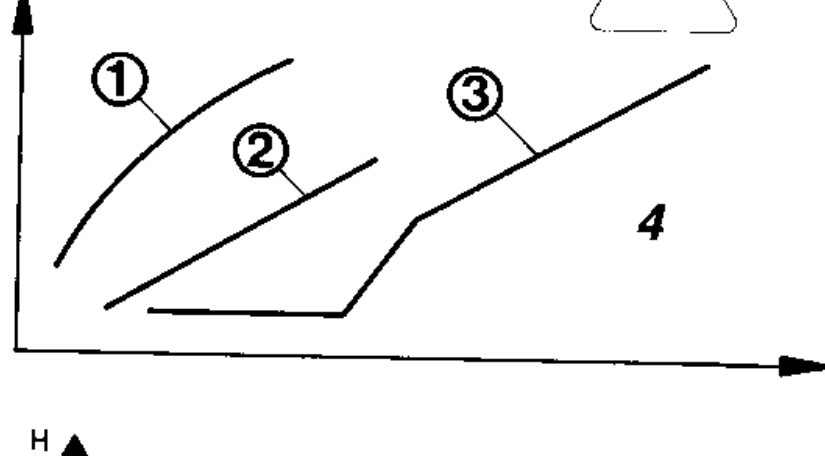
Loftbólur

Straumhraði lágrétt

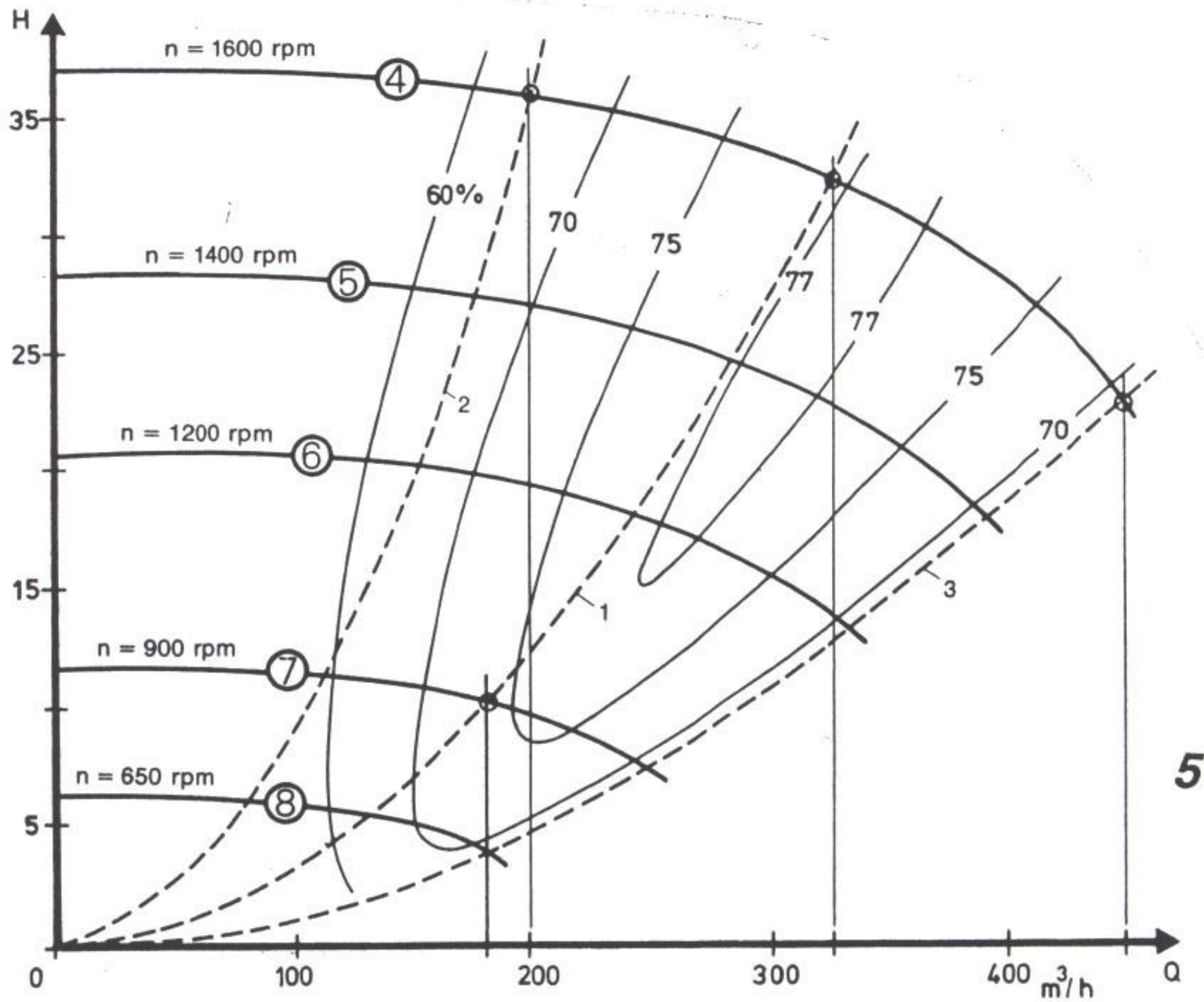
Tæring lóðrétt

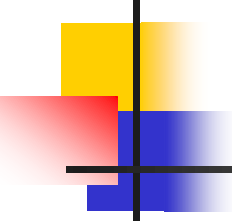
Lína 1 stálrör

Lína 2 hlutfall milli stál
galv. og CU/Ni
70/30



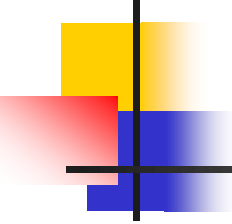
- Straumhraði 1 m/s
- Magn 1 kg/kW





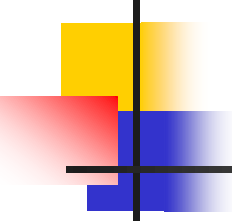
Magnstilling á sjókælidælum

- Þrengja þrýstihlið
- Með framhjáhlaupi
- Breyta snúningshraða dælumótors



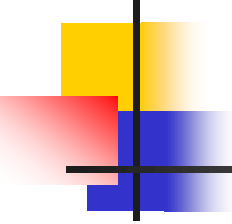
Breyting á snúningshraða

- Týristorstýring
- Viðnámsstýring jafnstraumur
- Olíuþrýstitengi
- Riðstraumsmótor með variator
- Skammhlaupsmótor með riðstýringu
- Glussadæla og vökvarótor



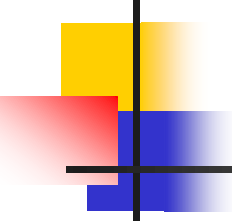
Kælikerfi

- Kælikerfi þarf að geta starfað við 30°C
- Straumhraði þarf að vera um 1 m/s
- Hitastig helst undir 10°C



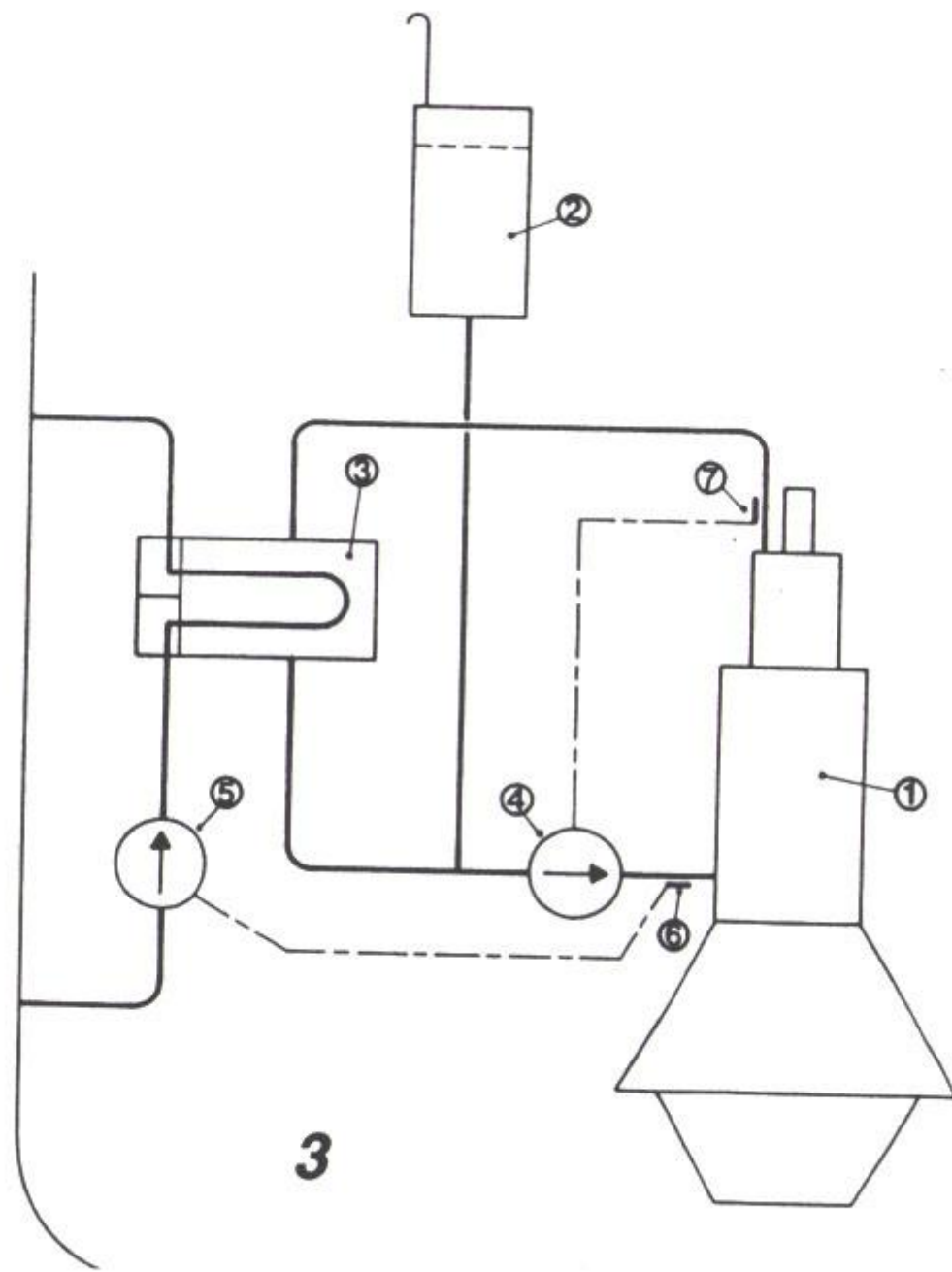
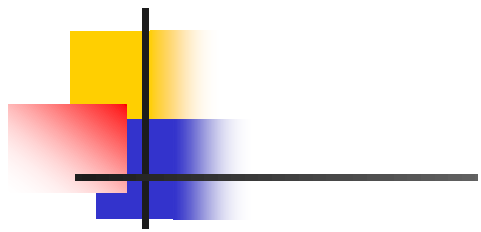
Afköst sjódælu

- Hitastig sjávar 30°C þarf vél sem er 1500 kW 45 m³ af sjó/klst.
- Ef sjávarhitinn er 15°C þarf helmingi minna af sjó



Aflþörf

- Ef afköst dælu eru minnkuð um helming mun aflþörf hennar vera ca. $1/8$, sem þýðir minni olíukostnað.
- Ekki er þá þörf fyrir hafnardælu, nema til vara.



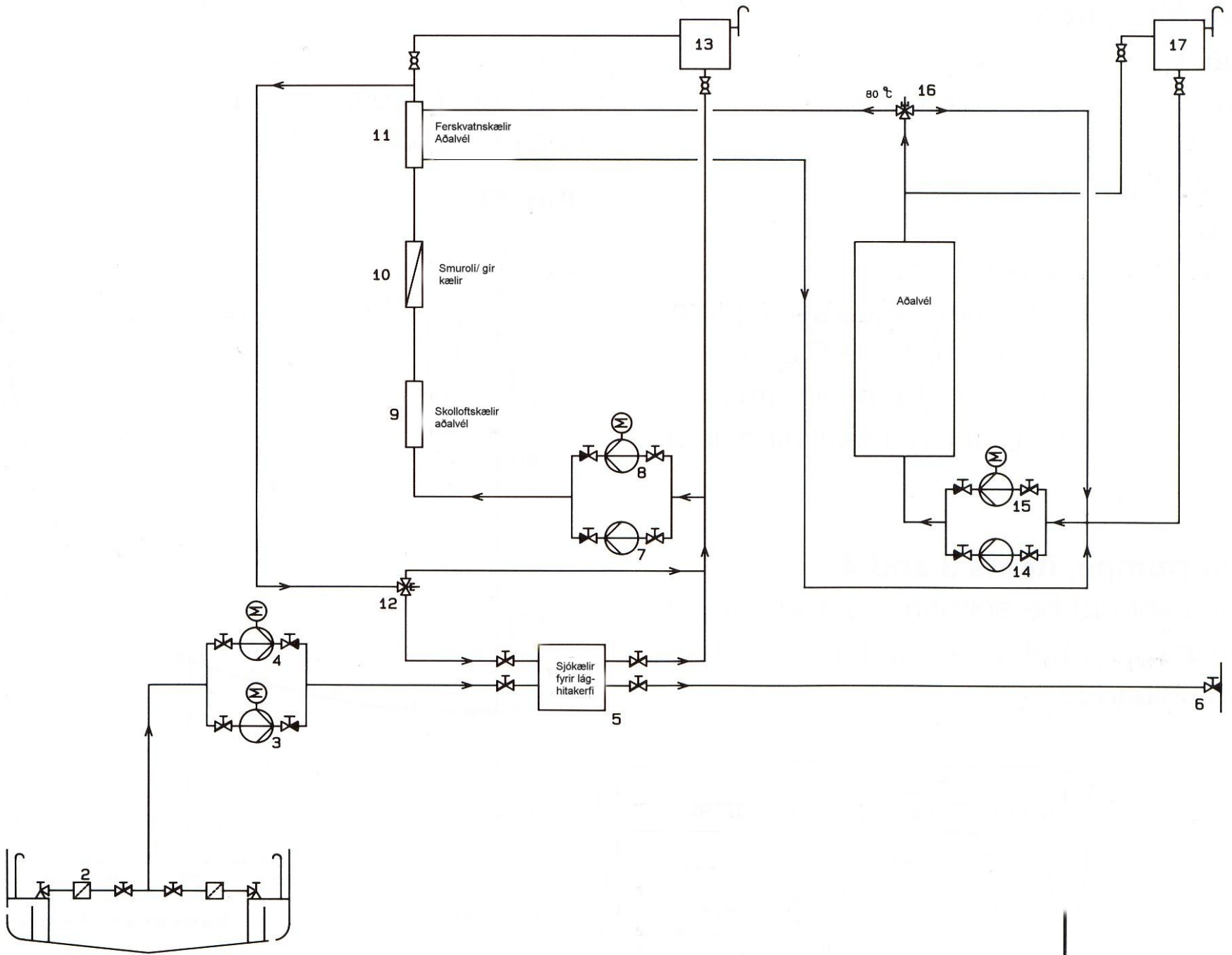
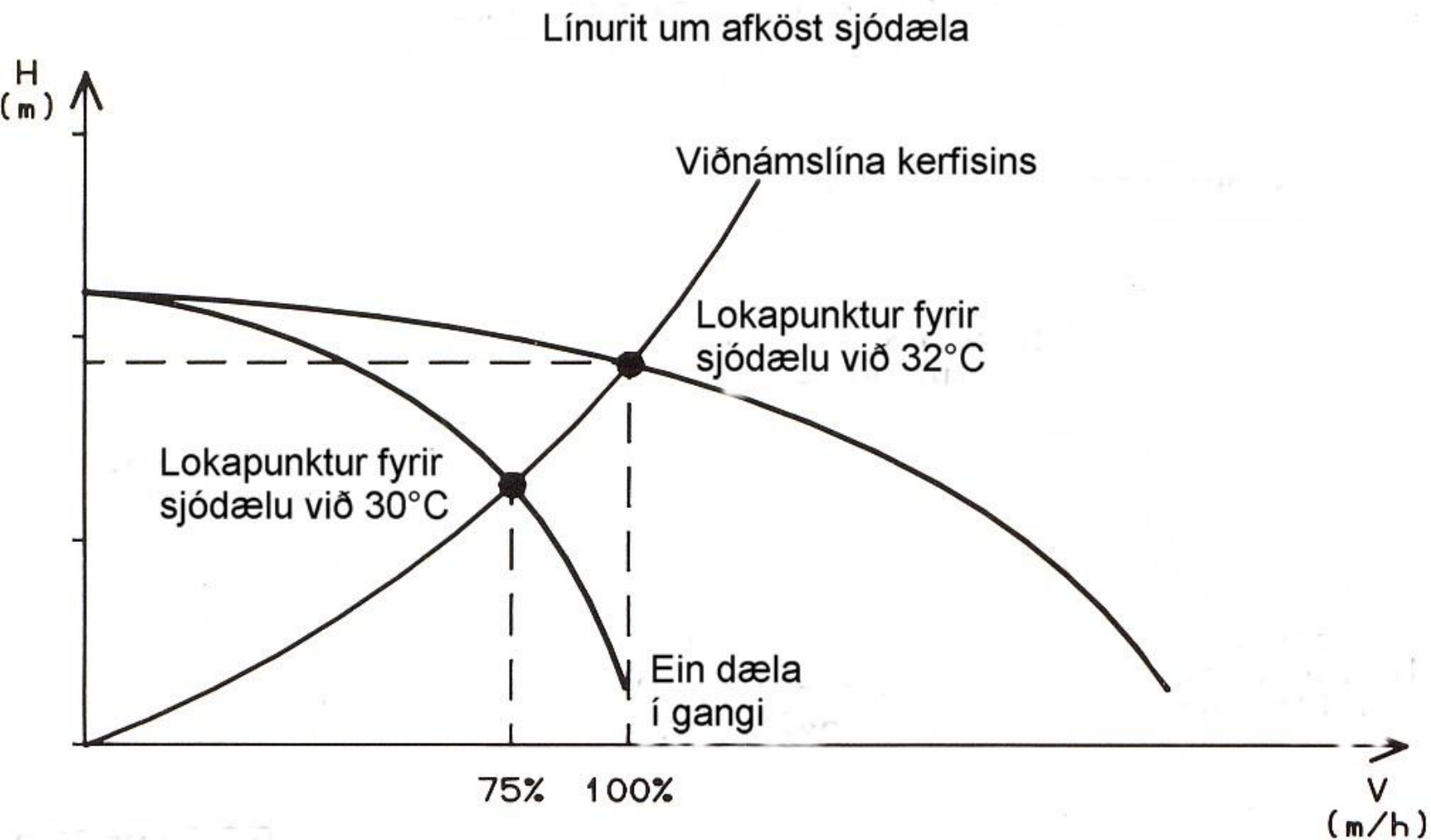
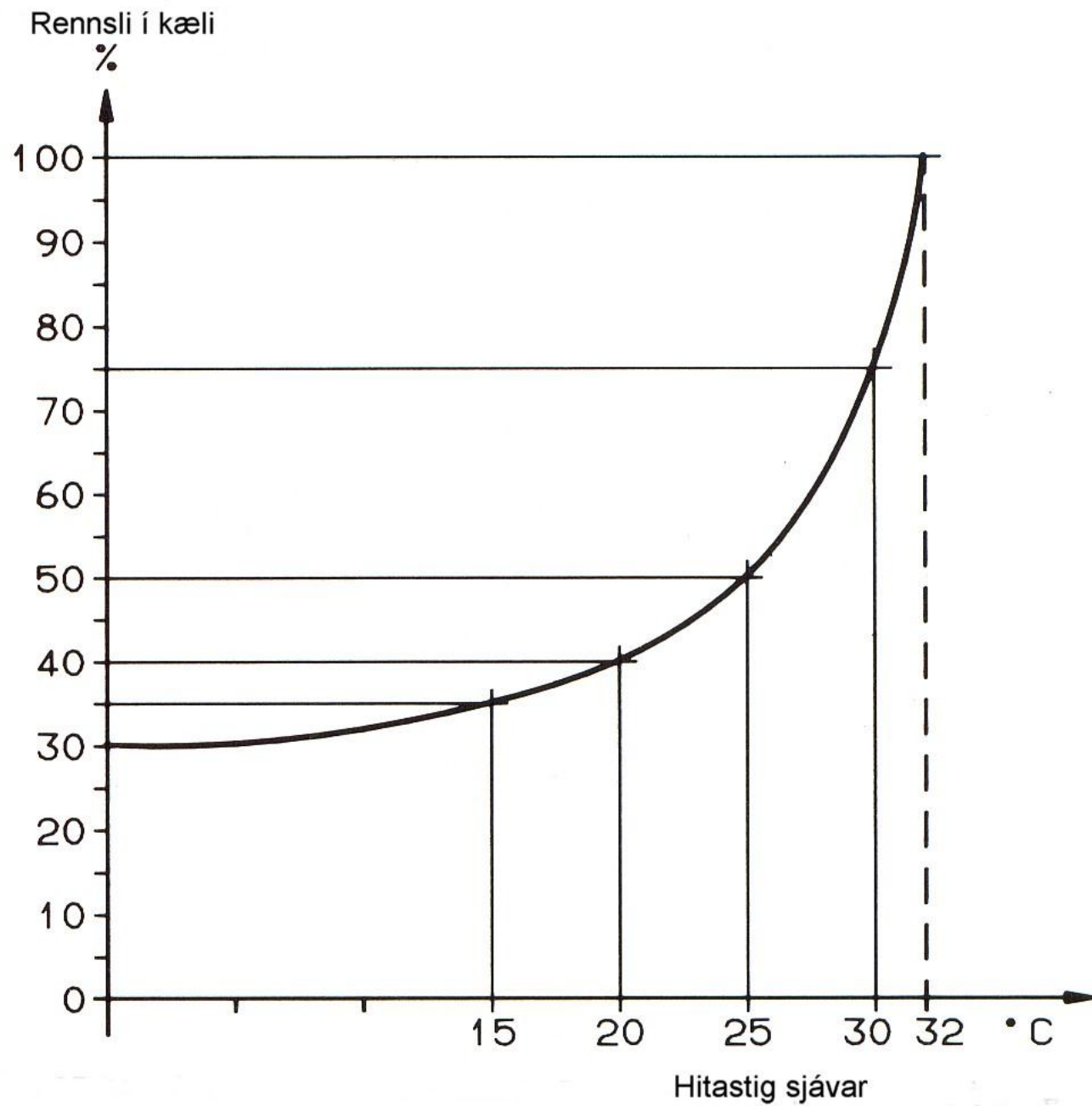
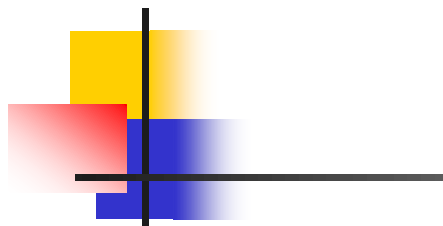


