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<div>PACKING SPECIFICATION</div>				
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1. PURPOSE

This specification explains SIAD MACCHINE IMPIANTI packing criteria.
Moreover, it also provides some prescriptions relating to road and rail transport.

2. SCOPE OF SUPPLY

This specification concerns plants, compression groups and storage tanks.
Either the above equipment will be packed on already assembled (on skids) or their components, such as vessels, piping, electric panels, etc. will be separately assembled according to shipping or client's requirements.

3. PACKING GUIDELINES

- 3.1. Wooden cases will be provided by SIAD M.I. dedicated and qualified personnel.
- 3.2. Steel packings are made outside by skilled suppliers according to prescriptions given by SIAD M.I. packing and shipping dept. chief
- 3.3. Packings are made by SIAD M.I.

4. GENERAL GUIDELINES

Packings are designed to withstand the multiple loading and unloading operations during transport and storage at site.
Packing strength and its material weight are always well balanced.
Packing can also cope with railways pushing manoeuvres.

5. CLASSIFICATION AND DEFINITION OF PACKINGS

- 5.1. Packings are classified as follows:
 - a) light packing
 - b) home packing
 - c) oversea packing
 - d) air packing

5.2. Light packing

It's suitable either for national or neighbouring countries or "at site" transport, and involves particularly strong materials that cannot be damaged by impacts during transport, as well as during load, unload and storage operations.

In this case, it's not considered as a real packing, but just a protection limited to the equipment most fragile components (wooden protections, grease, anti-corrosive paints etc.); mobile or fragile components will eventually be disassembled and placed inside boxes or cages according to their product group requirements.

5.3. Home packing

It's suitable for national or neighbouring transport by truck or railway wagon, foreseen a limited number of trans-shipments and indoor storage (when required) for a limited period of time (6 months max.).

The duration of eventual dehydrating salts (when prescribed) shall be at least 6 months.

5.4. Oversea and air packing

Oversea packing foresees a rather high frequency of heavy-duty trans-shipments. At site storage is meant indoor type for longer than 6 months under particularly severe climate conditions. The duration of eventual dehydrating salts (when prescribed) shall be at least 6 months.

6. DESCRIPTION OF MATERIALS USED**6.1. Wood and plywood**

The wood used for packing construction has the following features:

quality: taken from intact, seasoned and without any defects spruce wood;

nodes: of limited quantity and dimensions. They shall be complete and integral with the tables;

tables: having a width not exceeding 25 cm or lower than 10 cm.

Boxes/containers walls and cap/cover (those for oversea packing and special overseas type in particular) can be made of marine plywood. The type to use is called "external grade with phenolic bonding in Douglas fir".

The use of second-hand wood is not allowed.

6.2. Steel boxes/cases and containers

Their frames and cover are made of steel material.

6.3. Nails and staples

Nails are flat head type and their length allows, when possible, to pinch them.

In particular cases when this is not possible but a more solid/stronger connection is required, helical or ring nails are used.

Metal staples are used with plywood. Metal staples are surface treated (ex. copper plated) to prevent corrosion.

6.4. Metal supports

6.4.1 Straps

The use of the following types of straps is foreseen:

- synthetic material made
- hardened and painted steel made
- hardened surface treated made (copper plated or galvanised, for instance)

Annealed material is not permitted.

Straps are applied tightly through the dedicated device and tightened by a surface treated steel clamp as the main strap or made of the same strap material.

The edges of the boxes/cases near the straps are reinforced with steel angles to avoid carving and consequent strap loosening. (pict.1a).

6.5. Filling material

Inert, non-hygroscopic filling materials, such as expanded polystyrene (in blocks, balls, strips) are used where required to protect fragile parts/components and/or to fill empty spaces and avoid damages.

6.6 Cardboard

6.6.1 Cardboard boxes used for this kind of packing purposes (spare parts, for instance) have the following features:

- quality: well-made pressed cardboard and faultless that may otherwise compromise its resistance
- dimensions: length not exceeding 120 cm.
width not exceeding 50 cm.
height not exceeding 50 cm.