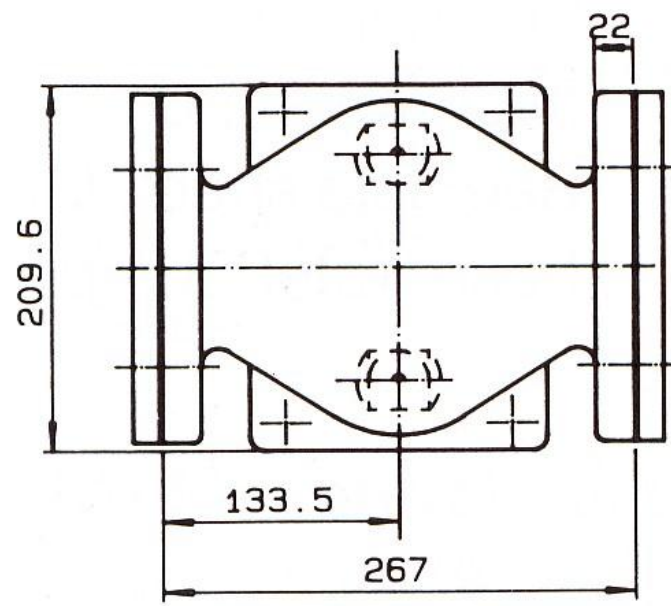
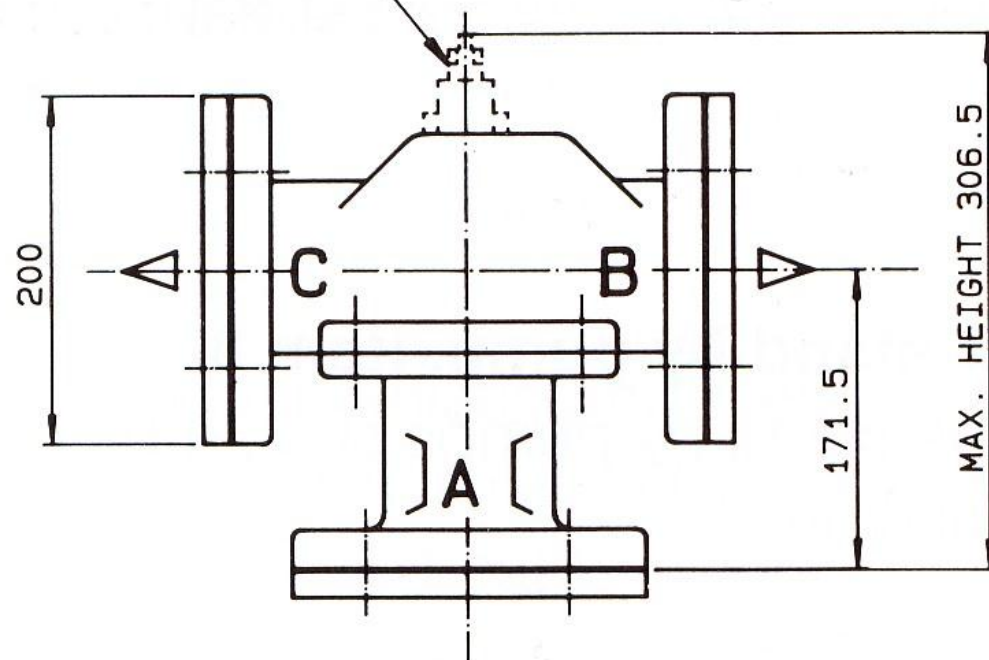
Fig 72

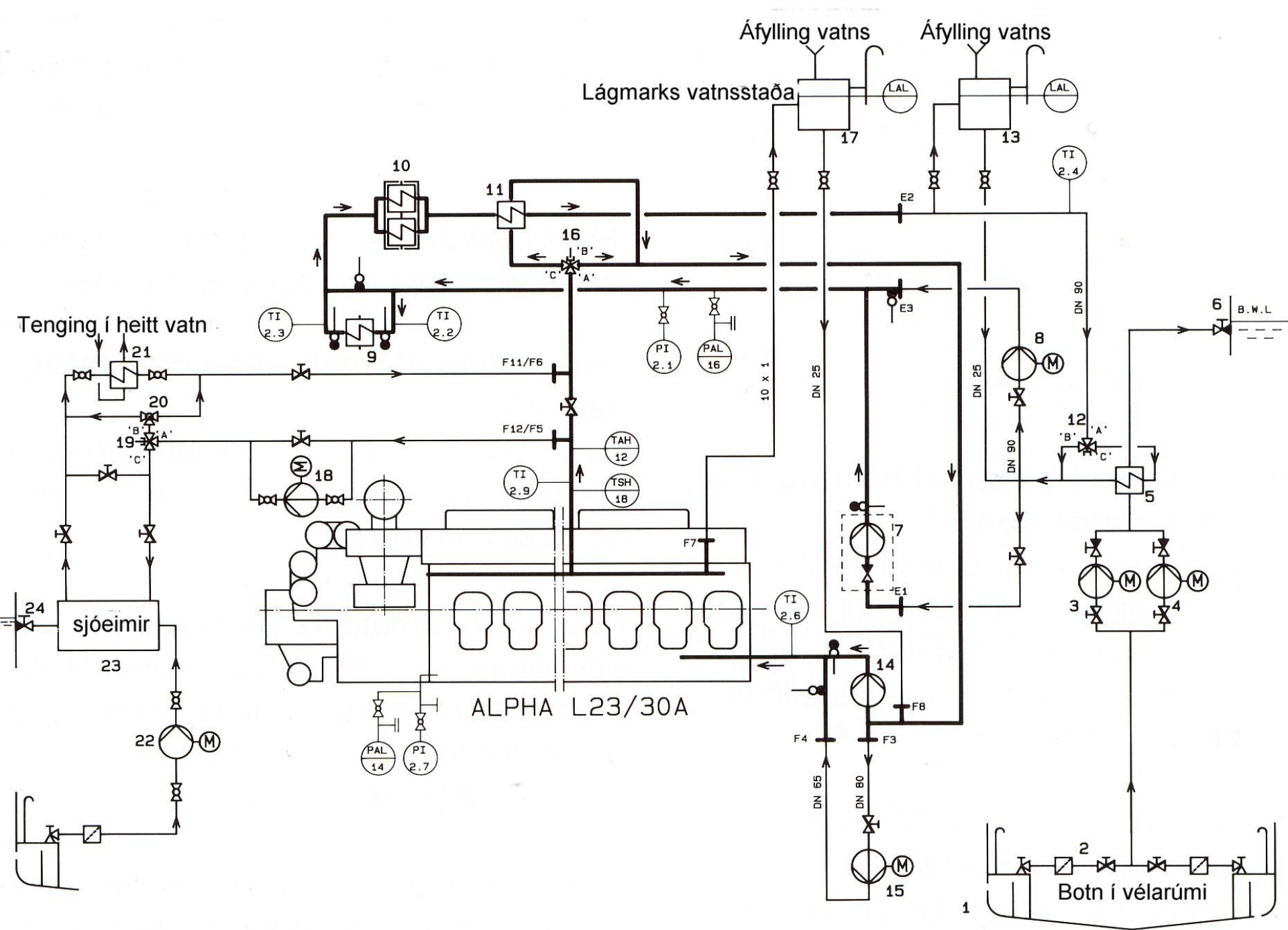


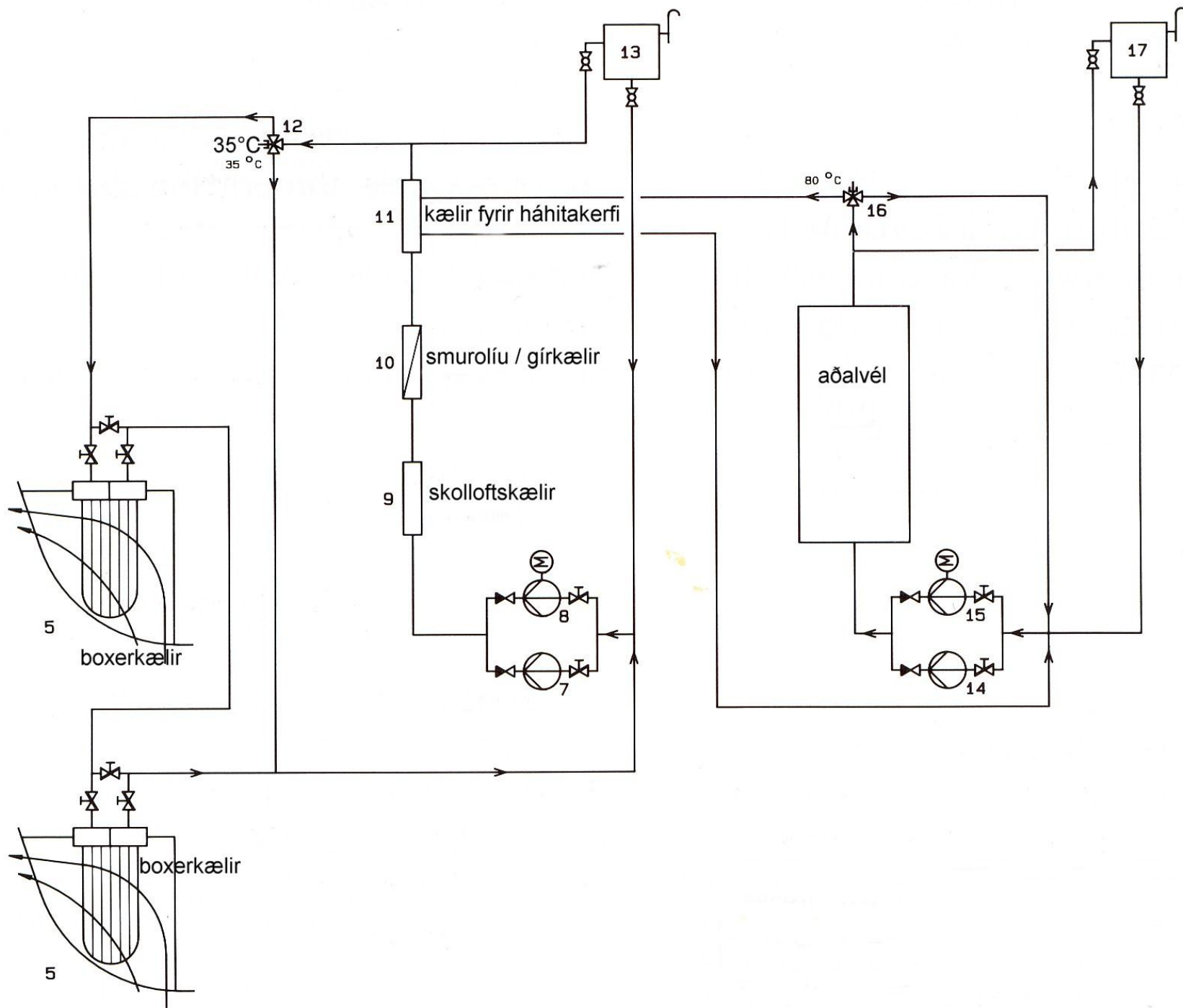


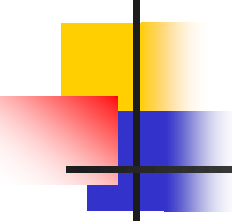


Aðeins fyrir handstýringu



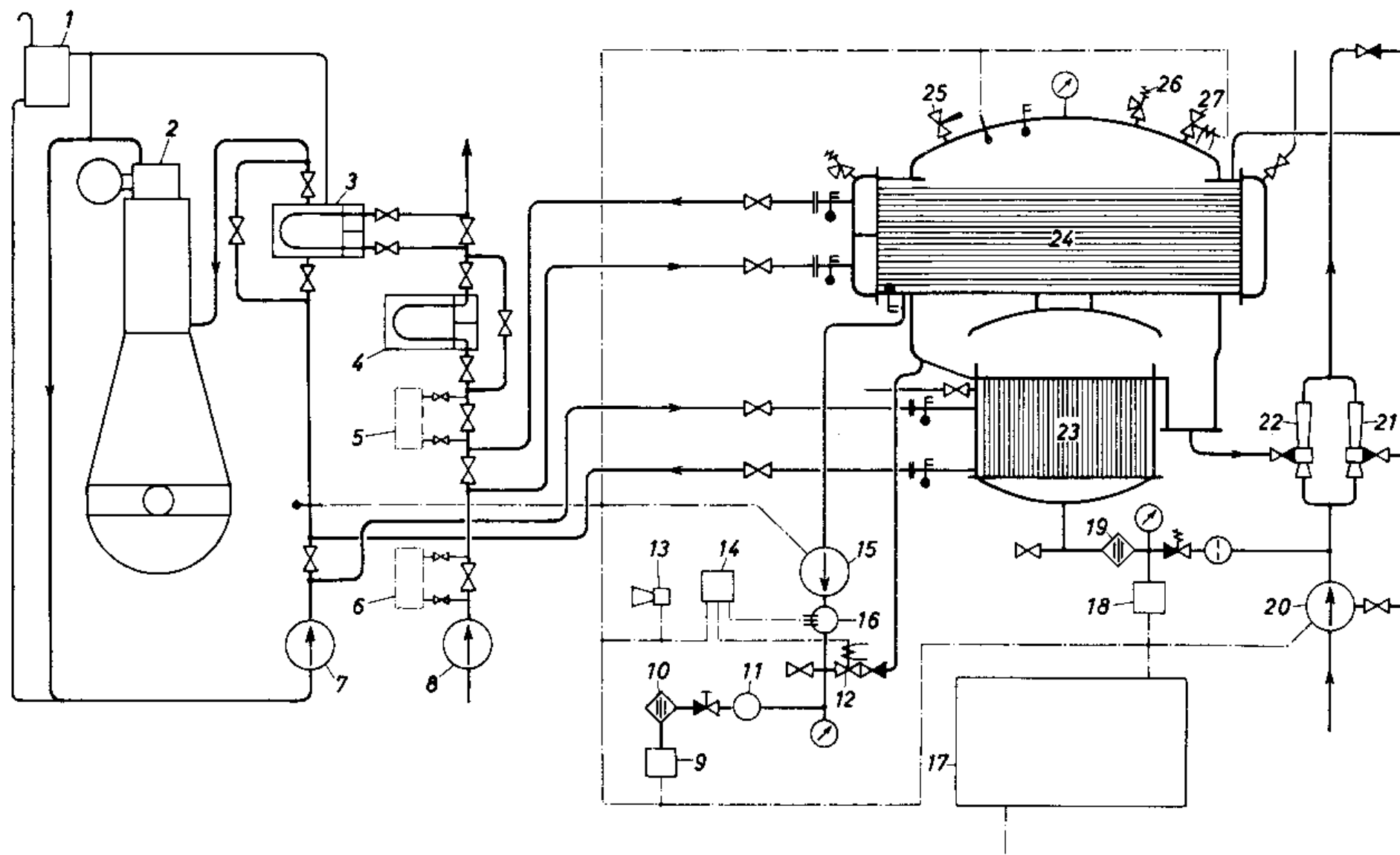




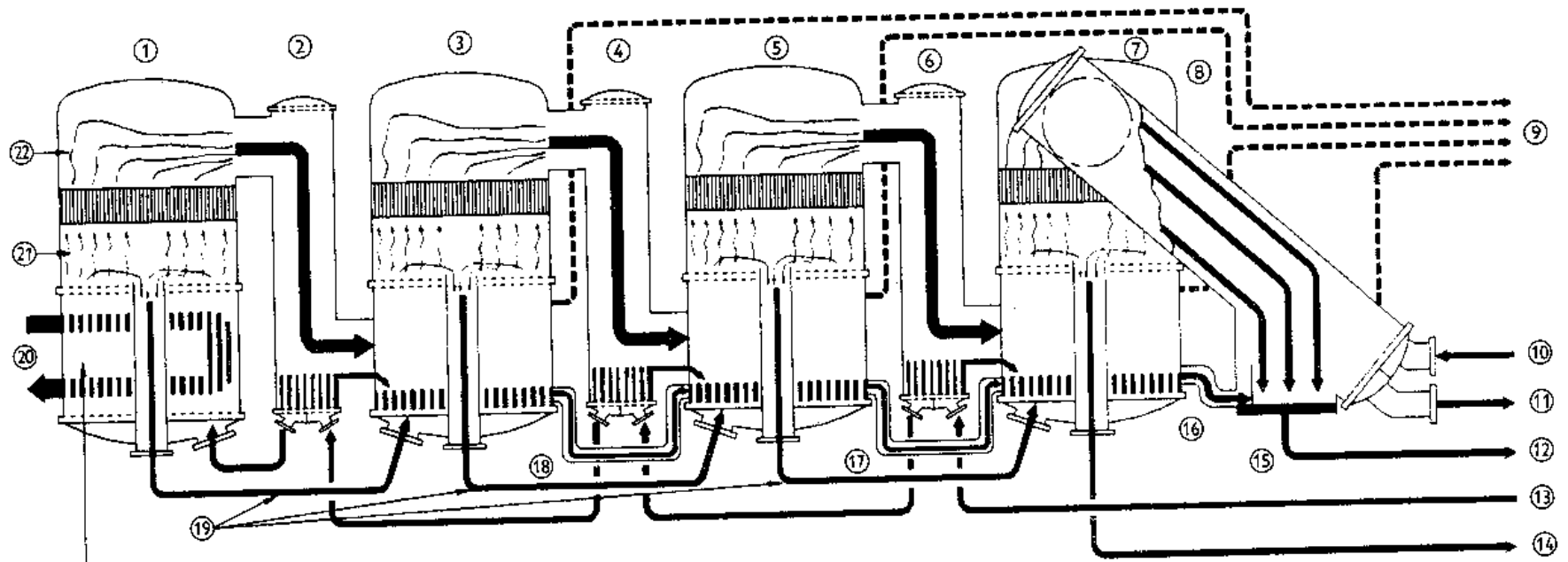


Sjóeimir gangsetning

- ❑ Veita kælivatni vélar til eimis
 - ❑ Gangsetja jektordælu
 - ❑ Opna frá sjó til eimis
 - ❑ Ath. eimingu í gegnum sjónglas
 - ❑ Gangsetja vatnsdælu
-
- ❑ Ath. magnstillingu á vatnsdælu

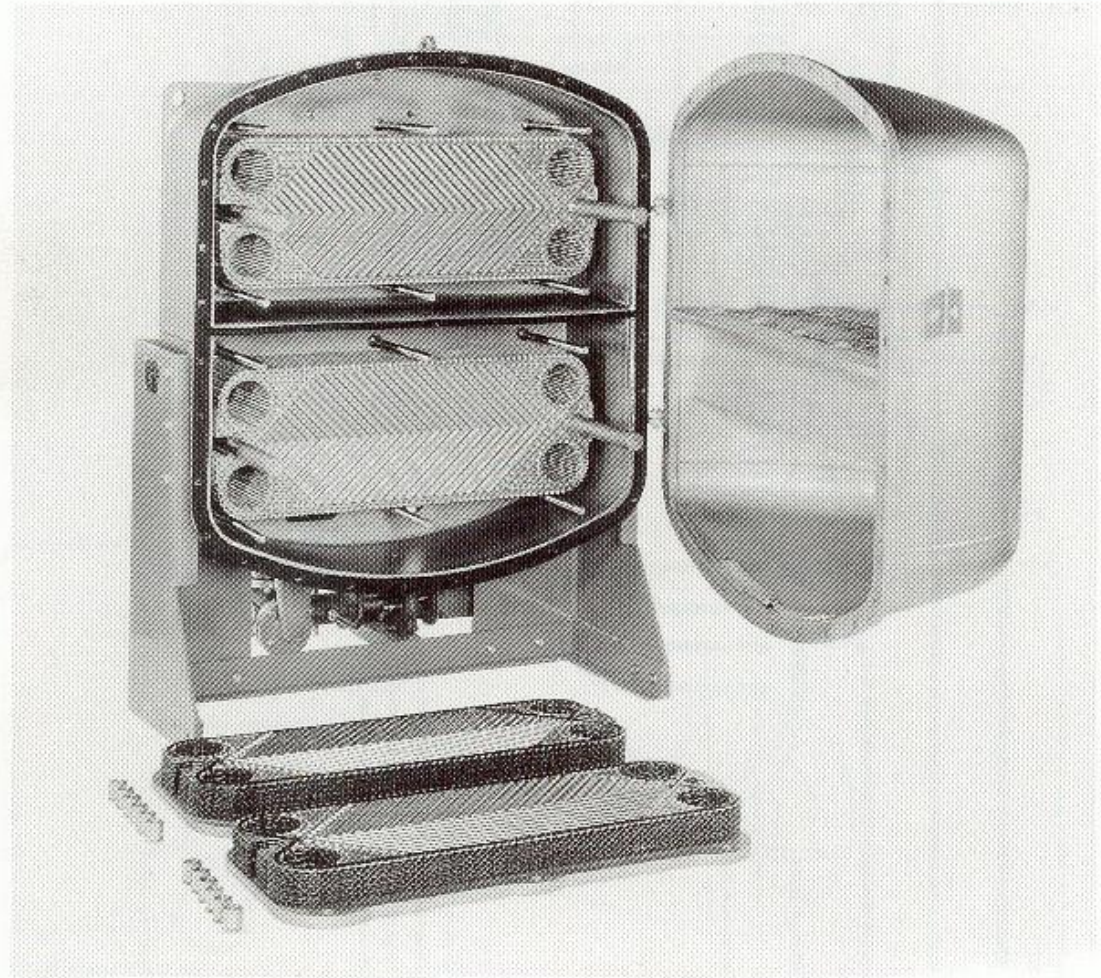


Margprepa



Alfa-Laval

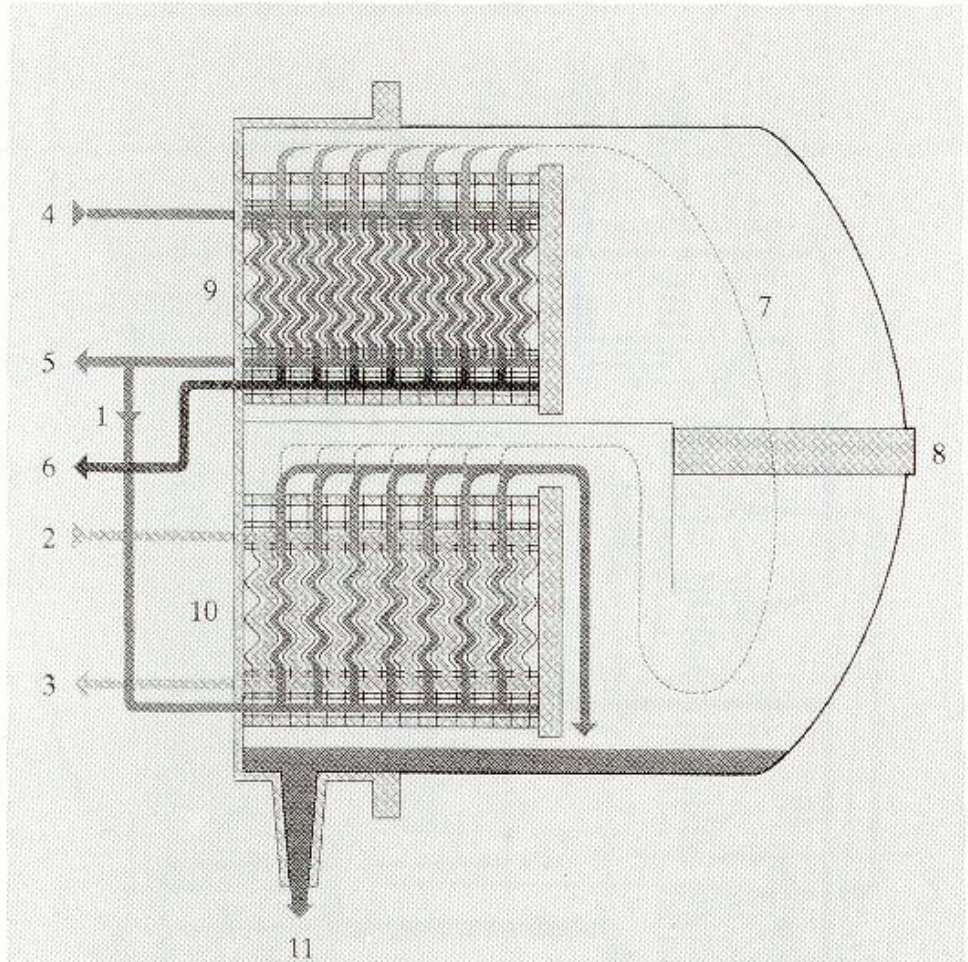
2

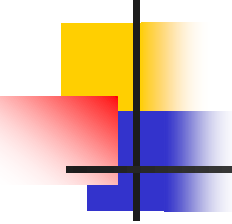


G.Eina

Alfa-Laval

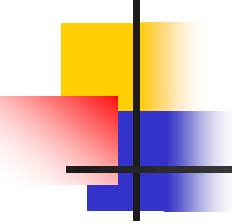
1





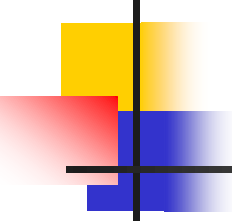
Eiming með vatnsgera

- Reynslan hefur sýnt að ekki eru kalkútfellingar í eimi.
- Ath. að stöðva eimi áður en skip nálgast strönd.
- Sjór hér við land er yfirleitt hreinn og laus við bakteríur.



Útblástur

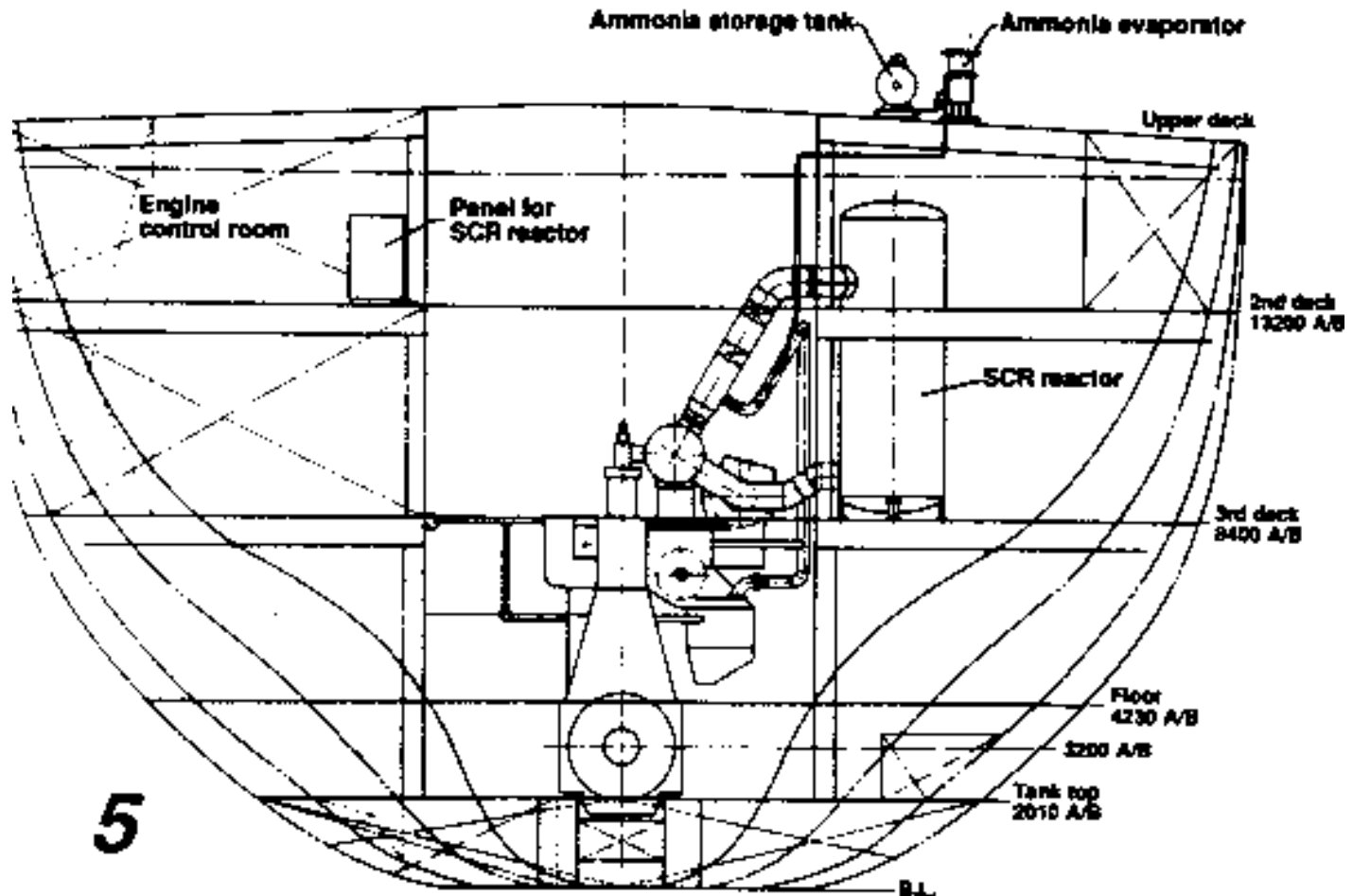
- Niturmónoxíð NO
- Niturdíoxíð NO_2
- Brennisteinsdíoxíð SO_2
- Brennisteinstríoxíð SO_3
- Kolmónoxíð CO Kolsýringur
- Koldíoxíð CO_2 Koltvísýringur



Afgasketill

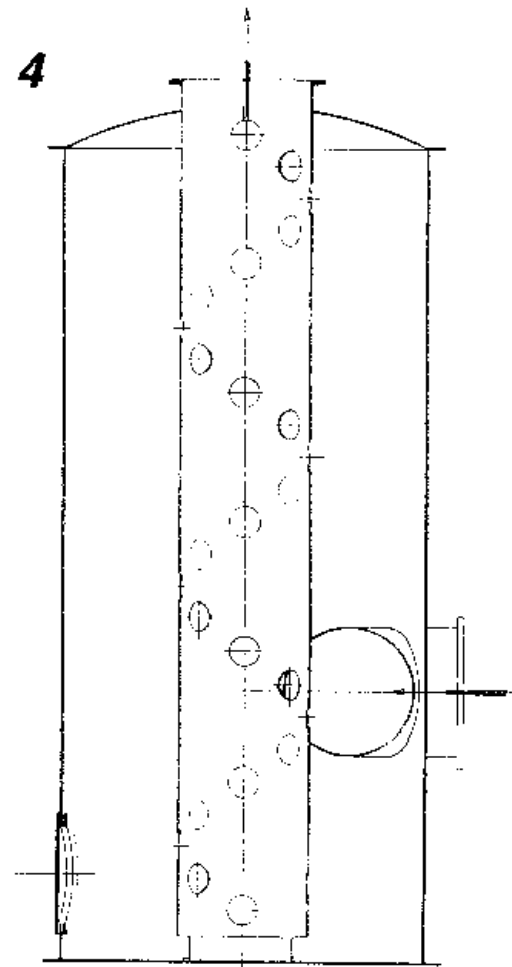
- Orka afgass getur verið um 30%.
- Orka í afgaskatli er glatorka.
- Hægt er að framleiða gufu til að hita HFO.
- Einnig er hægt að kynda skipið og framleiða vatn.
- Katlarnir eru knúnir með afgasi, olíu og rafmagni.

Selective Catalytic Reduction



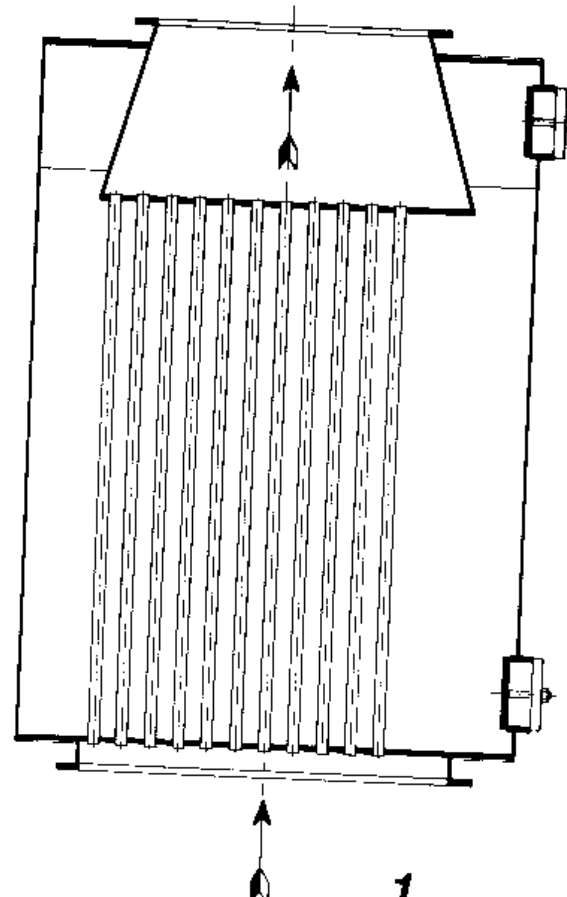
Hljóðdeyfir frá B&W

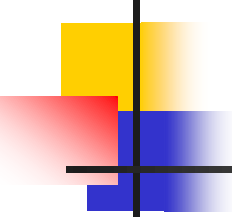
- Rörið er leitt eftir stóru röri, göt eru á því sem er eins og skrúfugangur.
- Þegar gasið streymir jafnast þrýstisveiflurnar og hávaðinn minnkar.



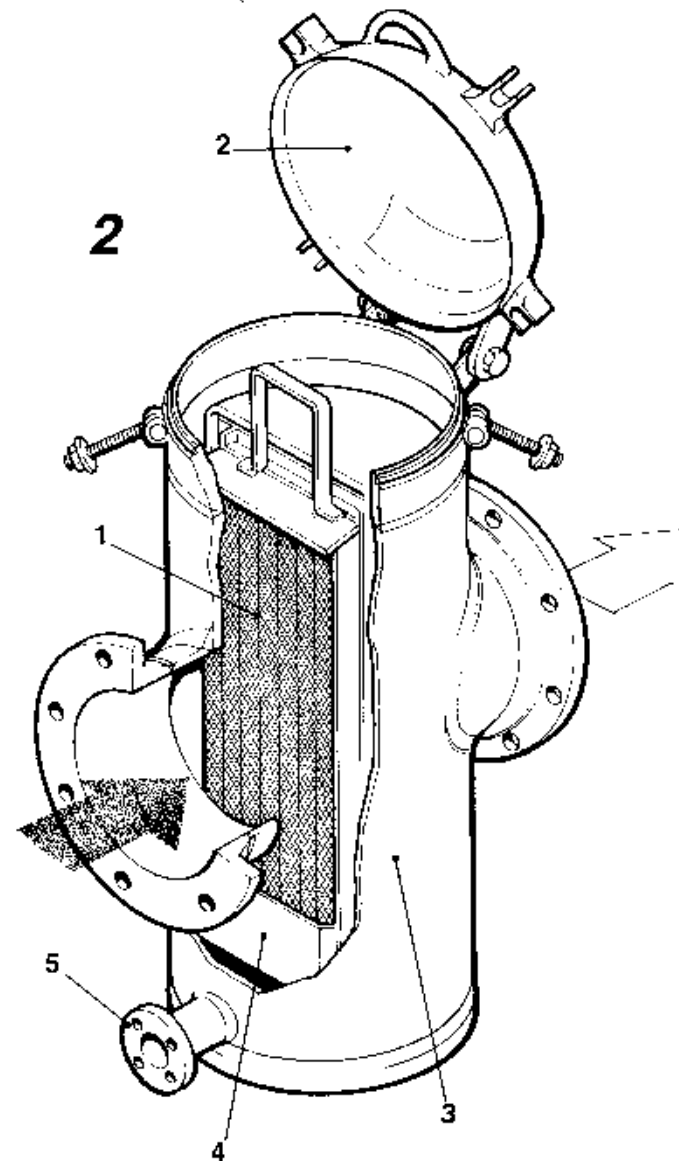
Afgasketill

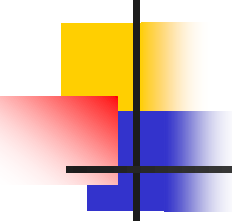
- Ketillinn er lóðréttur reykröra ketill, heilsoðinn.
- Hann þolir að afgasið fari í gegnum hann þó að hann sé vatnslaus.





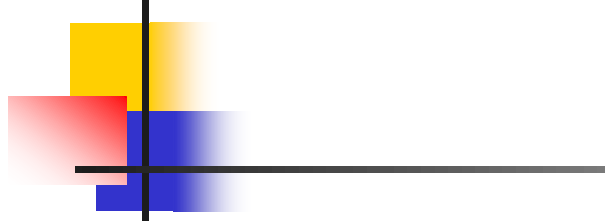
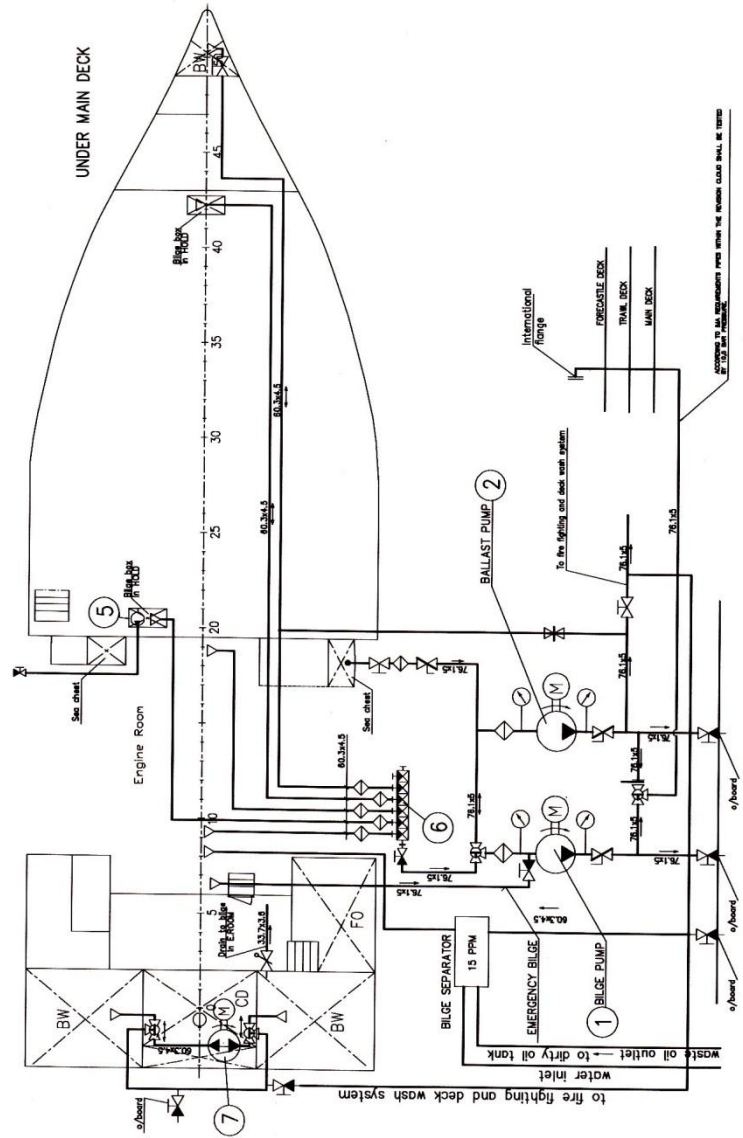
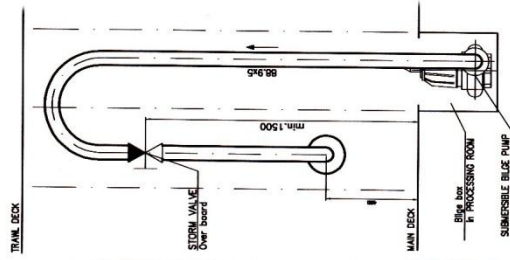
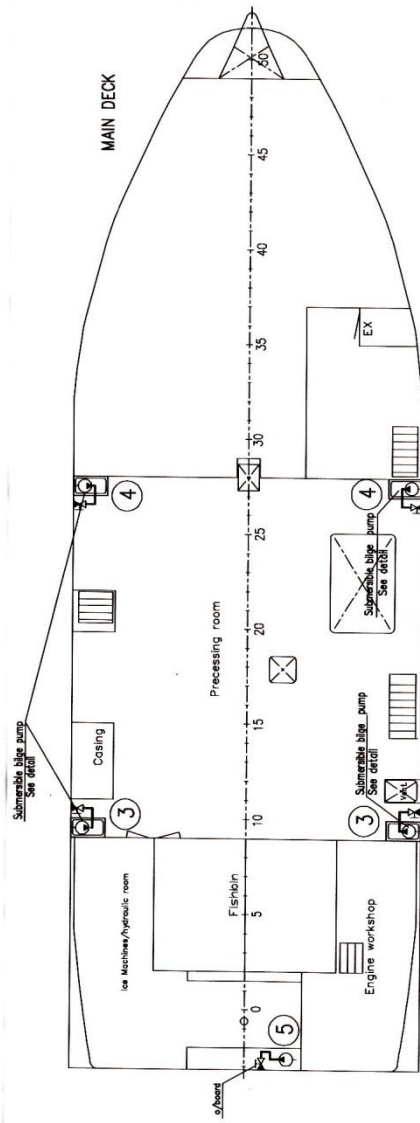
■ Austursía





Það er mikilvægt að:

- sjór fari ekki í eldsneytistanka
- sjór fari eingöngu í tanka fyrir ballest
- dæla ekki eldsneytisolíu fyrir borð
- dæla ekki sjó í settanka
(Millitankar fyrir FO eða HFO)



COMPONENTS

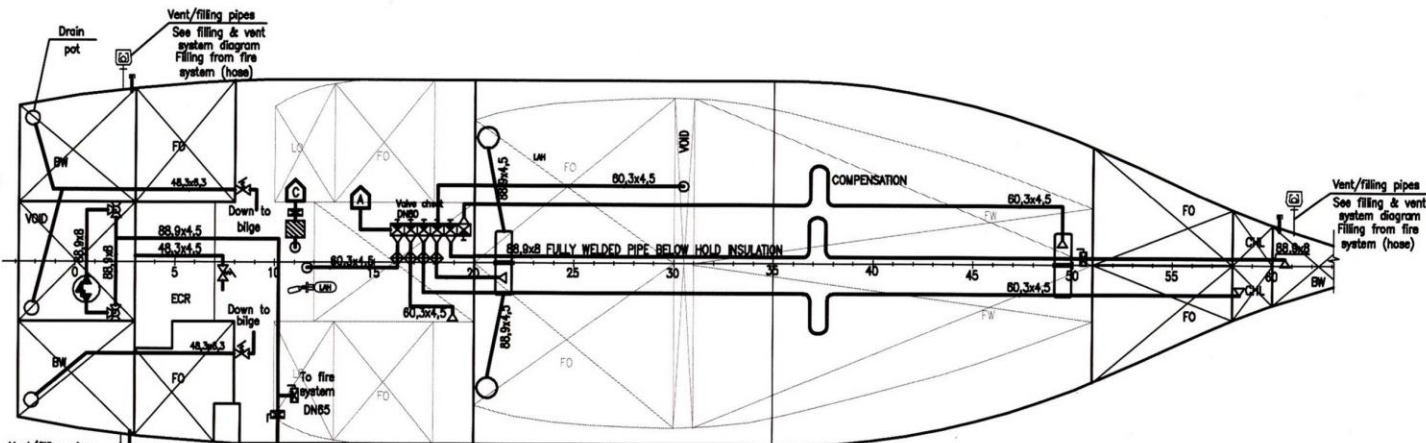
Item	Q-ty	Description	Type	Technical data
1	1	BALLAST / BILGE / FIRE PUMP	Centrifugal with selfpriming unit or impeller type, electric driven	Q=30 m³/h , p=3 bar
2	1	BILGE / BALLAST PUMP	Centrifugal with selfpriming unit or impeller type, electric driven	Q=30 m³/h , p=3 bar
3	1	BILGE WATER SEPARATOR		0,5 m³/h 15 ppm
4	1	HEELING PUMP	Axial flow, reversible electric driven	30 m³/h / 0,5 bar
5	1	EJECTOR		10 m³/h / 1 bar

MATERIALS

PIPING	JOINTS	VALVES
Material	Type	Type
Galvanized seamless steel pipes	Slip on flanges PN16	Cast iron or bronze Butterfly valves with rubber lining
Valves on ship side (sea chest)		Bronze
Discharge	Piping working pressure 3 bar. Piping class II, overboard pipes class II. Piping test pressure: 4,5 bar	
Suction	Piping working pressure 1 bar. Piping class II, overboard pipes class II. Piping test pressure: in action	

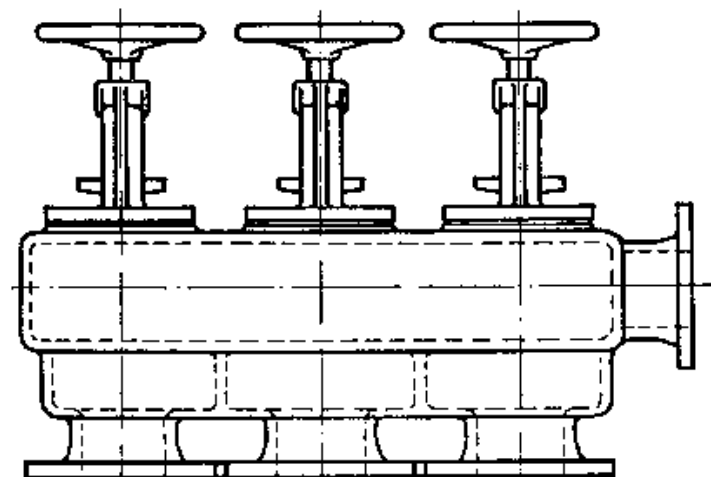
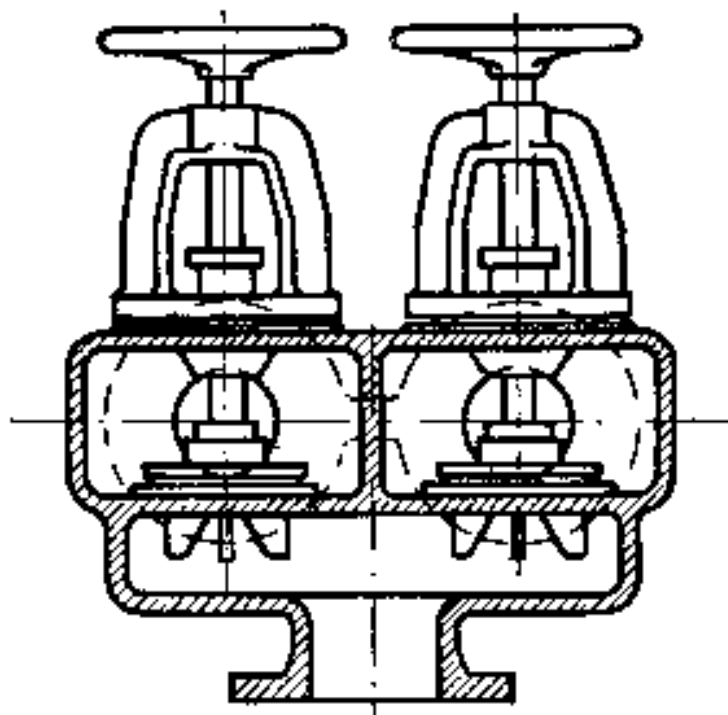
CALCULATIONS

- Internal diameter of bilge main shall not be less than:
 $d_i = 1,88 \sqrt{(B+D)} + 25 = 1,88 \sqrt{42(11+4,7)} + 25 = 68 \text{ (70) mm}$
- Internal diameter (in mm) of bilge branch shall not be less than:
 $d_b = 2,15 \sqrt{(B+D)} + 25 = 2,15 \sqrt{18,6(11+4,7)} + 25 = 62 \text{ (hold)}$
 $d_b = 2,15 \sqrt{(B+D)} + 25 = 2,15 \sqrt{5,1(11+4,7)} + 25 = 44 \text{ (eng. room)}$
 But not less than 50mm
- Internal diameter of ballast branch shall not be less than:
 $d_b = 18 \sqrt[3]{V} = 18 \sqrt[3]{42} = 63 \text{ mm}$
 Where $V=42 \text{ m}^3$ - volume of the biggest ballast tank.
- Pump capacity not less than:
 $Q = 0,00575 d_i^3 = 0,00575 \times 70^3 = 28,18 \text{ m}^3/\text{h} \text{ (470 l/min)}$
- Flow velocity in pipes for pump 30 m³/h (500 l/min):
 Main 88,9x4,5: C = 1,7 m/s, Branches 76,1x4,5: C = 2,4 m/s