The use of second-hand boxes is not allowed.

6.6.2 Boxes closing

Boxes are tightened by polyethylene tapes with “SIAD MI” logo.

6.6.3 Filling materials

(See par.6.5).

7. DESCRIPTION OF WOODEN PACKINGS

Wooden packing cases/boxes can be two types: supporting and not-supporting

7.1. Wooden packings supporting type general description

Home, oversea and special oversea packing cases/boxes type structure is the same.

The differences between the types are:

- planking, reinforcing joists and bottom beams thickness,
- internal protection

Cases/Boxes shall allow handling by fork truck, so are always equipped with thicknesses or underbeams, allowing forks passage at least perpendicularly towards the larger side.

The bottom planks are juxtaposed and nailed to beams. The bottom is coated by tarry paper and/or cellophane to allow ventilation and, above all, to drain any water that may have penetrated into the case/box.

The bottom structure (beams and axes) shall be able to support the weight of the entire equipment.

As for oversea and air type packings, beams connection is made by fixed joints (pict.1b).

7.2. Cases/Boxes and cages categories

Cases/Boxes and cages are divided into three categories:

- | | | |
|-----------------------|--------|----------|
| 1°) for weights up to | 500 | Kg. |
| 2°) for weights up to | 4.500 | Kg. |
| 3°) for weights up to | 10.000 | Kg. (°°) |

(°°) The implementation of these particular and heavy packings is always negotiated with Client and supplier/packager, since they can be different according to required delivery terms and destination.

7.3. Cases/Boxes and cages up to 500 Kg. or French type (picts. 2 and 3)

7.3.1 Sealing beams

Cases/Boxes, depending on their content, can be built/manufactured/made without any bottom beams, that can be replaced by sealing beams to allow handling both by fork truck or by lifting ropes

Bottom beams minimum dimensions: 5 x 10 cm.

Planking sealing beams and cover dimensions: 10 x 2,5 cm min.

7.3.2 Planking

At present, the 23 mm thickness commercial size is cheaper than the 20 mm one.

Supplier or packager can use the 23 mm type, thus having a stronger packing.

7.3.3 Bottom

Bottom tables thickness varies between 2,5 and 4 cm.

7.4. Cases/Boxes and cages up to 4500 Kg. (pict. 4 and 5)

7.4.1 Bottom beams

The use of cases/boxes equipped with bottom beams, parallel to the longitudinal axis is essential.

Beams dimensions can approximately be the following:

cm 10 x 10 (weight up to 4500 Kg).

In any case, section and interaxgle spacing depend on construction and dimensional features of the product.

Beams have 45° rounded ends to facilitate the passage of ropes or tow on the snow.

7.4.2 Underbeams/sub-beams

6 cm thickness underbeams/sub-beams are crosswise placed under the beams thus allowing handling either with forklift truck or with lifting ropes.

Underbeams/sub-beams position and number are given according to case/box length and its center of gravity.

Underbeams/sub-beams have a width equal to about 2 times their thickness and are fixed with nails.

7.4.3 Planking

Planking is vertically positioned in order to obtain a stronger resistance to resistance to overhanging loads.

7.4.4 Bottom

Bottom tables thickness is cm. 4.

7.4.5 Stiffening joists

Stiffening beams (cm 10 x 6 min.) are fixed under the cover. Joists are sized according to the weight of the package and its width because their purpose consists in helping the case/box hold up to the pressure caused by the lifting ropes.

7.4.6 Windbracings

They can be either external or internal type (American type).

Their distance depends on case/box dimensions and weight.

For instance, cm 10 x 2,5 section up to 15 x 3 cm - max. 80 cm. interaxle spacing

Within the category up to 4500 Kg., two additional type can be found, which differ only in the cover bracing.

Type A – with external bracing

It's allowed to reach cm. 150/200 width by adding two or more longitudinal tables (tie shape) between cover and stiffening joists.

The choice is left to supplier / packager construction criteria.