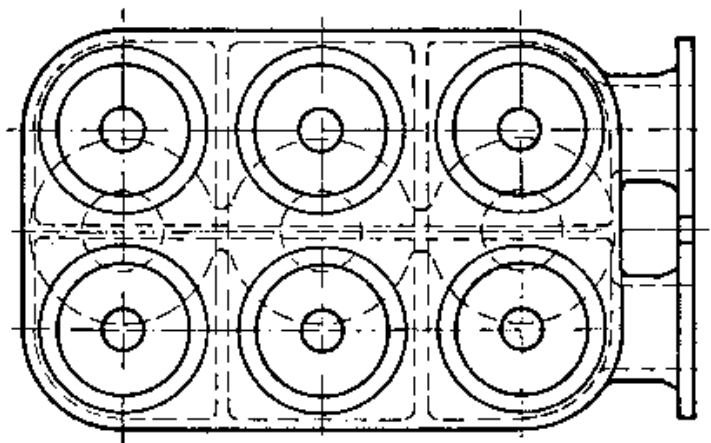


Austurkista

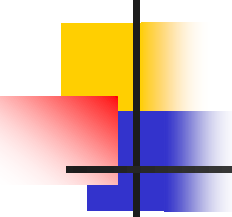
- Austurlokar, séð frá hlið og ofan frá



1a



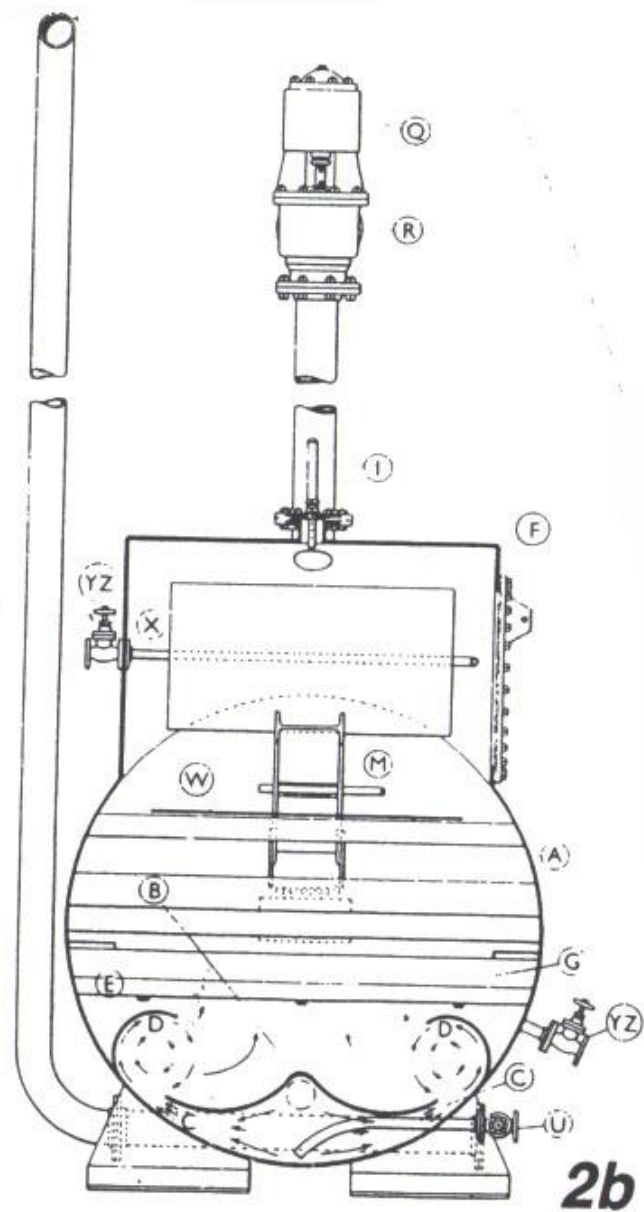
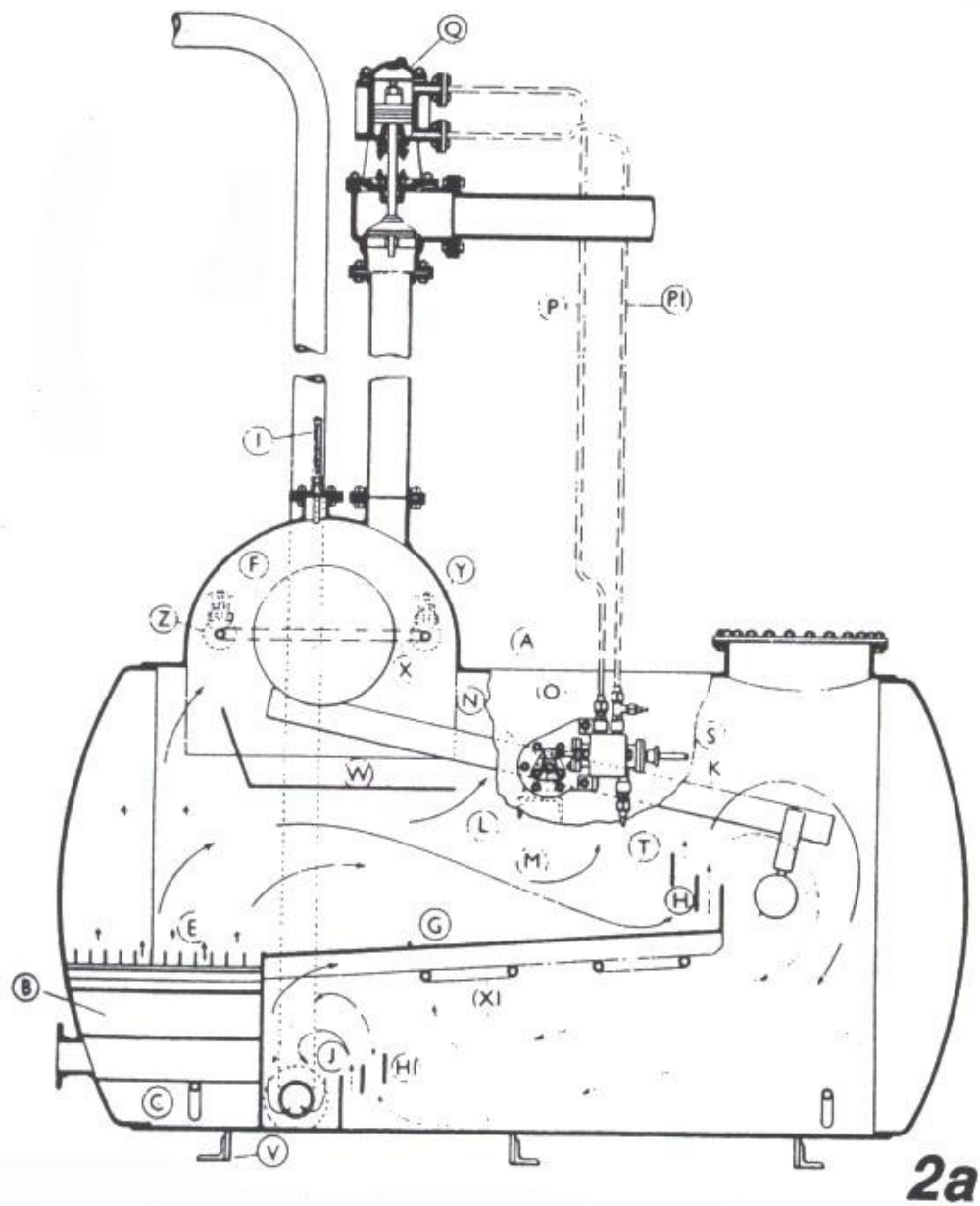
1b



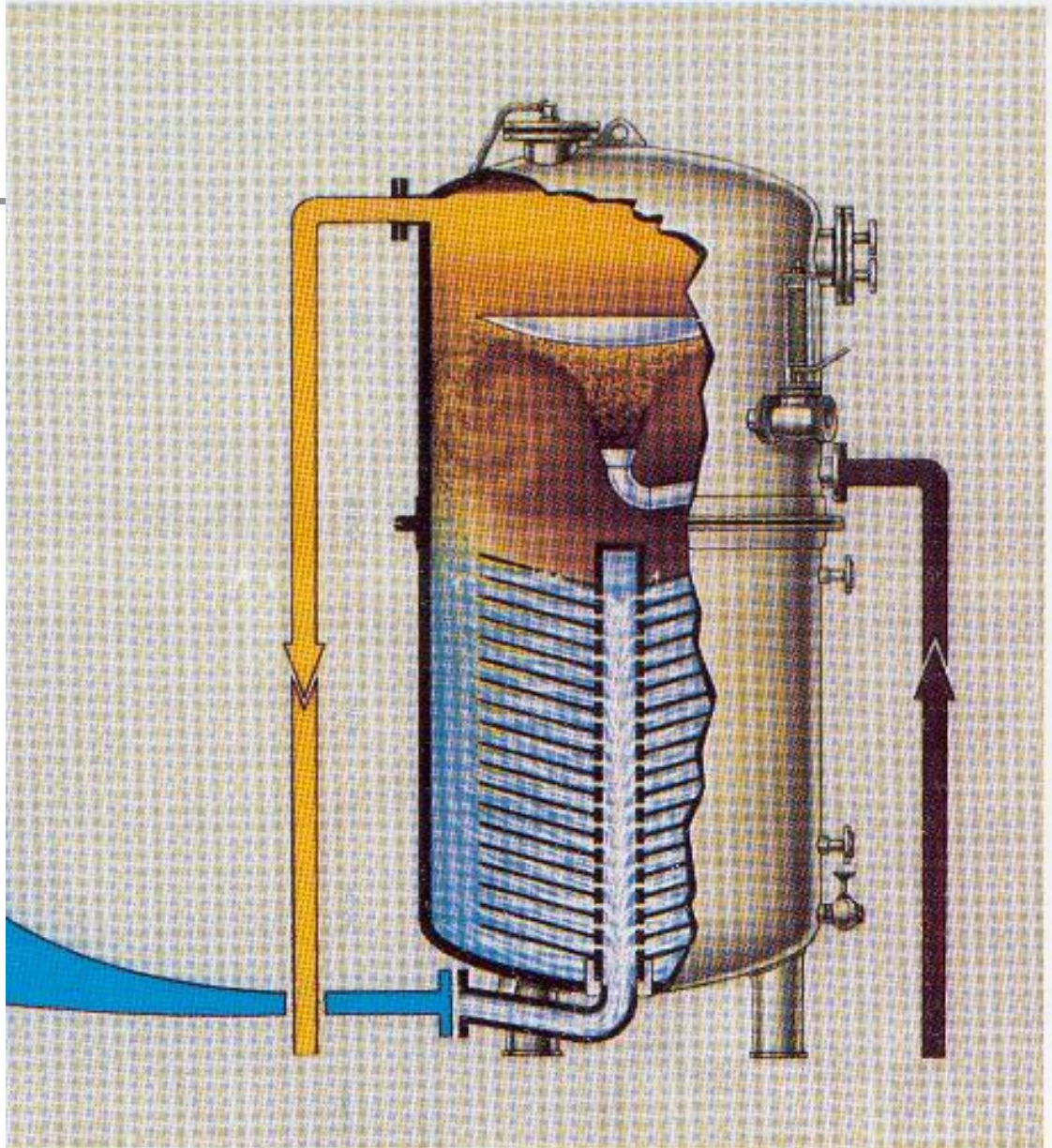
Skylda vélstjórans

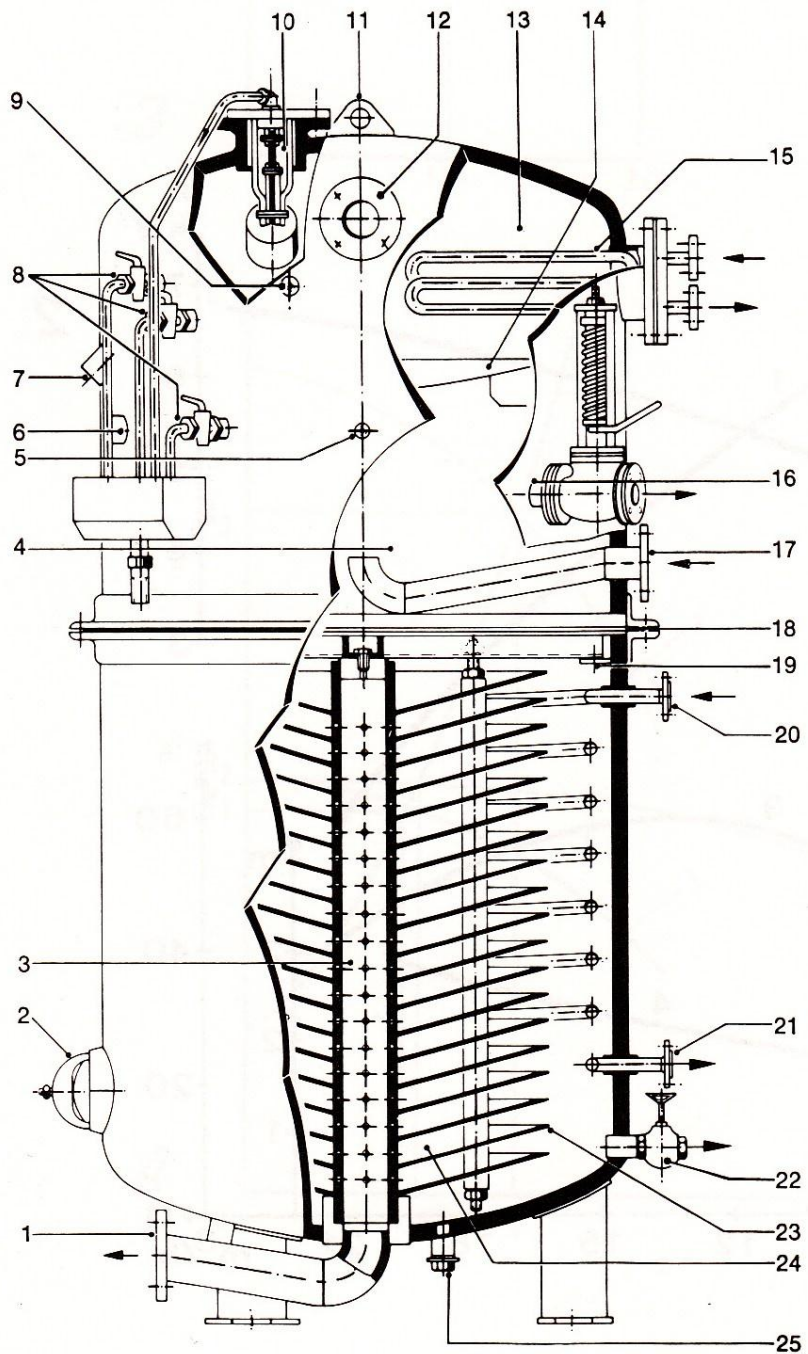
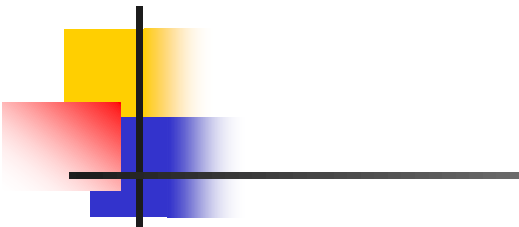
- Það er skylda vélstjórans að sjá til þess að hafið mengist ekki af olíu frá skipi hans.

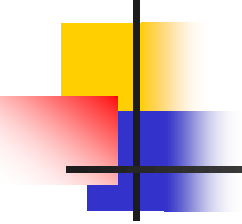
Á mörgum hafsvæðum er refsivert að dæla olíumenguðum sjó fyrir borð. Það er óábyrgt að dæla olíumenguðu austri fyrir borð og verður brátt bannað alls staðar.



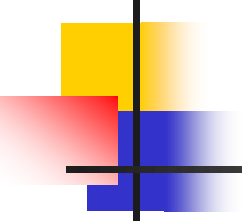
- Austurskilja



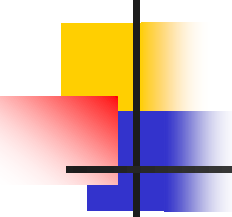


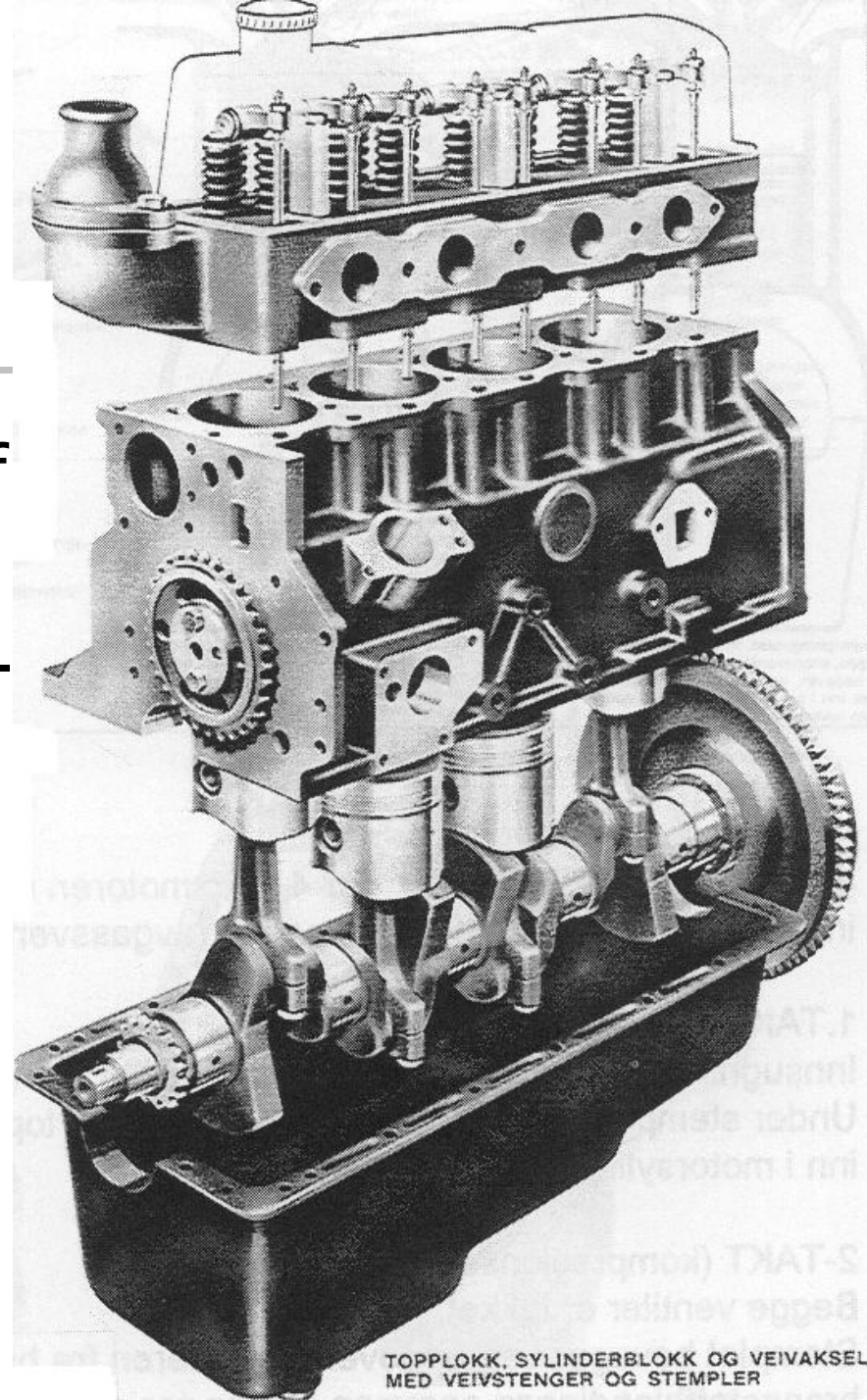
- 
- Þessi er stór



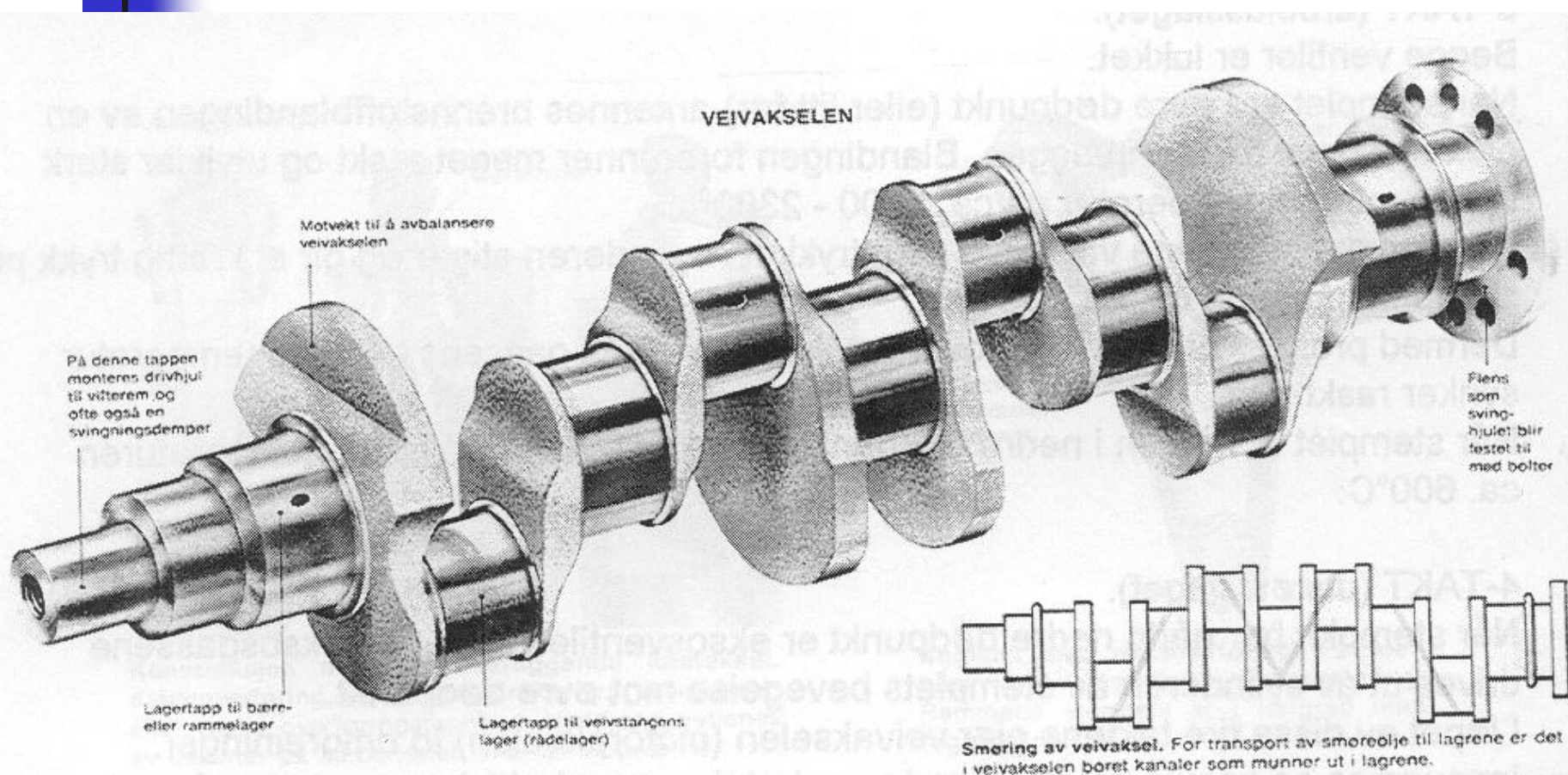
- 
- Kallinn sem þrífur
 - Hvað gera hinir?