Typo B – with internal bracing

In this case, depending on case/box width, adding one or more tables (tie) between cover and stiffening joists is advisable, in order to make the box stiffer.

7.5. Particular cases

7.5.1 Cases/Boxes and cages shipped to countries subjected to heavy snow shall be free from underbeams, since cases/boxes may be dragged on the snow and beams would work as a sledge.

This case will be specified in purchase order. A dedicated hitch shall be foreseen on both case/box ends.

7.5.2 Fractioning columns and similar

They foresee the use of dedicated shaped wooden saddles, on which column is leant. Bands connected to saddles are later applied/placed on the column by strong tie-rods (pict. 6).

7.5.3 Cryogenic tanks

As per previous paragraph, wooden saddles only are used.

The carrier will fasten the tank to the appointed vehicle for transportation as accurately as possible.

7.6 Not-supporting wooden packings general features

This paragraph provides both required operating instructions and features for design and implementation of a not-supporting case/box of a skid mounted plant packing and its handling.

The use of a storage unit equipped with not-supporting base plate is made if the plant/unit which shall be packed is already provided with its own supporting structure suitable for being handled directly (skid).

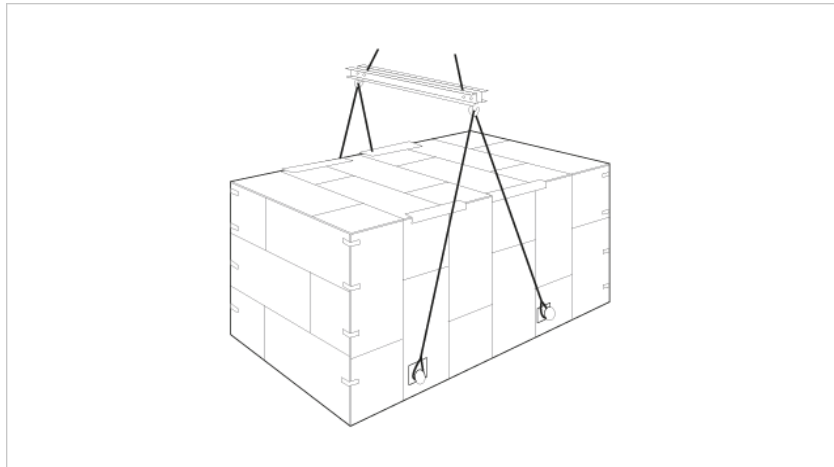
In this case, the box/case has a covering purpose only.

When a not-supporting container/box/case is built, design shall take the below requirements into account:

- container/box/case design shall comply with UNI.9151-1,-2,-3 requirements
- Baseplate shall be firmly tightened to metal structure by bolts
- Access openings to bitts/bolts or lifting plates shall be performed on site on container/box/case walls to ensure correct access for skid handling. Should bitts/bolts be tightened to base plate by bolts, the latter shall comply with design temperature (special/alloy steels A320 L7 for low temperatures, for instance)

Handling shall be carried out by bitts/bolts or lifting plates that are connected to the baseplate (and/or auxiliary).

See below picture



- The outside of the box/case shall always foresee a lifting sketch (see above picture);
- Non overlap stamp (ISO 780 n°2402) placed on the outside of the packing because there kind of packings are not resistant to overlap load.

When a not supporting base/baseplate and thermowelded cover packing is made, if present, tie rods connecting material to the wooden base, thermowelded cover tightening shall be carried out, in order to prevent water flowing from the bottom. This can be implemented by the use of sealing and proper gaskets. Moreover, thermowelded covers weldings shall be folded down in order to facilitate the outflow of any water/condense that may enter the packing.

7.6.1 Thermowelded cover welding/sealing to packing case/box bottom

It is applied to packings whose thermowelded cover needs drilling to allow tie rods/beams passage to the base.

The first step consists in placing tie rod on the base and insulating rubber around it with the addition of some silicone on the tie rod base.

- Drill shall be made by a dedicated hollow punch



- After placing the thermowelded cover and drilling it by a punch avoiding any radial cuts, made a sealing frame on the rubber gasket in the area surrounding the area for the hole.



- Apply insulation rubber by placing it on the silicone frame and drill it by a dedicated punch.



- Position the skid near fastening bolts.



- Place a rubber frame between nut and skid surface and tighten the nut to complete tightening.



7.6.2 Thermowelded cover sealing on lifting points (bitt)

Below are the necessary steps

- bidisassembly the bitts by bolts unscrewing



- Double-sided tape application on bitt skid side



- Apply a 1/1,5 mm th. previously dinked rubber tailored gasket on bitt double-sided tape skid side.



Drilled rubber gasket

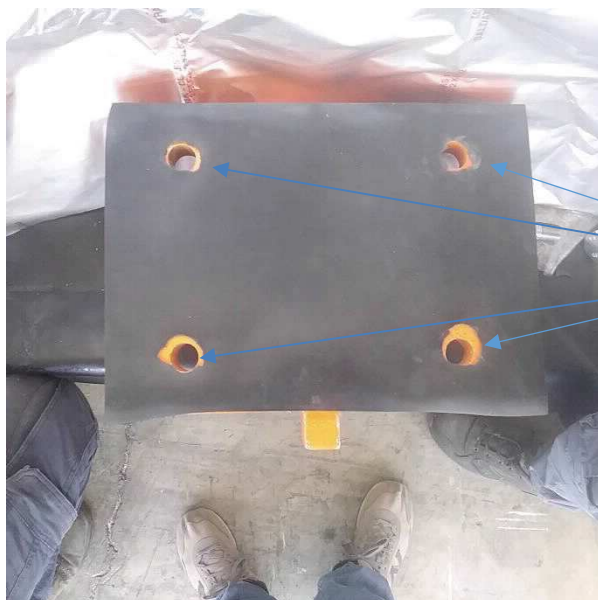
- Apply thermowelded cover on the gasket



- Apply double-sided tape on bitt.



- Apply a 1/1,5 mm th. previously dinked rubber tailored gasket on bitt double-sided tape.



Drilled rubber gasket

- Assembly the bitts by screws tightening.





- Openings creation on box/case walls near the bitt to grant box/case appropriate closing, thus letting/having the bitt come out of it.

8. DESCRIPTION OF METAL/STEEL PACKINGS

8.1. Bins/Tanks

8.1.1 Bins/Tanks are suitable up to 25.000 Kg. and their sizes/dimensions and strength can change according to goods type.

8.1.2 They consist in a frame having a fretted plate around and are closed on 5 sides. The bottom is in fact free and lowered from above and placed on a baseplate that is usually the same as compression group or plant's (pict. 7).
An inspection door is foreseen on the most appropriate part of a wall to enable custom control.
They are also equipped with 4 upper corners for correct lifting,

8.1.3 Bins/Tanks/Containers are fixed/tightened to baseplate by screws.
External surface is pickled and painted by epoxy painting.

8.2. Container

8.2.1 They comply with international standards.

8.2.2 Containers can be used as permanent protection for dedicated plants (pict. 8).

9. PRE - PACKING

9.1. Material shall be adequately prepared, regardless of its packing type.
To this purpose, any mobile components are fixed/tightened to the equipment structure and any fragile parts that may interfere with packing are protected.

9.2. In case of sharp edges on the equipment, it's fundamental to cover them by soft material, in order to avoid tearing protection cap (tied to barrier and/or cellophane).

Nozzles and all equipment openings are firmly plugged/closed. Dehydrating salts are added inside in case of particularly severe weather conditions or equipment fragility.

9.3. Small materials shall be duly classified, identified and stored in middle-sized boxes/bins/tanks. (properly packed per typology).
Middle-sized boxes/bins/tanks can be carton boxes, bags, etc.

10. CELLOPHANE PROTECTION

10.1 As a minimum requirement, material/goods inside boxes/bins/crates is/are always covered by a polyethylene cap open at the bottom for air circulation.
For materials/goods protection against humidity, the use of closed cellophane coves is not allowed.