- 
- Þetta er bensínvél af eldri gerð
 - Þarna eru undirlyftustangir
 - Kambás er keðju-drifinn
 - Ath. hvar kveikjan kæmi og bensíndælan

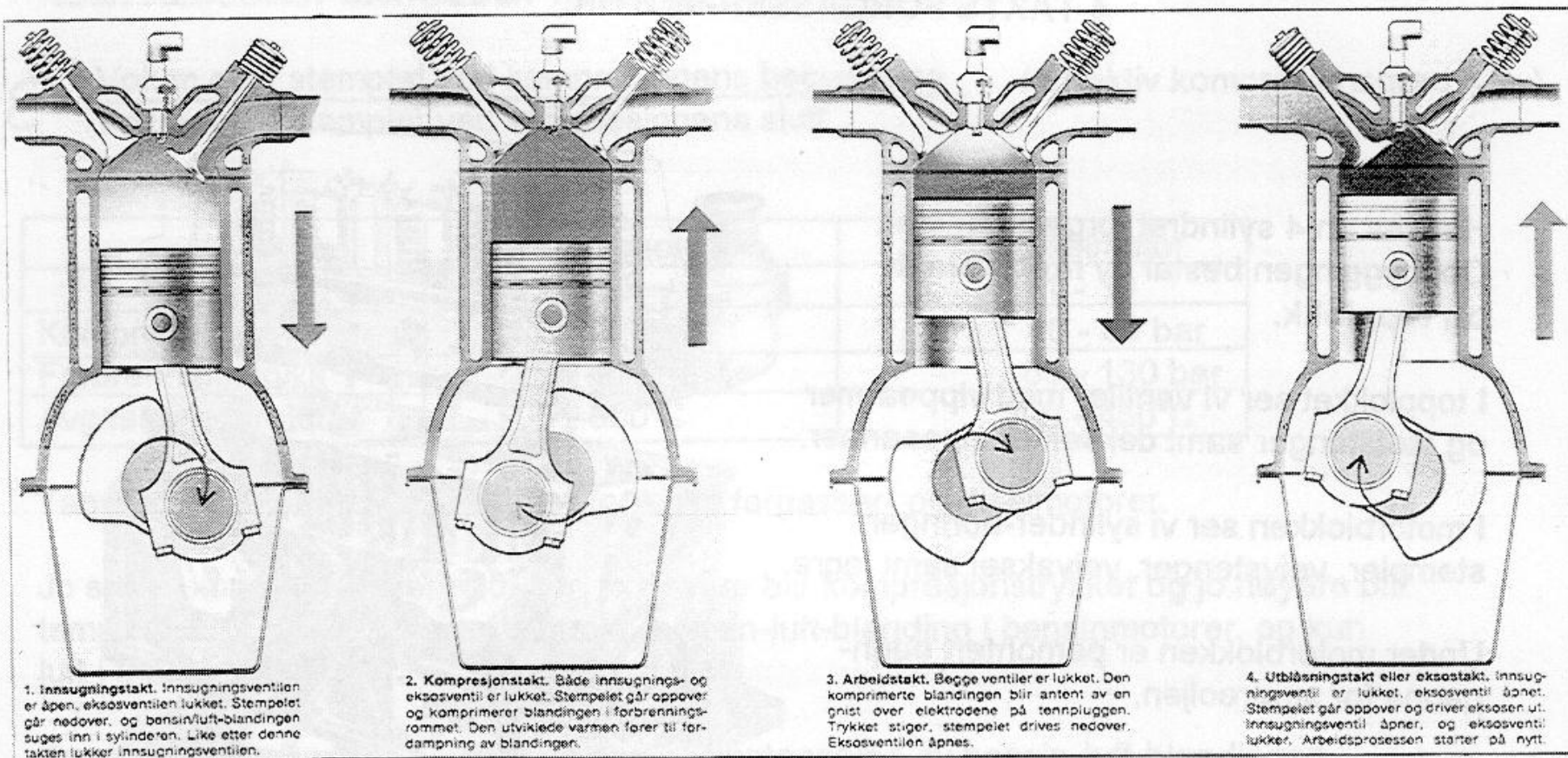


Sveifarásinn



Fjórangis bensínvél

4-TAKTS FORGASSERMOTOR.

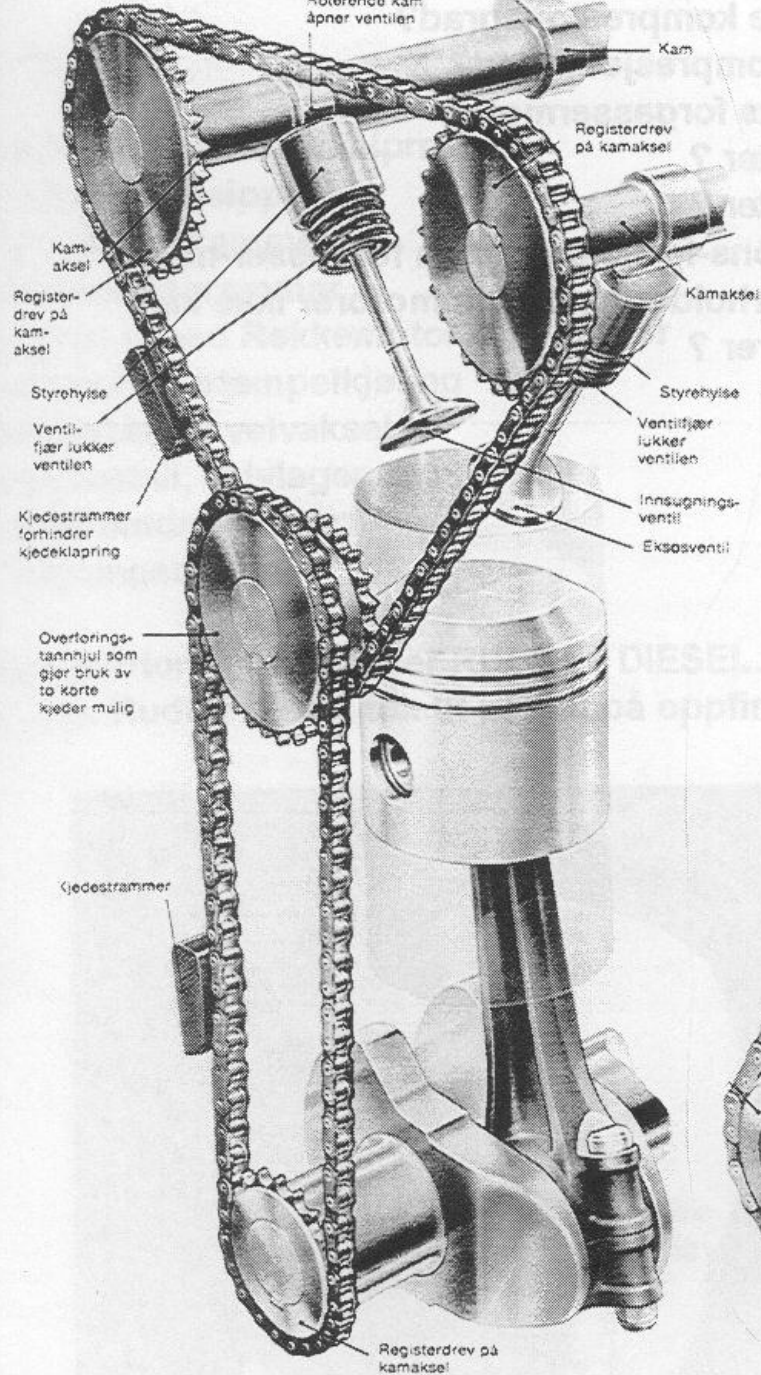


1. TAKT

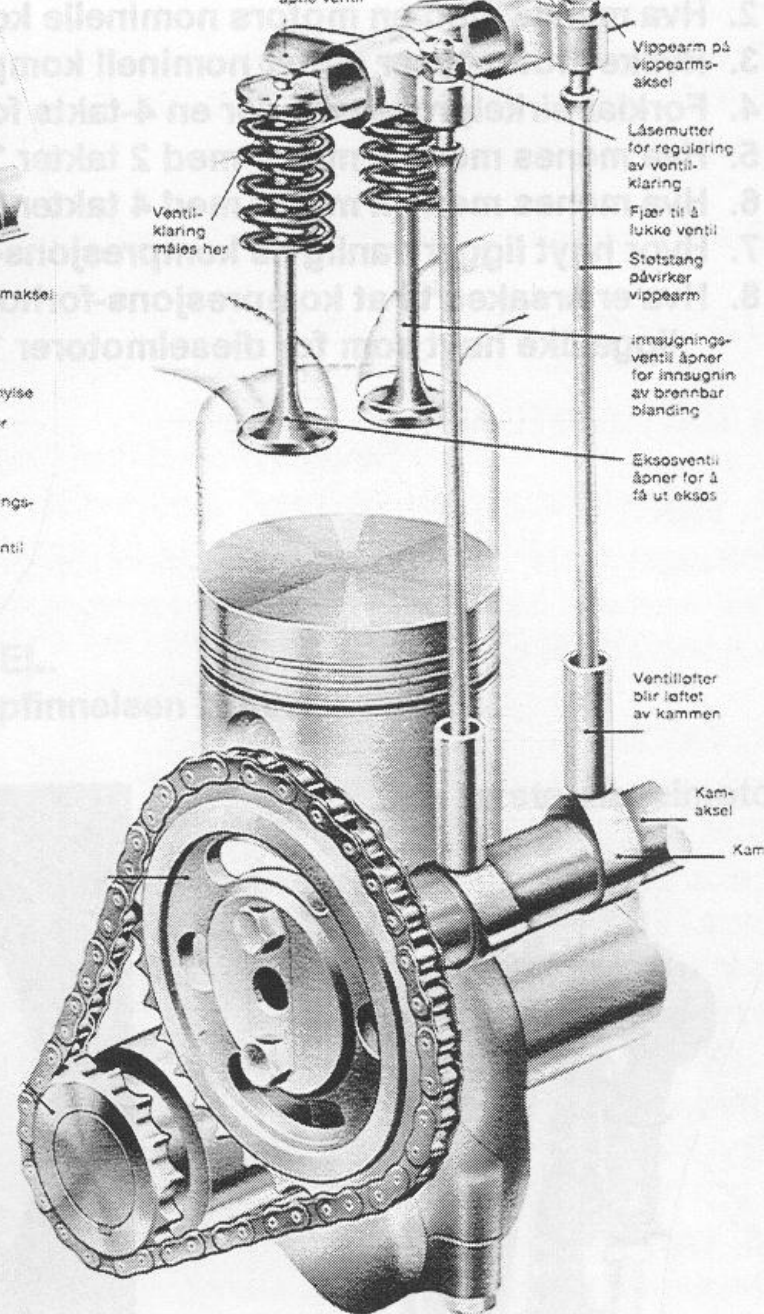
2. TAKT

3. TAKT

4. TAKT

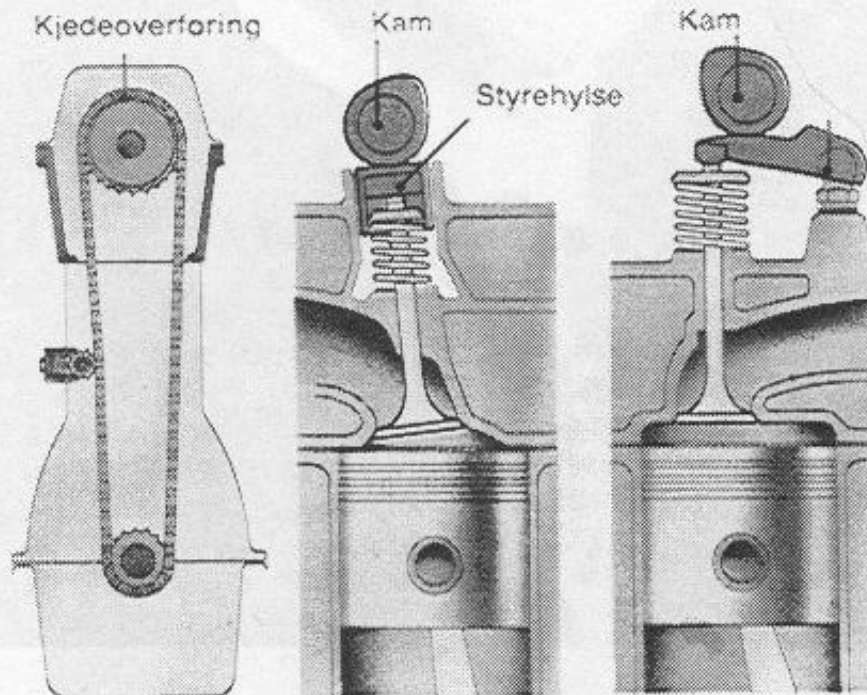


OVERLIGGENDE KAMAKSEL MED KJEDEOVERFØRING

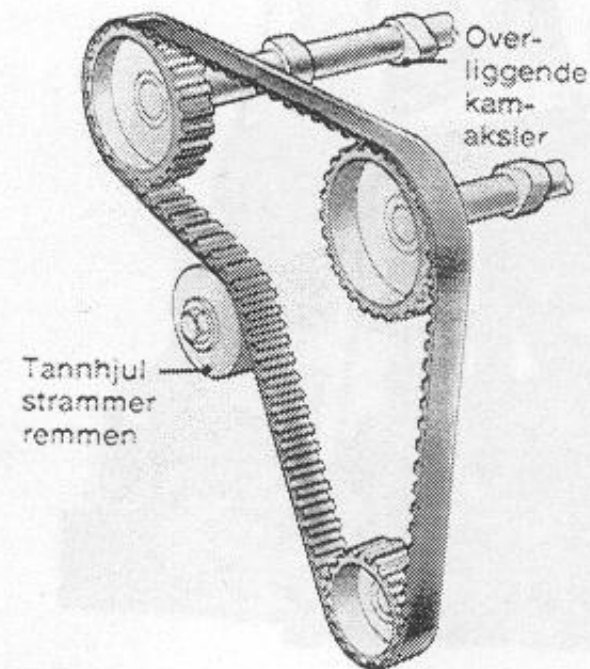


VENTILSYSTEM MED STØTSTENGER

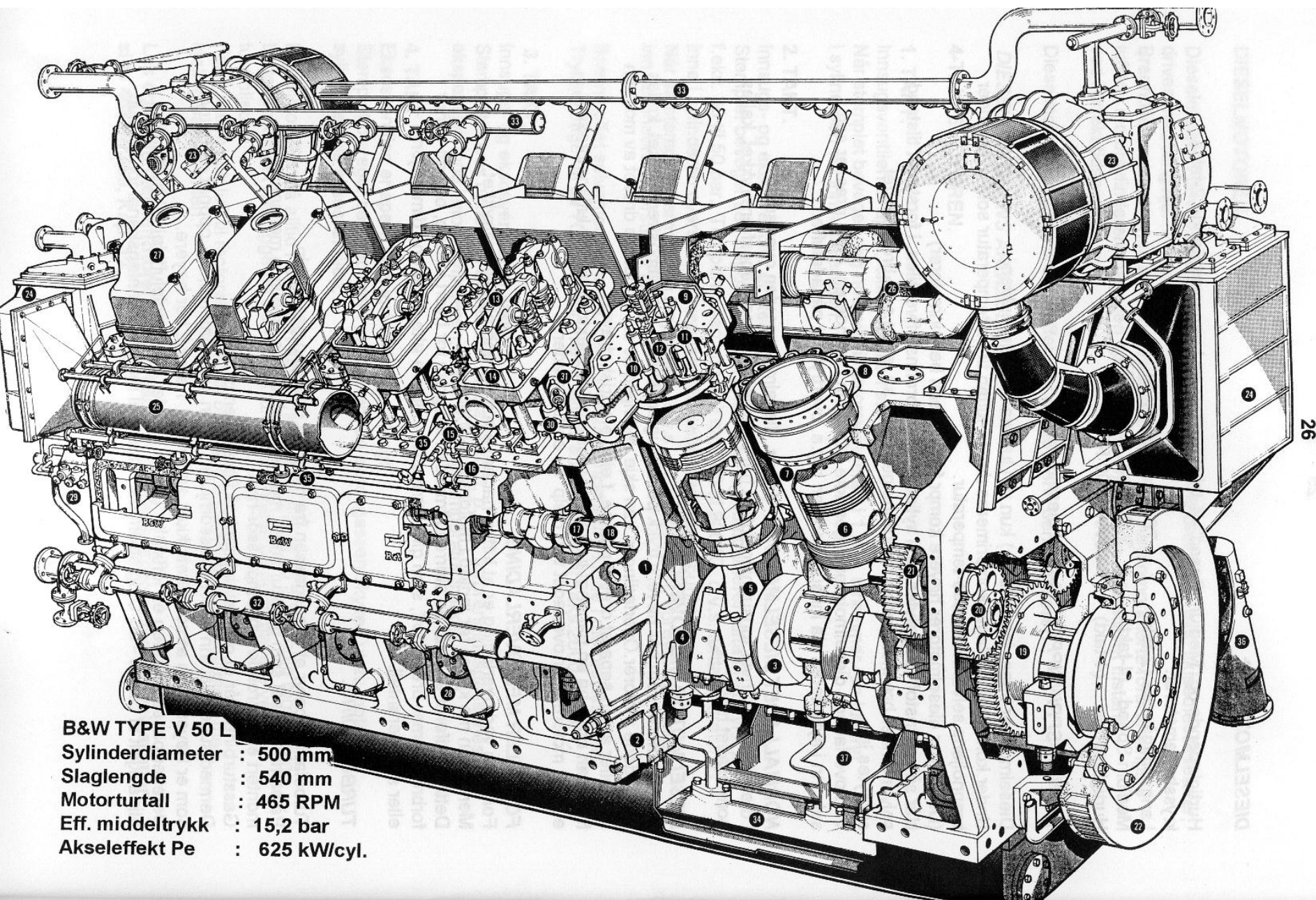
Nútíminn

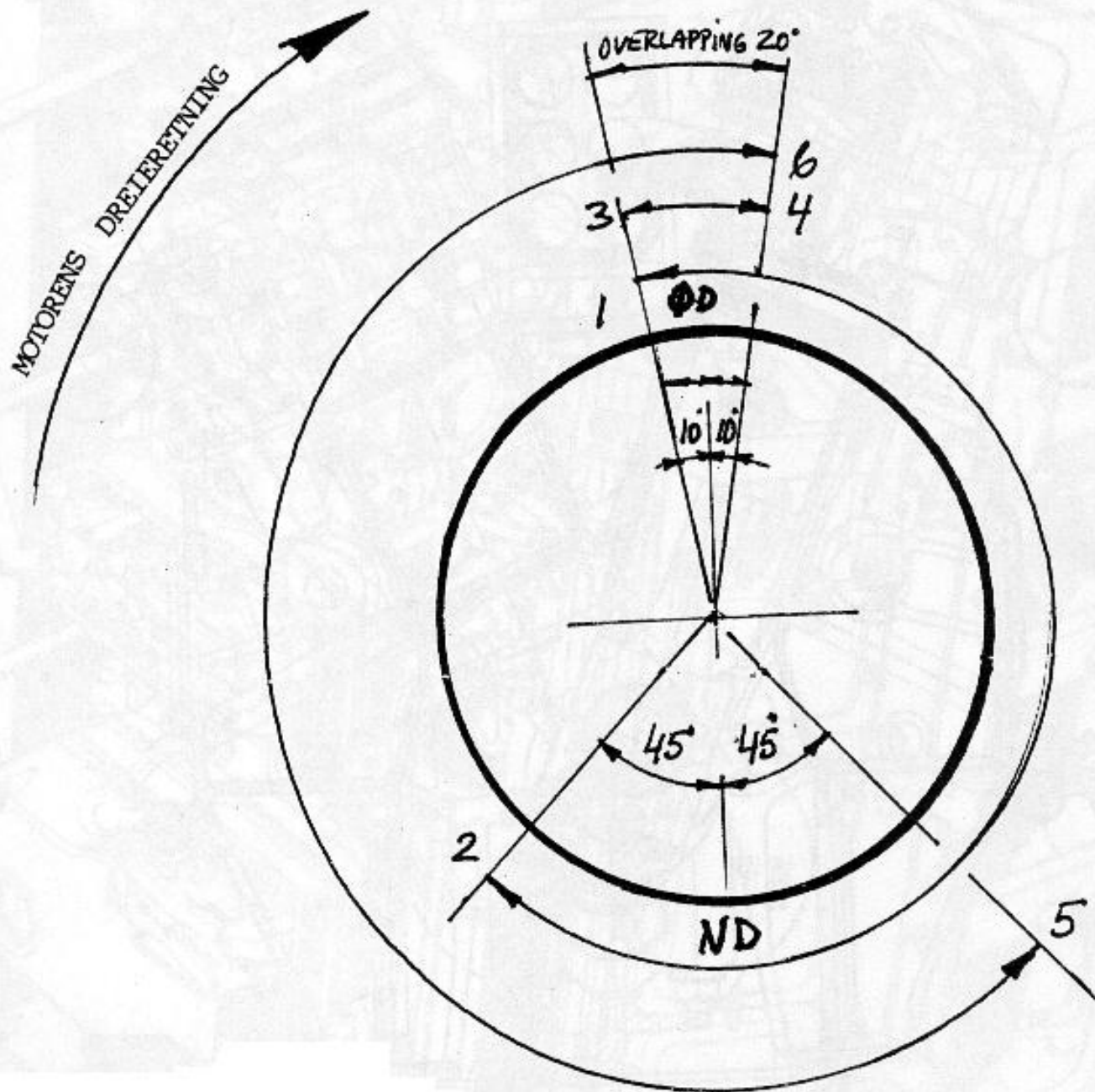


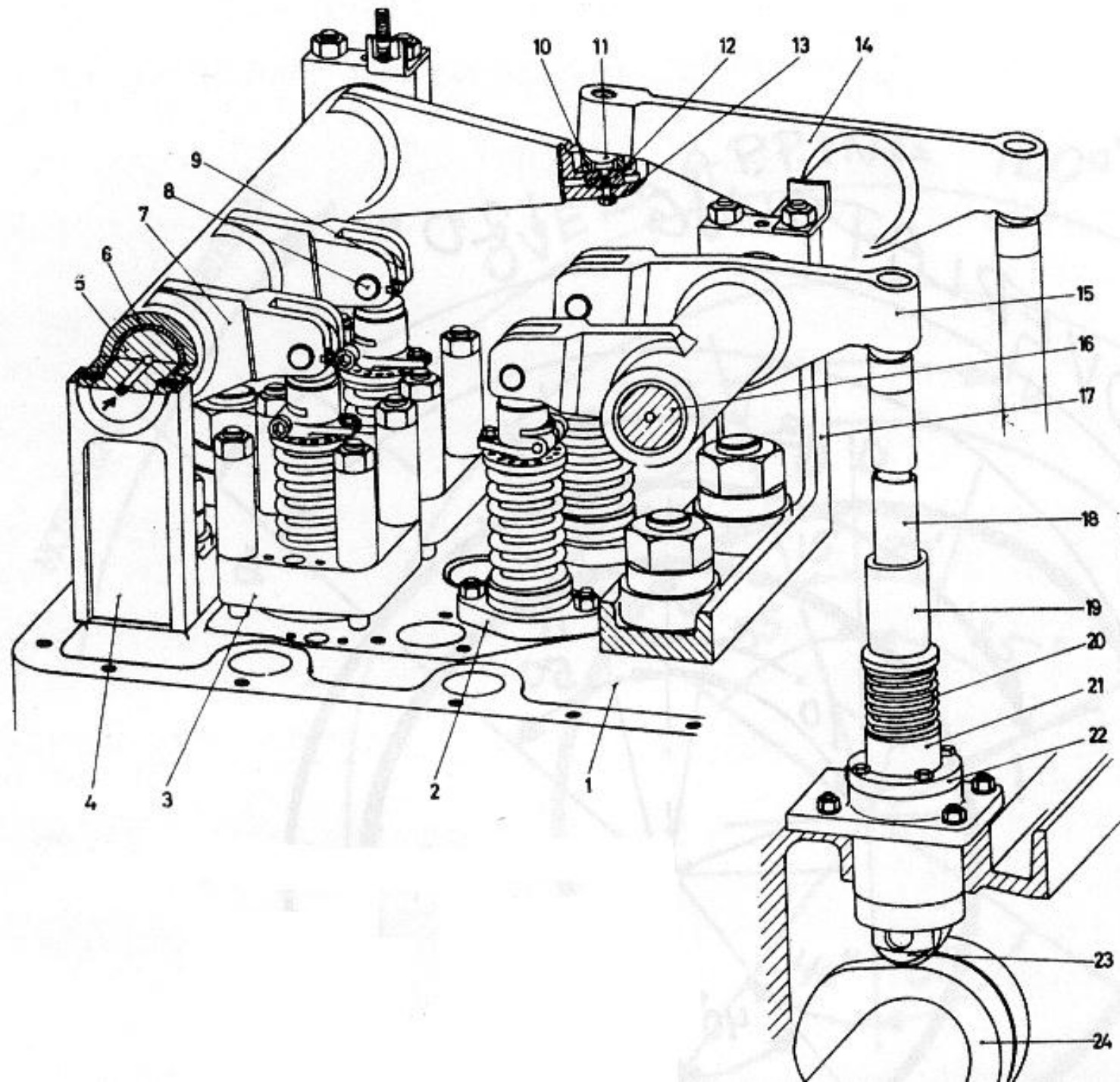
Konstruksjon med en overliggende kamaksel. Kjedeoverføring kan være direkte fra veivakselen eller via et overføringstannhjul. Ventilene betjenes av kammer på kamakselen eller av vippearmer.

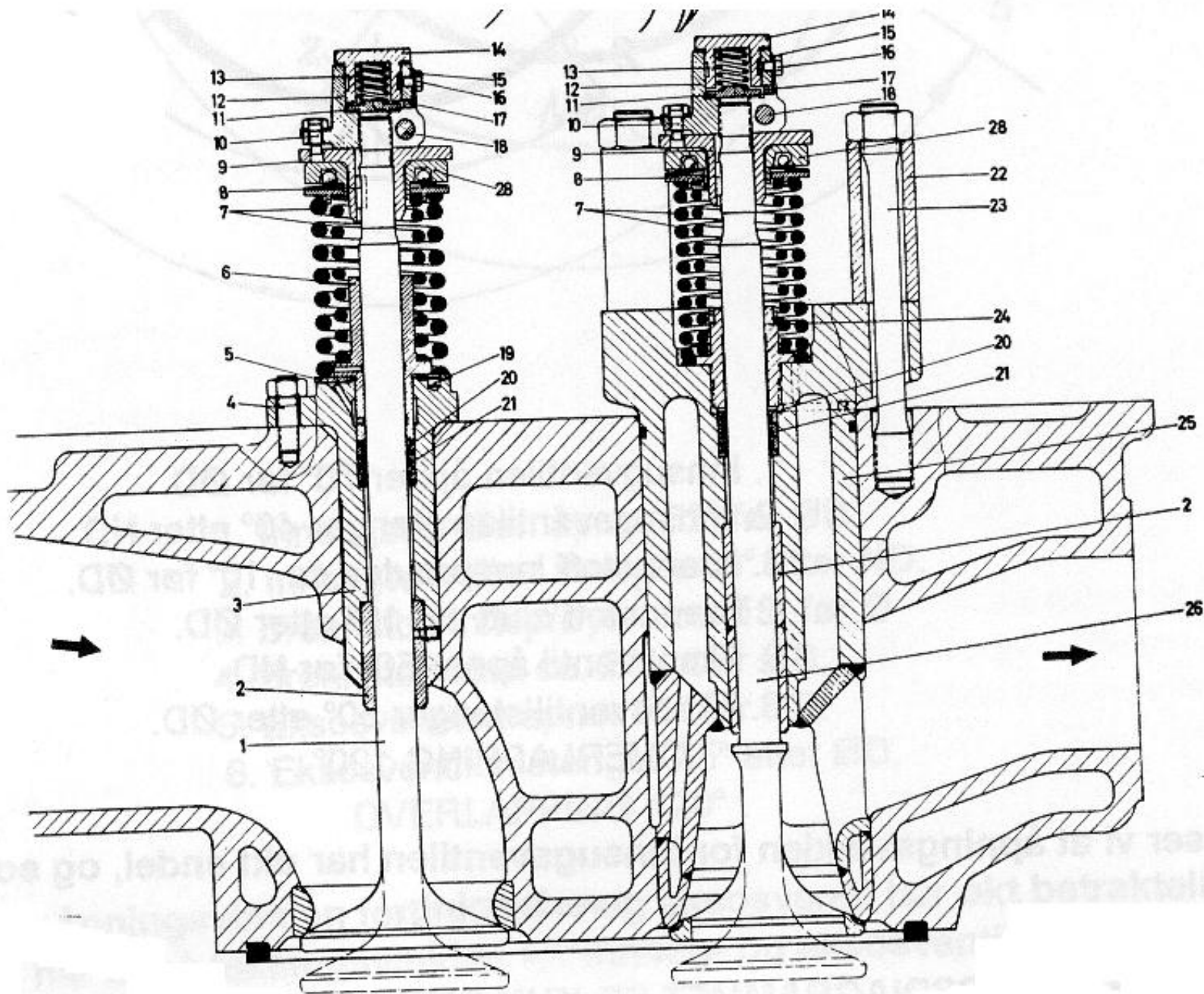


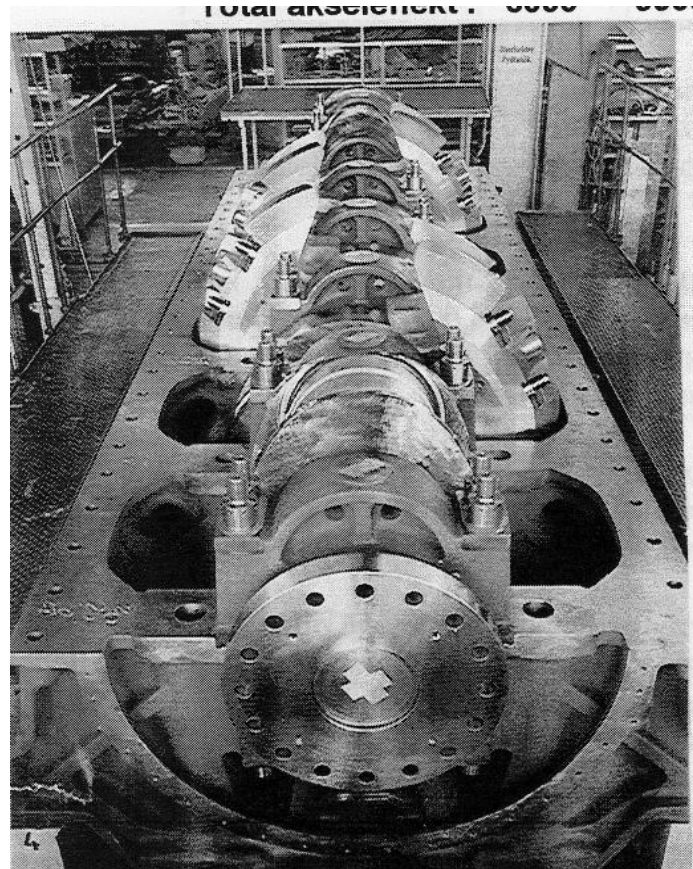
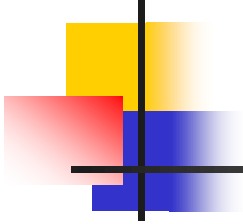
Register med removerføring. På noen biler har registeret removerføring. Remmens «tenner» er i inngrep med registerdrevene.

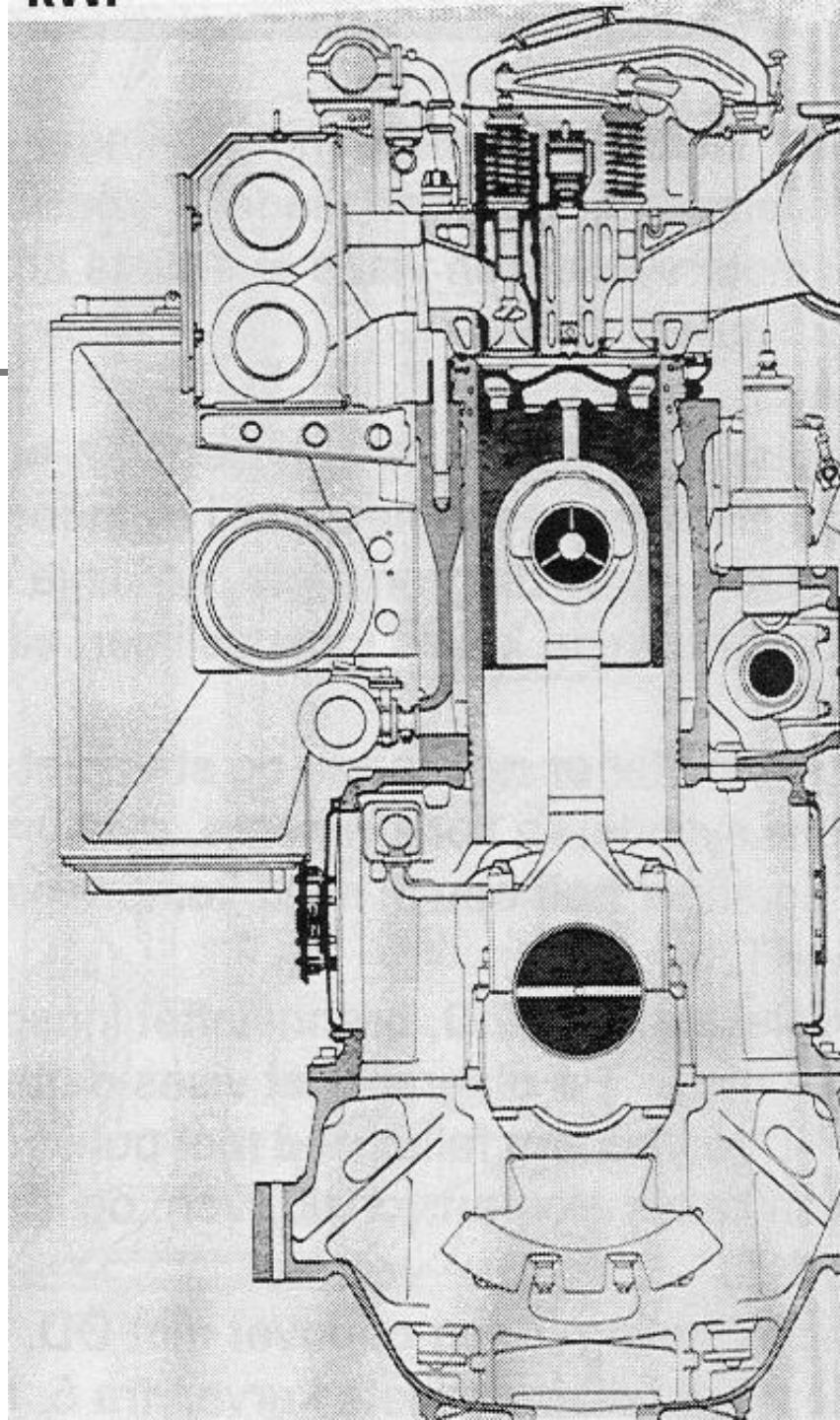




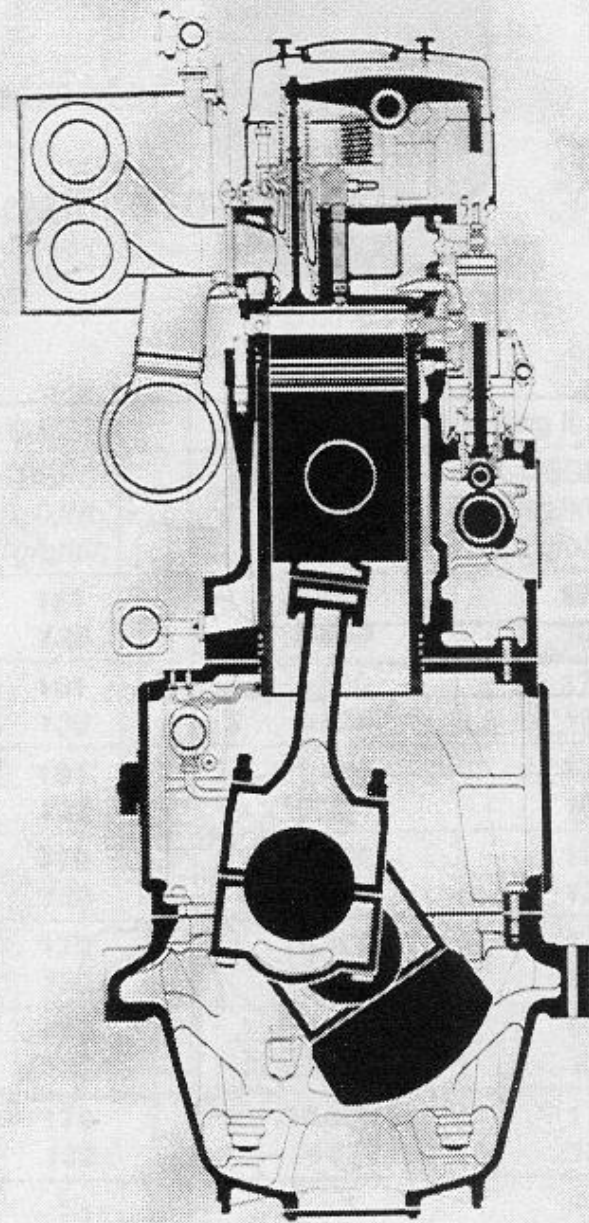
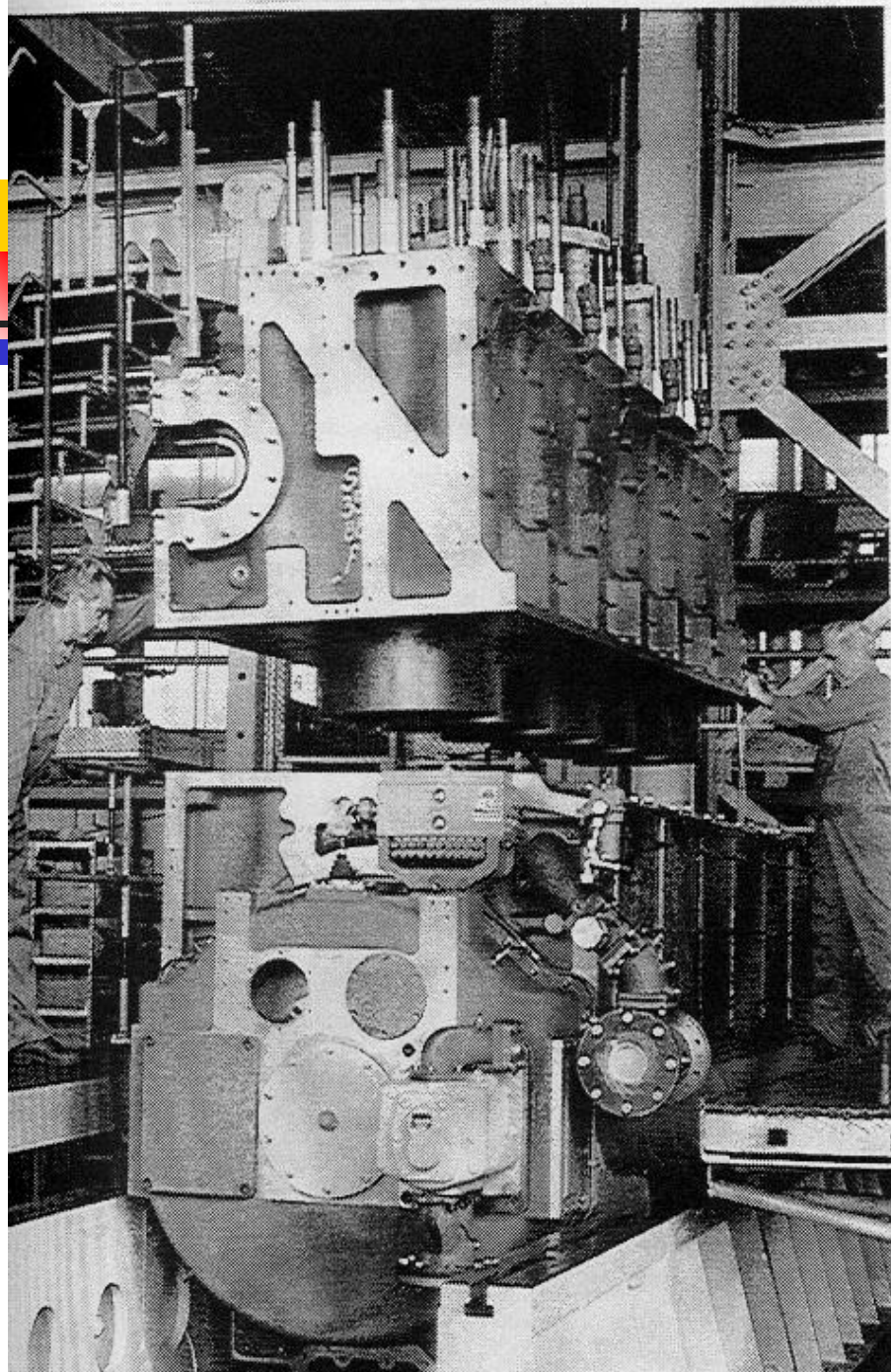




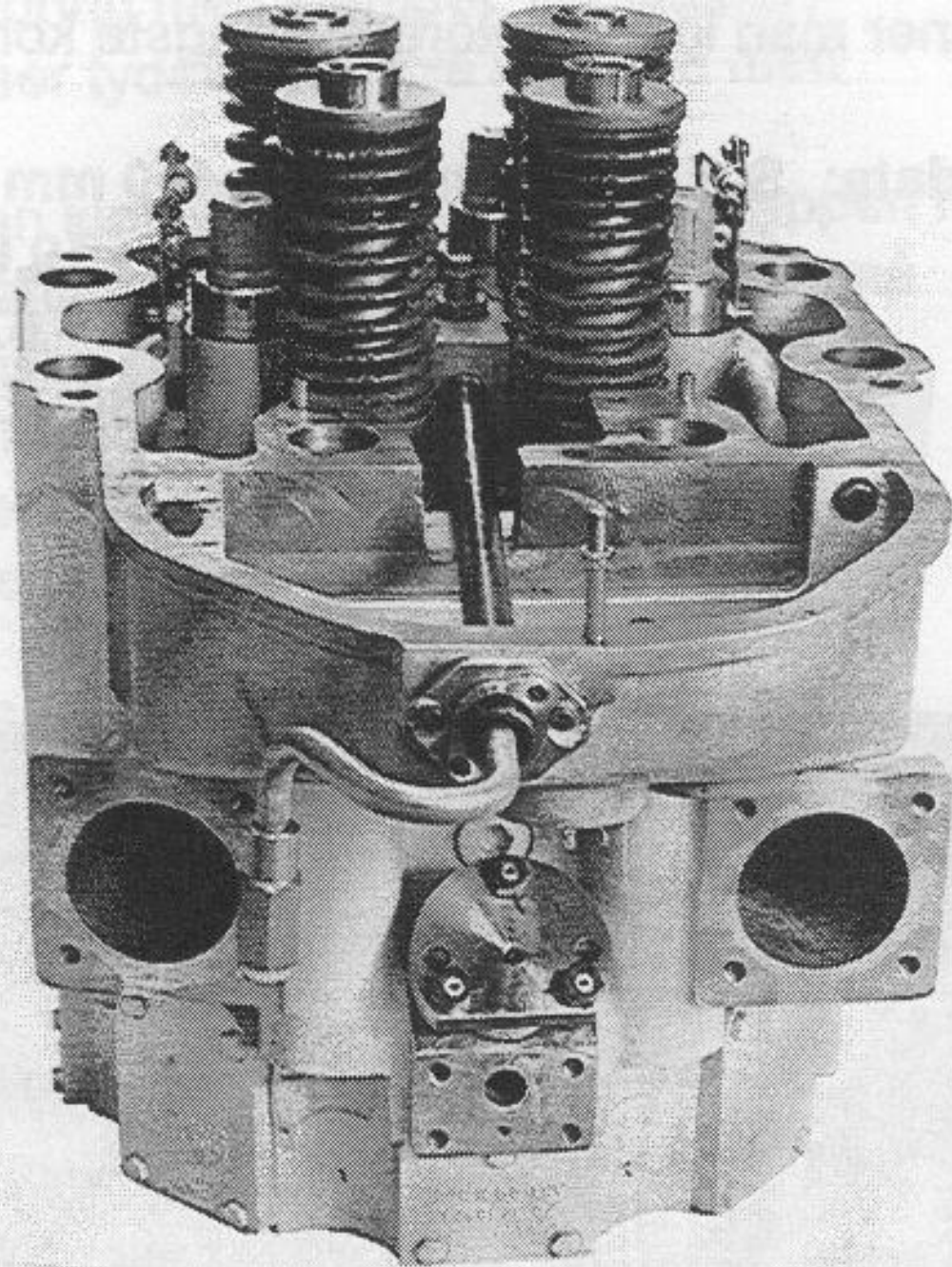
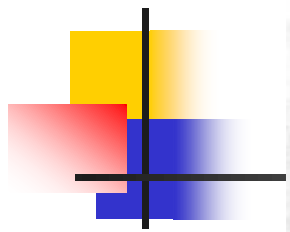