10.2 Cellophane sheets are arranged like a tile to keep the content dry in case of rain, as well as during travel by road train, railway wagon or ship.
Cellophane sheets min. depth is 0,10 mm.

11. PROTECTION BY HEAT SEALABLE BARRIER

11.1. It is used for long preservation and/or sea transport.

11.2. The barrier is made of a high molecular density laminated polyethylene sheet and grants a vacuum seal created after assembly. It is supplied by specialised companies that also provide for its assembly at SIAD M.I.

- 11.3 A sort of base is placed under the goods to be packed, then connected to the protective cover that envelopes the goods.

Thermowelding around base perimeter is afterward carried out and air is removed by a pump. In the end, as soon as thermowelded cover adheres to goods shape, suction union is removed and welded to the last barrier connection..

- 11.4 Before placing the protective cover, some dehydrating salt bags are spread all around, according to the kind of goods and its volume.

12. MATERIAL STOWAGE/STOWING

- 12.1 Materials are stowed in boxes/cases or containers in order to minimize packing volume. In this way, material is prevented from moving during transport.

- 12.2 All equipment having baseplates (machines in general, control panels, etc..) is fastened/screwed/anchored to box/case and/or cage bottom and calibrated rubber shims are added in order to avoid mechanical stresses.
Crossbeams and supports are then used to ensure material absolute blocking.

13. PACKINGS/BOXES/CASES DIMENSIONS

- 13.1. To the purpose of minimizing oversize/exceptional kind on transport as much as possible, it's fundamental that supplier, already starting from design and construction phase, limits equipment dimensions/volume/sizes, considering that packing should comply with road transport regulations first, or rail transport ones as an alternative.

- 13.2 The below max dimensions are valid for transport in Europe:
trucks sizes: length m. 11,50 x width 2,50 x height 2,5
railway cars sizes: length m. 14,00 x width 3,10 x height 2,10 (2,95)

Should the packed unit be transported under cover, trucks sizes shall be the following:
width. m. 2,40; height m. 2,30.

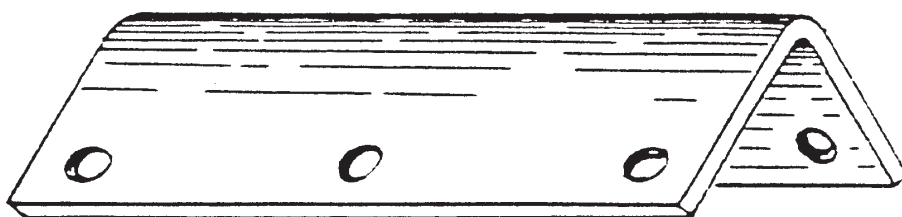
- 13.3 Should restrictions stated at point 13.2 be overcome, packing supplier shall notify it to SIAD M.I. dedicated dept, in order to take all necessary precautions for transport (permits, means of transport, etc.).

14. ACCEPTABILITY CRITERIA

Packings will be accepted if in compliance with this specification only.

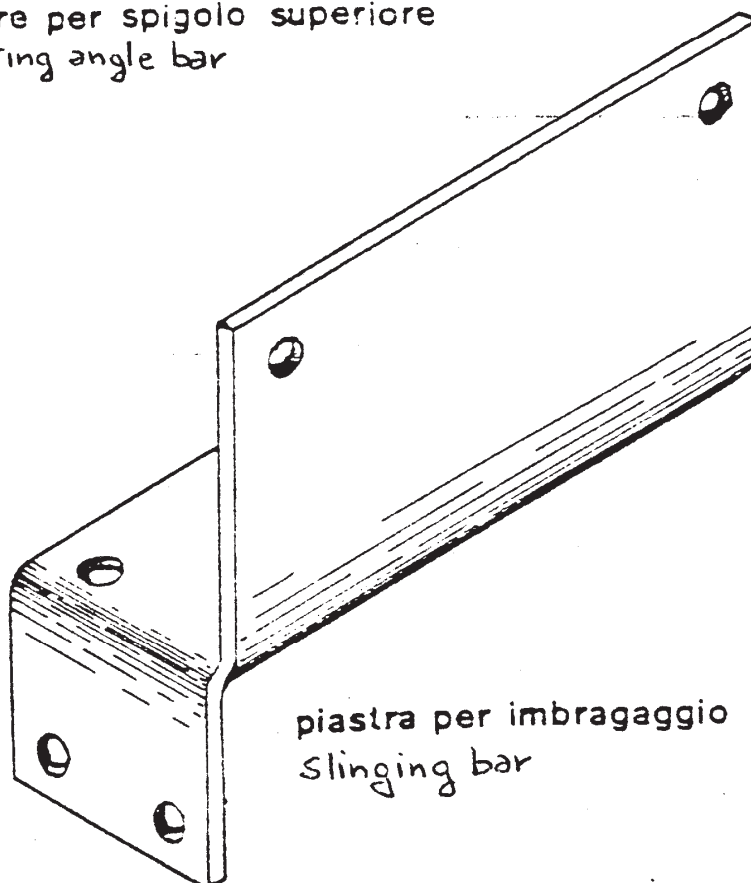
15. INSPECTIONS

- 15.1 When requested, packing shall be supervised by SIAD M.I. Quality Control Staff, that will verify compliance with this specification prescriptions and will issue a dedicated inspection report.
- 15.2. When foreseen, SIAD M.I. packing dept, shall comply with client's supplementary/additional specifications and submit the relevant packing for inspection by its representative.