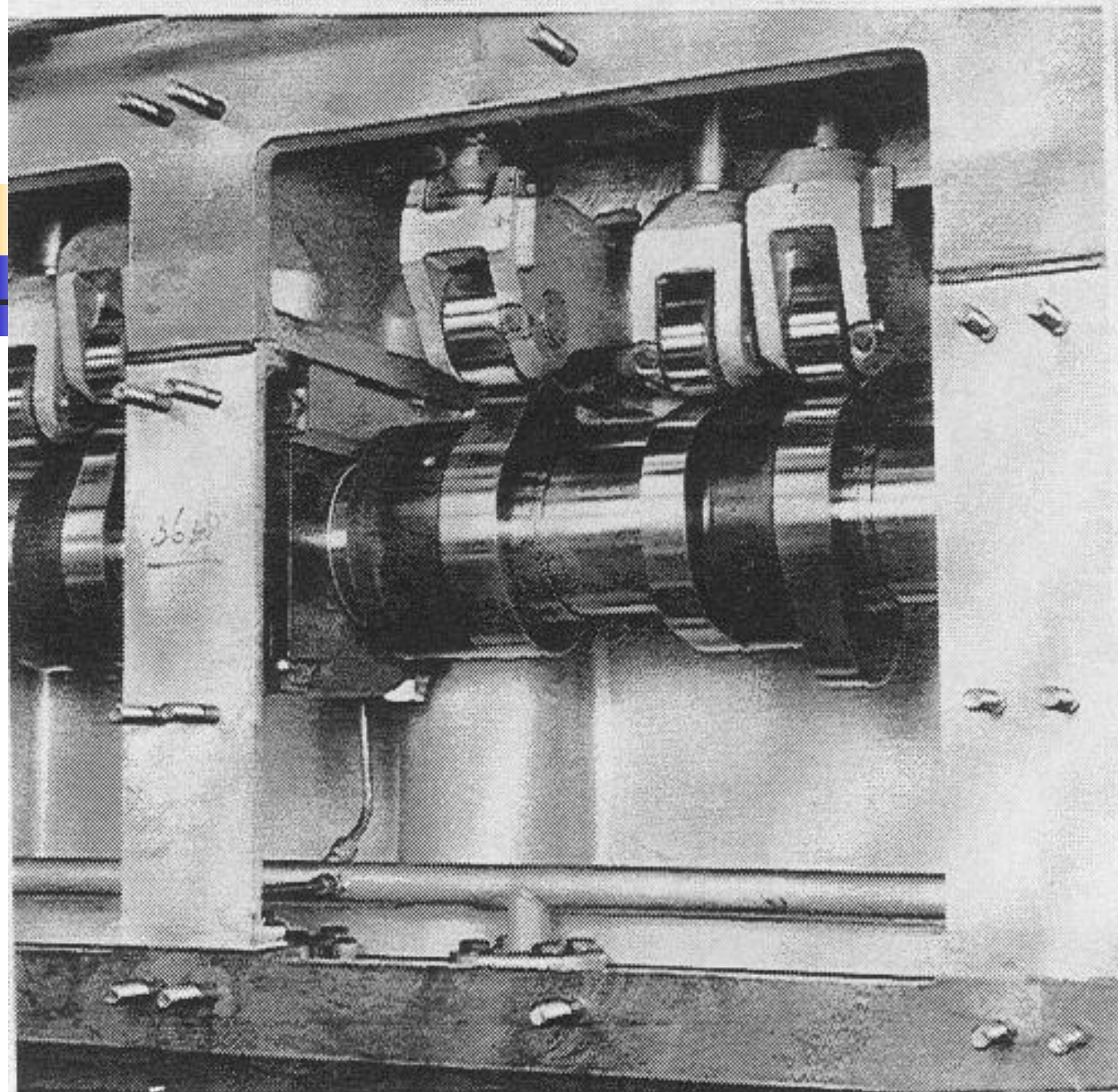
G.Einarsson

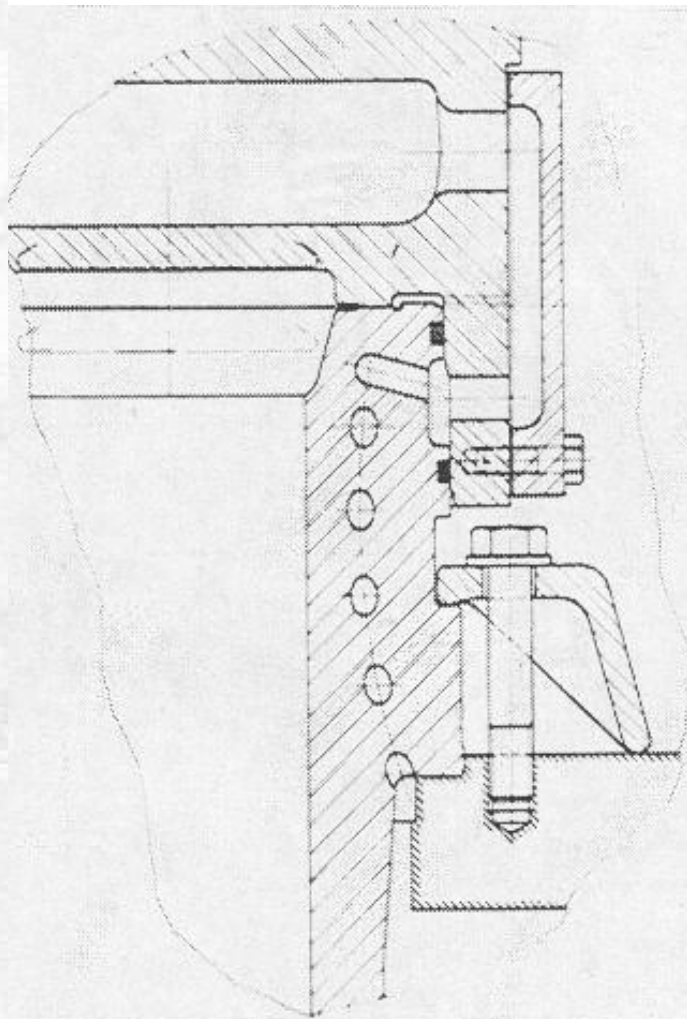
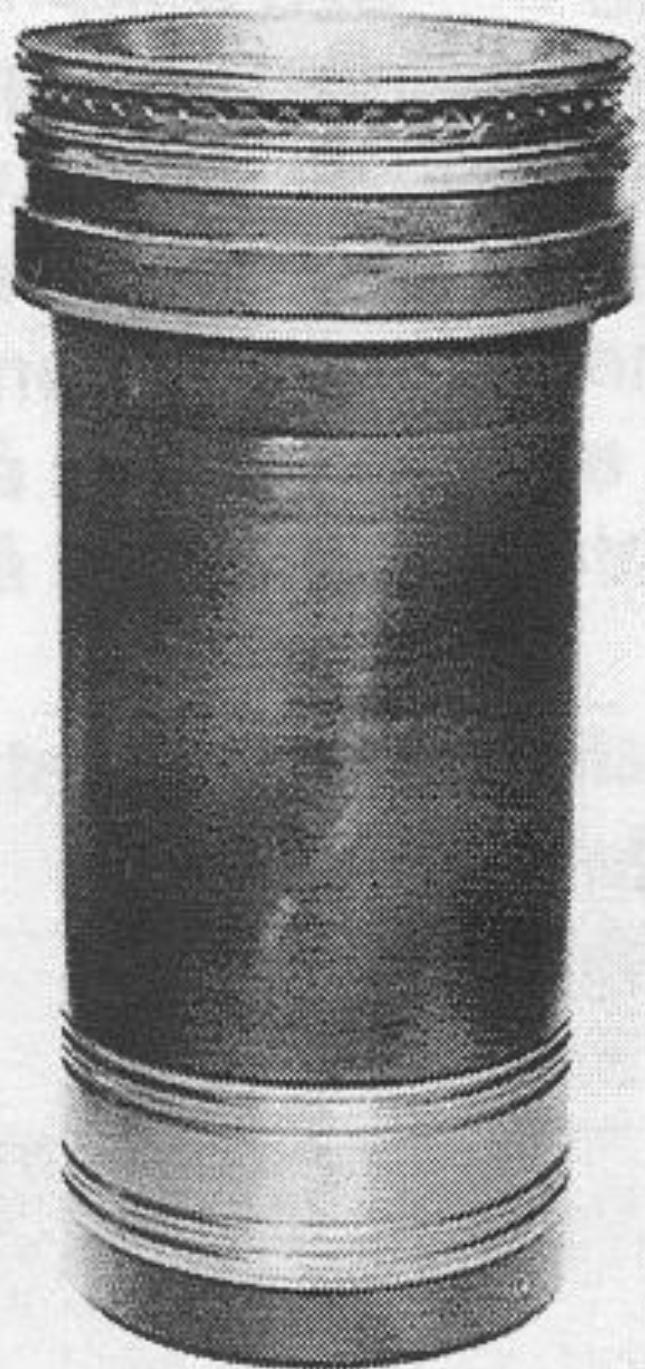


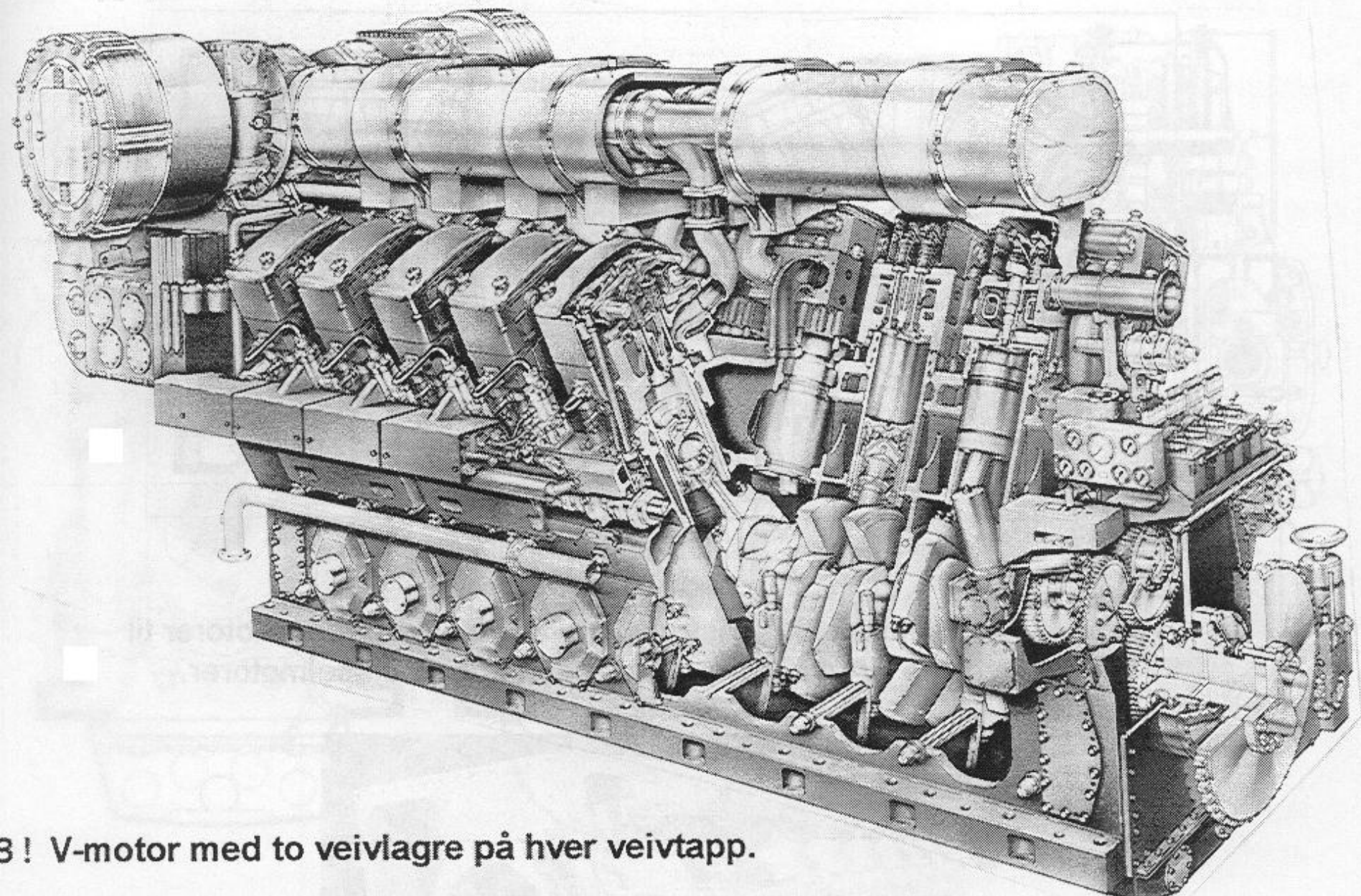
Cross-section of M 552 C



G.I

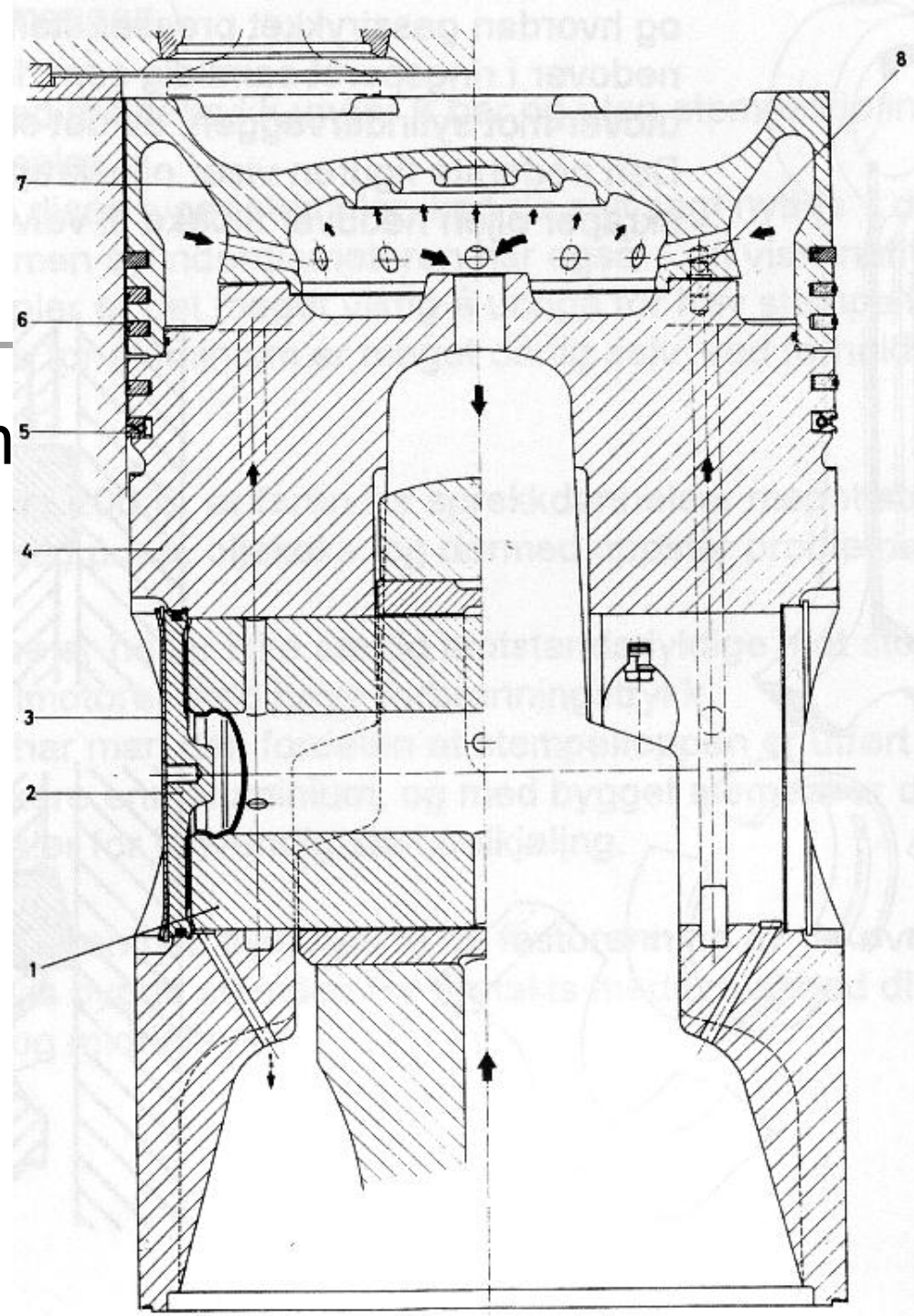




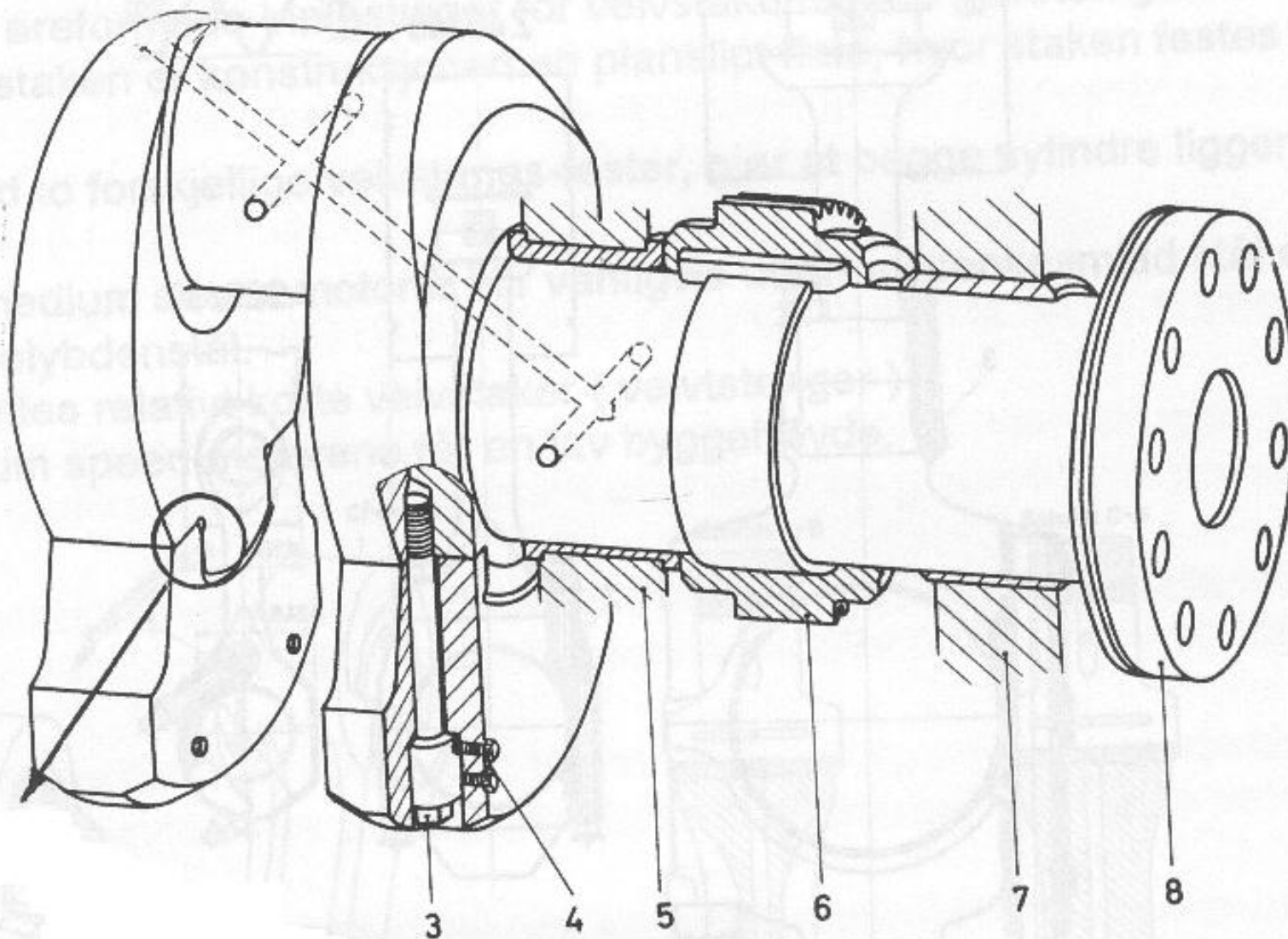


3 ! V-motor med to veivlagre på hver veivtapp.