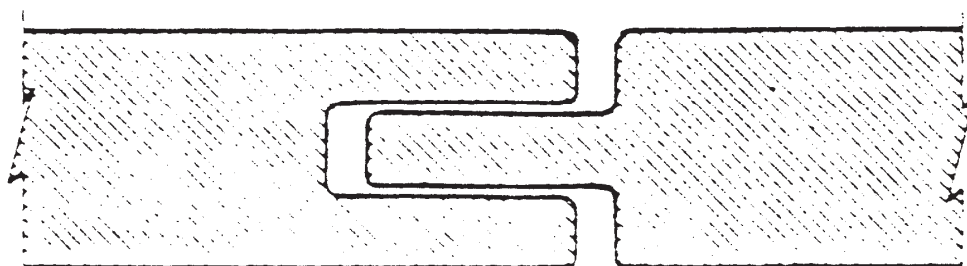


angolare per spigolo superiore
protecting angle bar

fig 1a

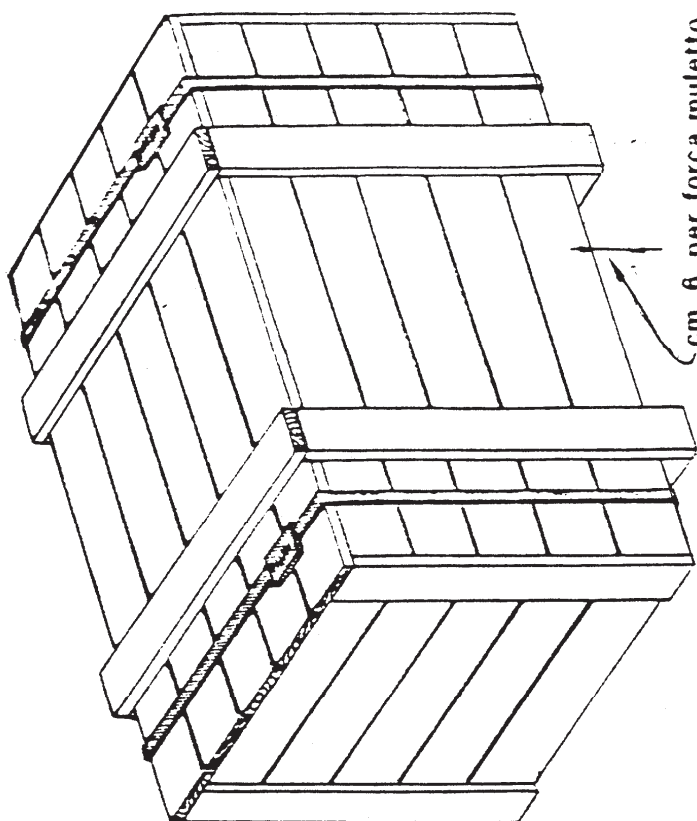


piastra per imbragaggio
slinging bar



collegamento fra le tavole
connection between boards

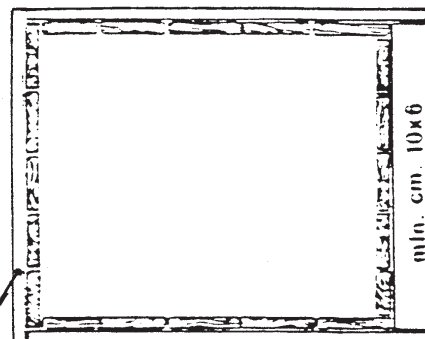
fig.1b



cm. 6 per forza muletto
cm. 6 for fork

min. section 10x2,5
sezione min. 10x2,5

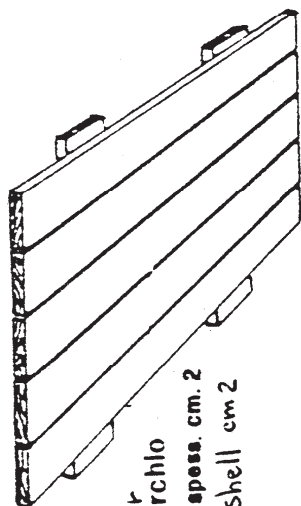
misura max
100x60x60



min. cm. 10x6

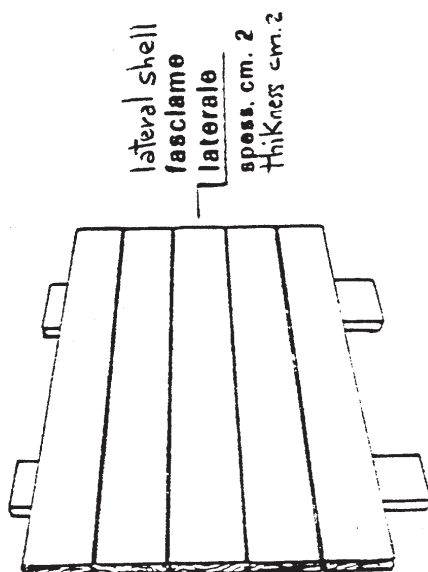
fig. 2

CASSA PER PESI FINO a Kg. 500.