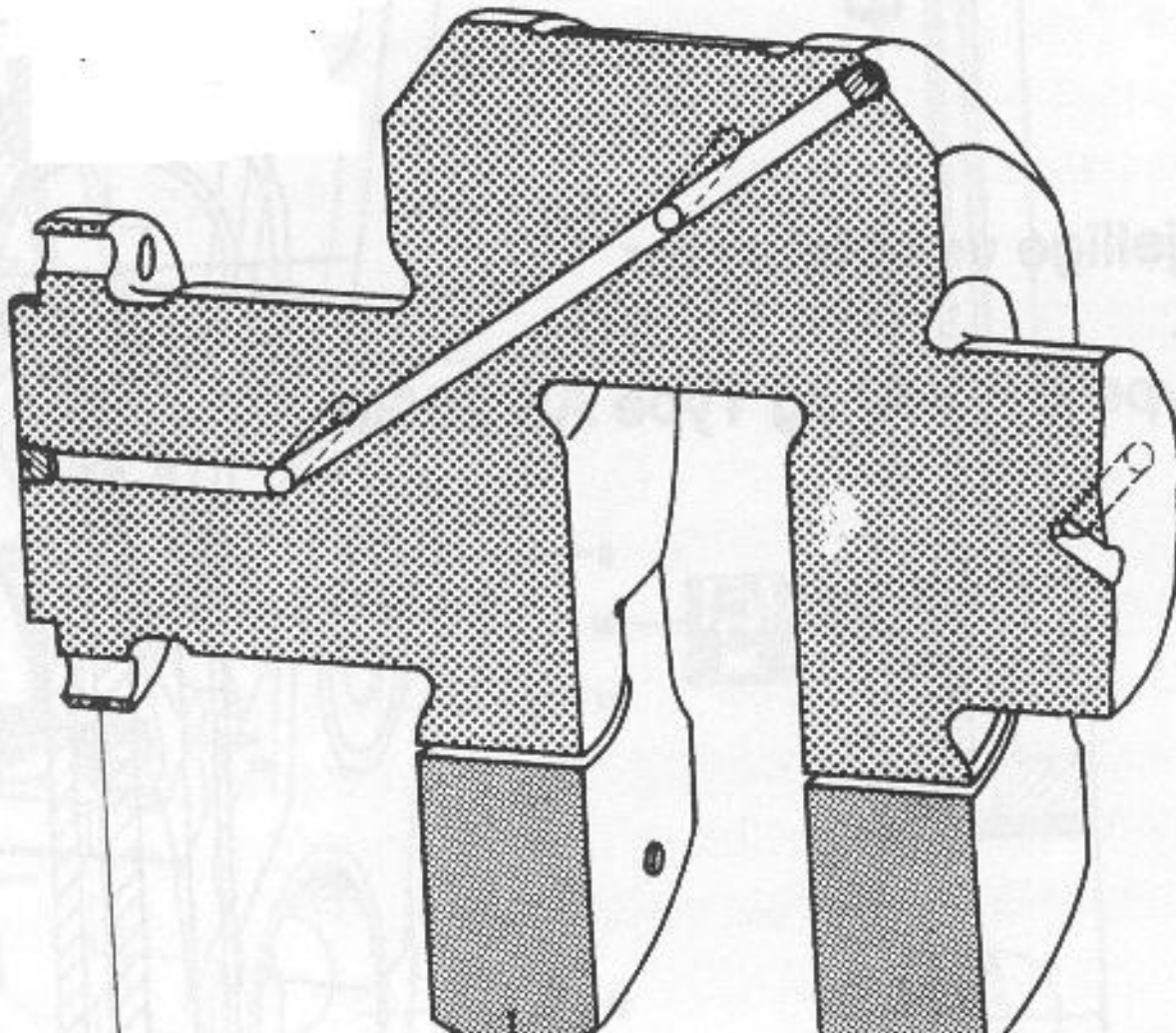
- Stimpilkæling m smurolíu



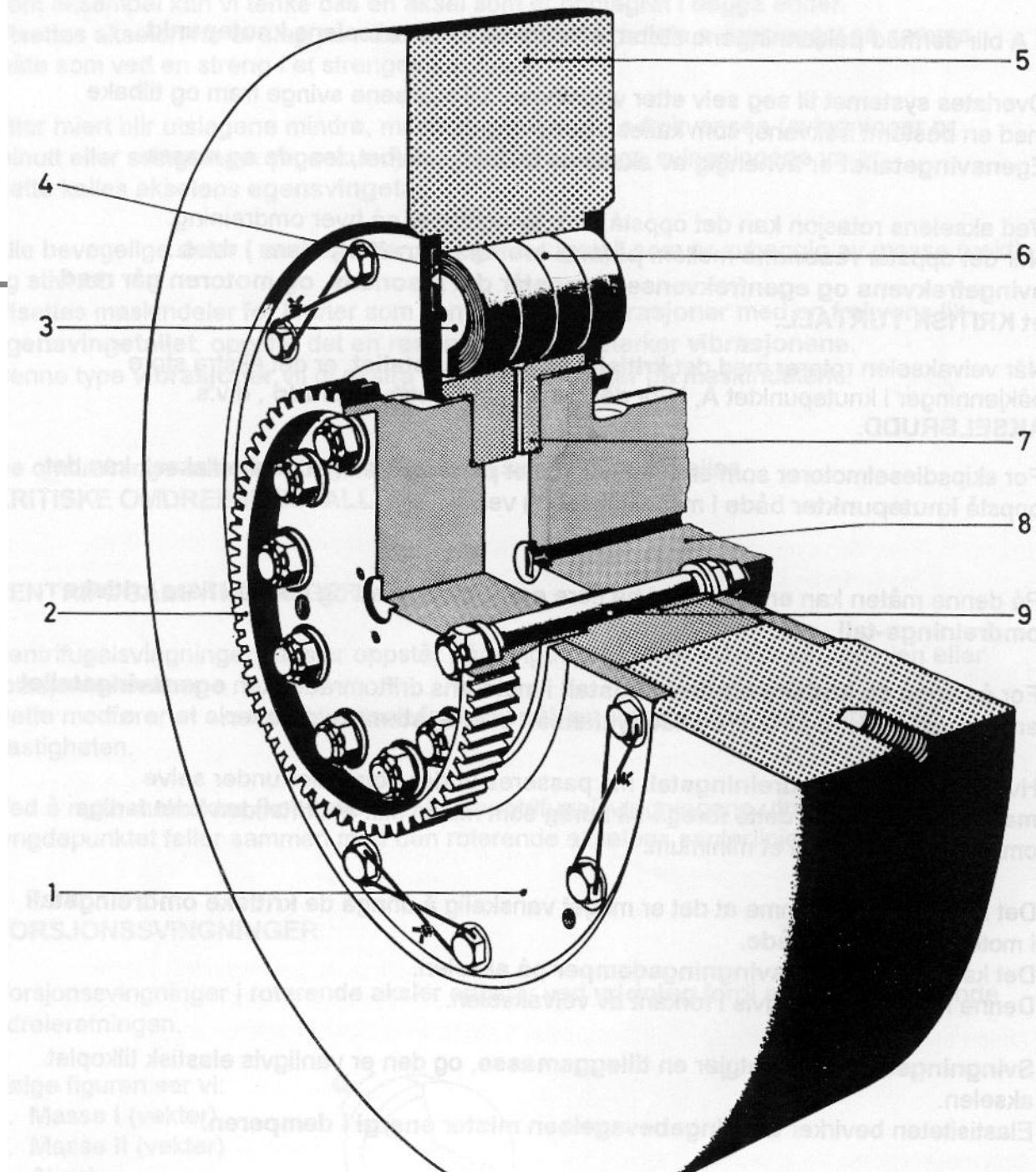
Sveifarác na emirolían

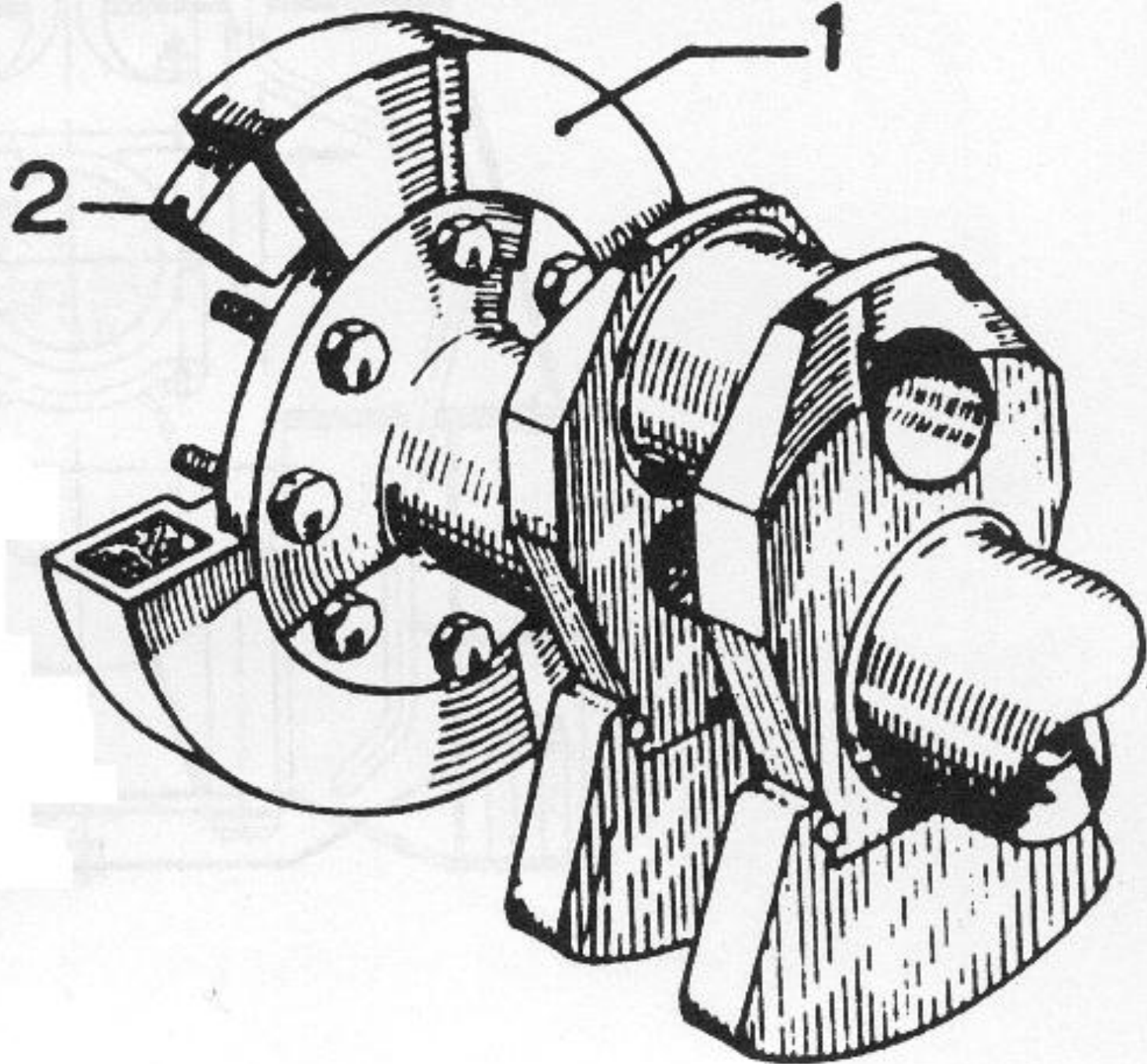


Smurrásirnar boraðar

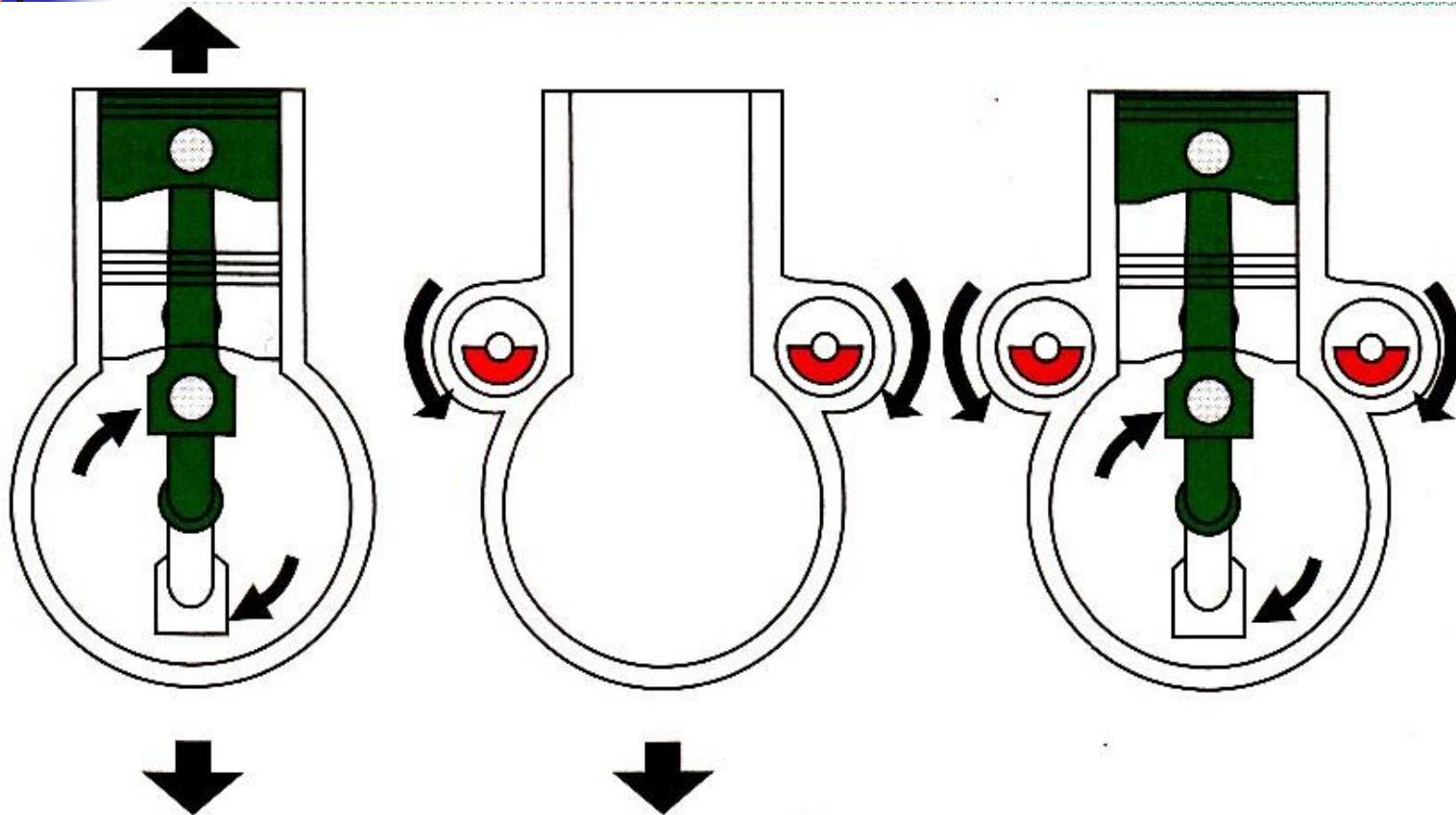


- Titrings-
- deyfir

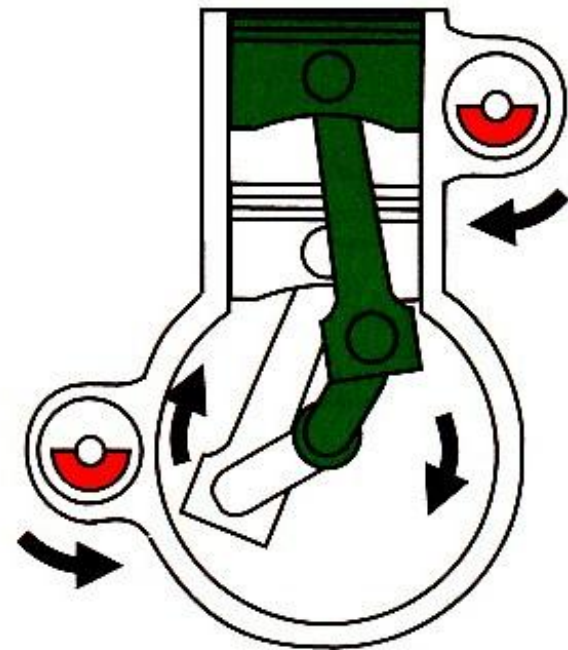
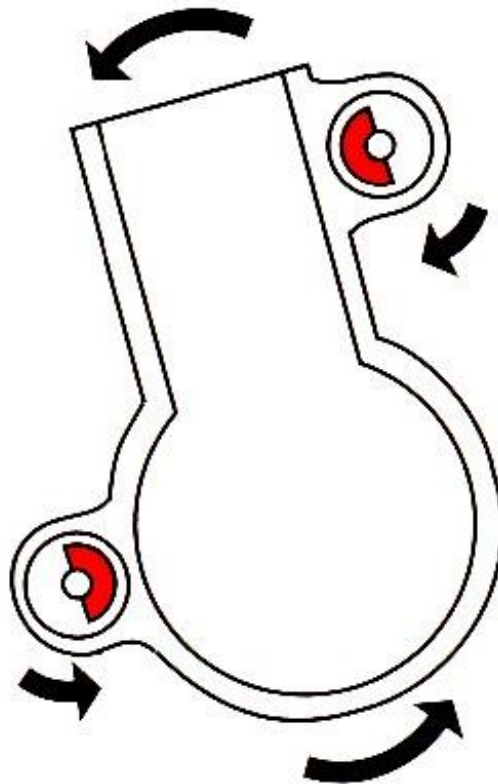
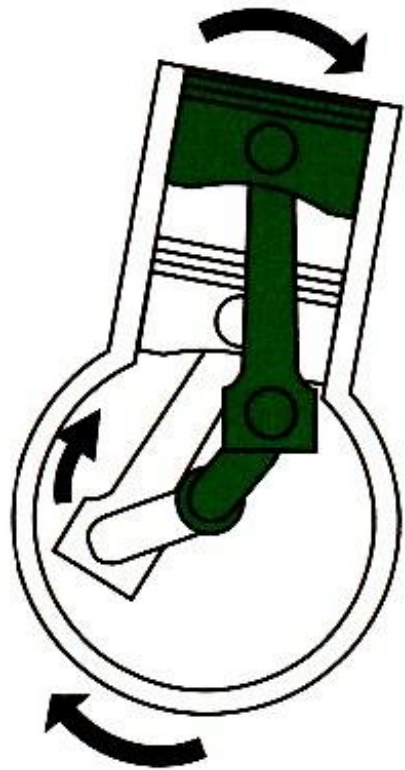




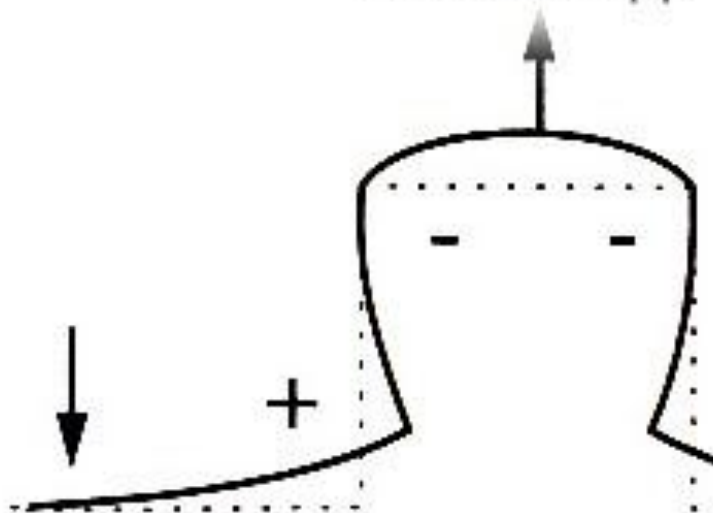
Stimplapar upp



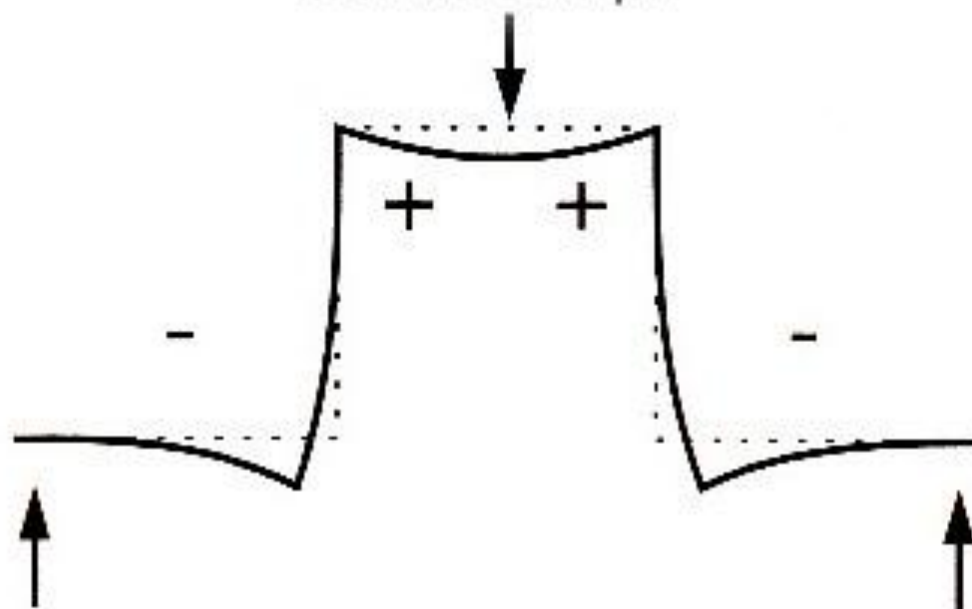
Stimplapar niður

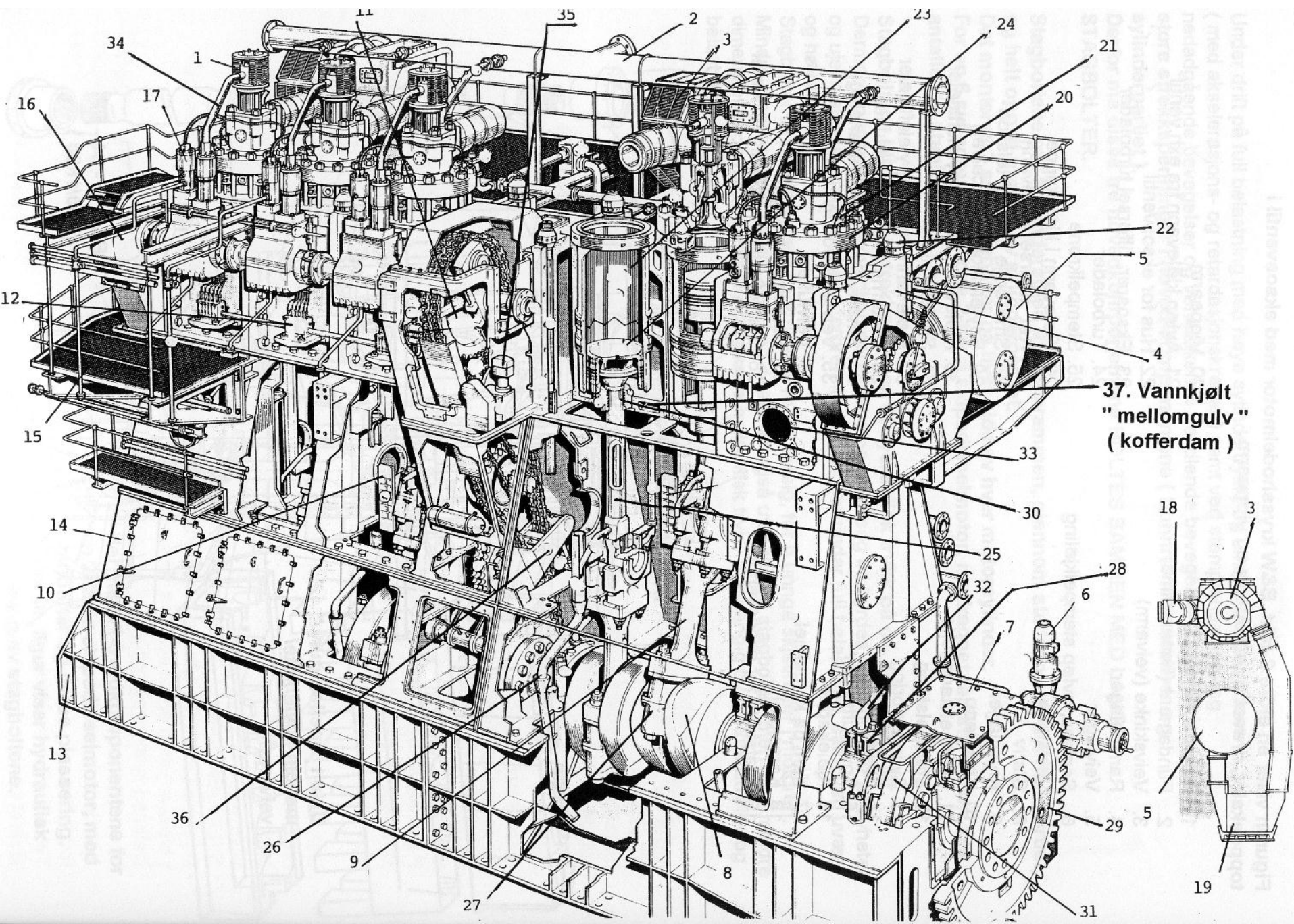


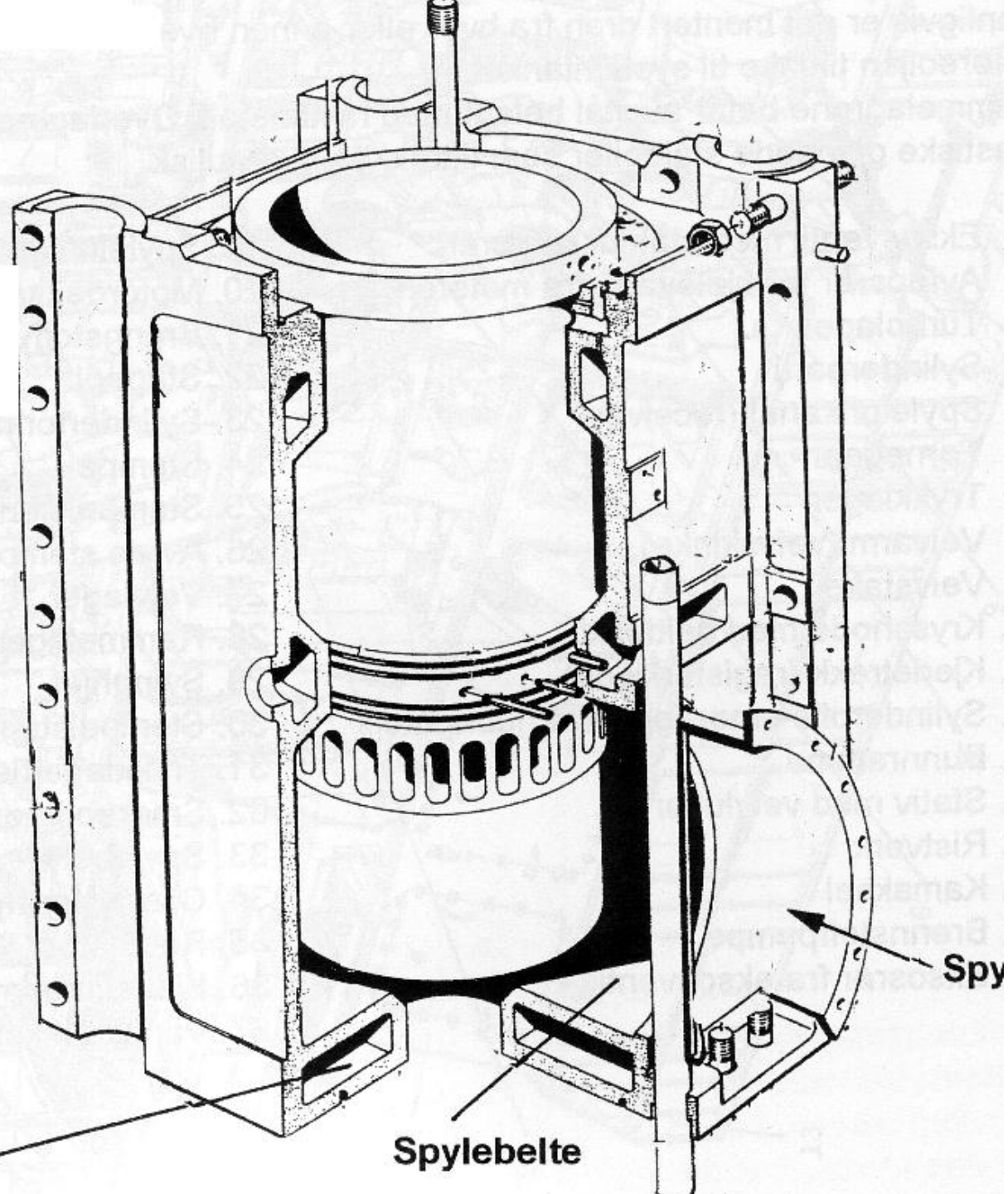
Eftir átak leitar
massinn upp



átak frá stimpli



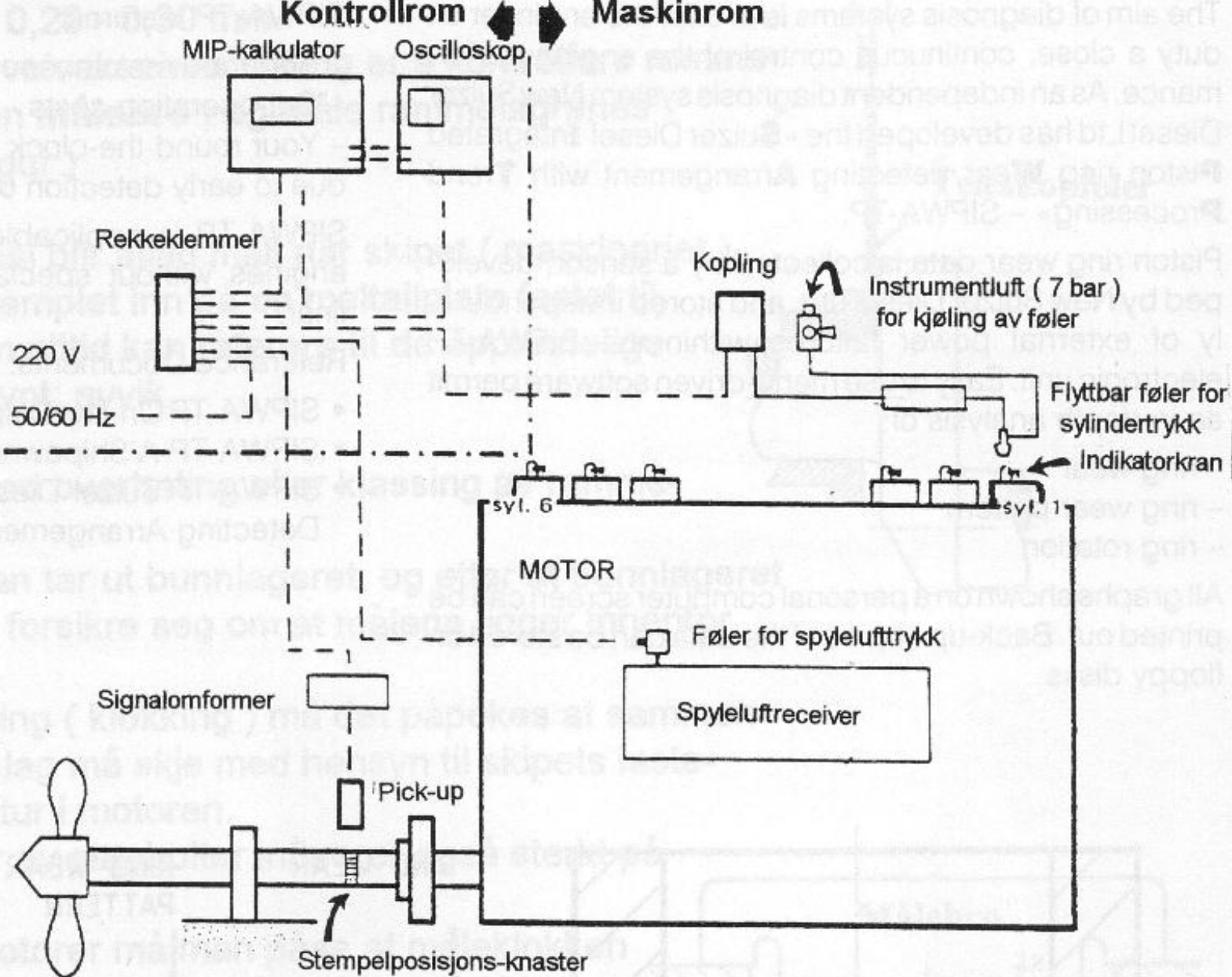




Vannkjølt kofferdam
("mellomgulv")

Spylebelte

Spy



Det skisserte system er basert på analog-teknikk.