CASE FOR WEIGHTS UNTIL Kg. 500

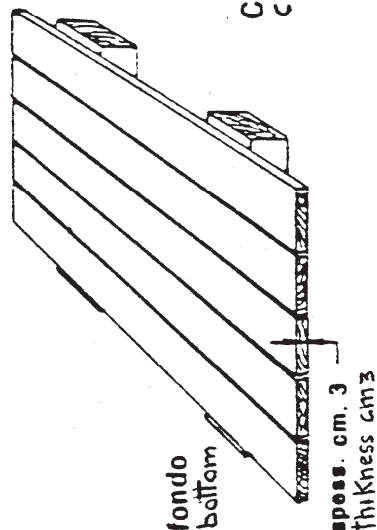


cover
copercchio

fasciame spess. cm. 2
thickness shell cm 2



lateral shell
fasciame
laterale
spess. cm. 2
thickness cm. 2



fondo
bottom

spess. cm. 3
thickness cm 3

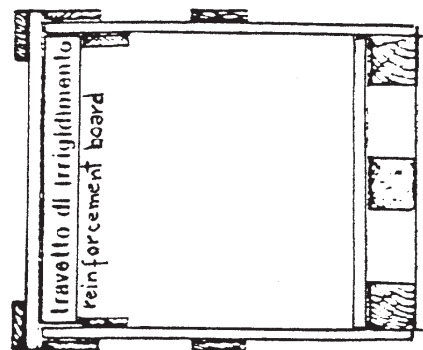
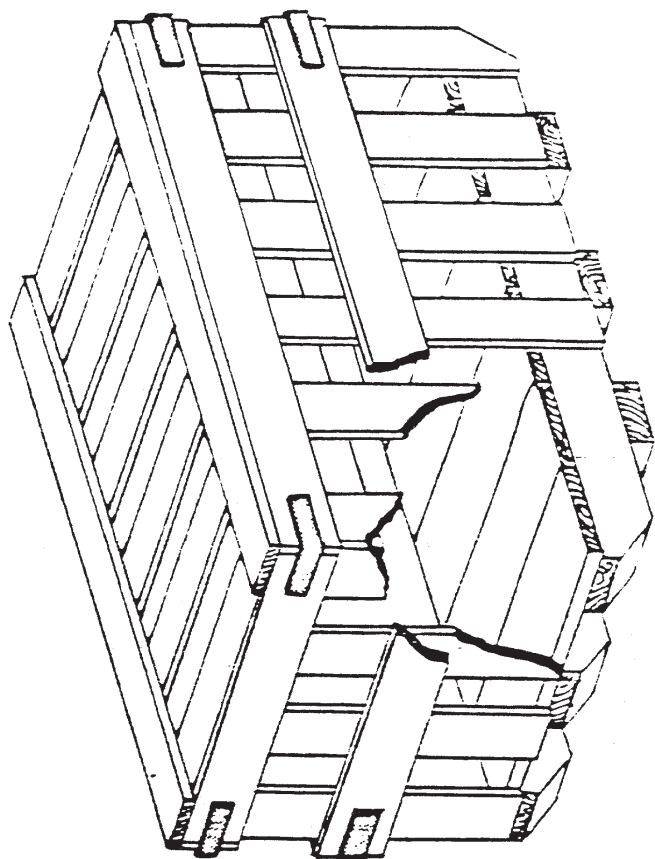
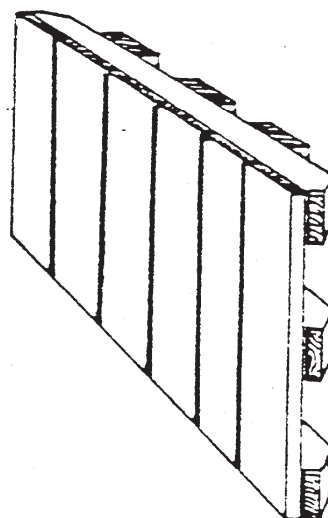
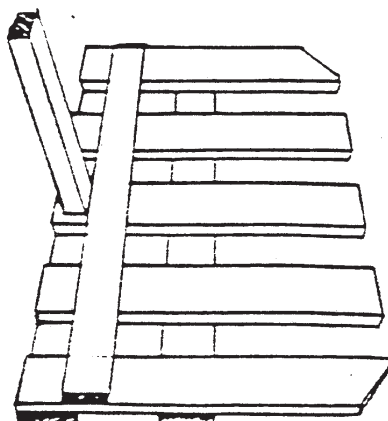
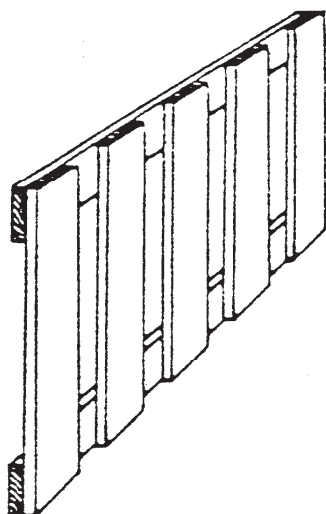


fig. 3

GABBIA PER PESI FINO A Kg. 500
GRATE FOR WEIGHTS UNTIL Kg. 500



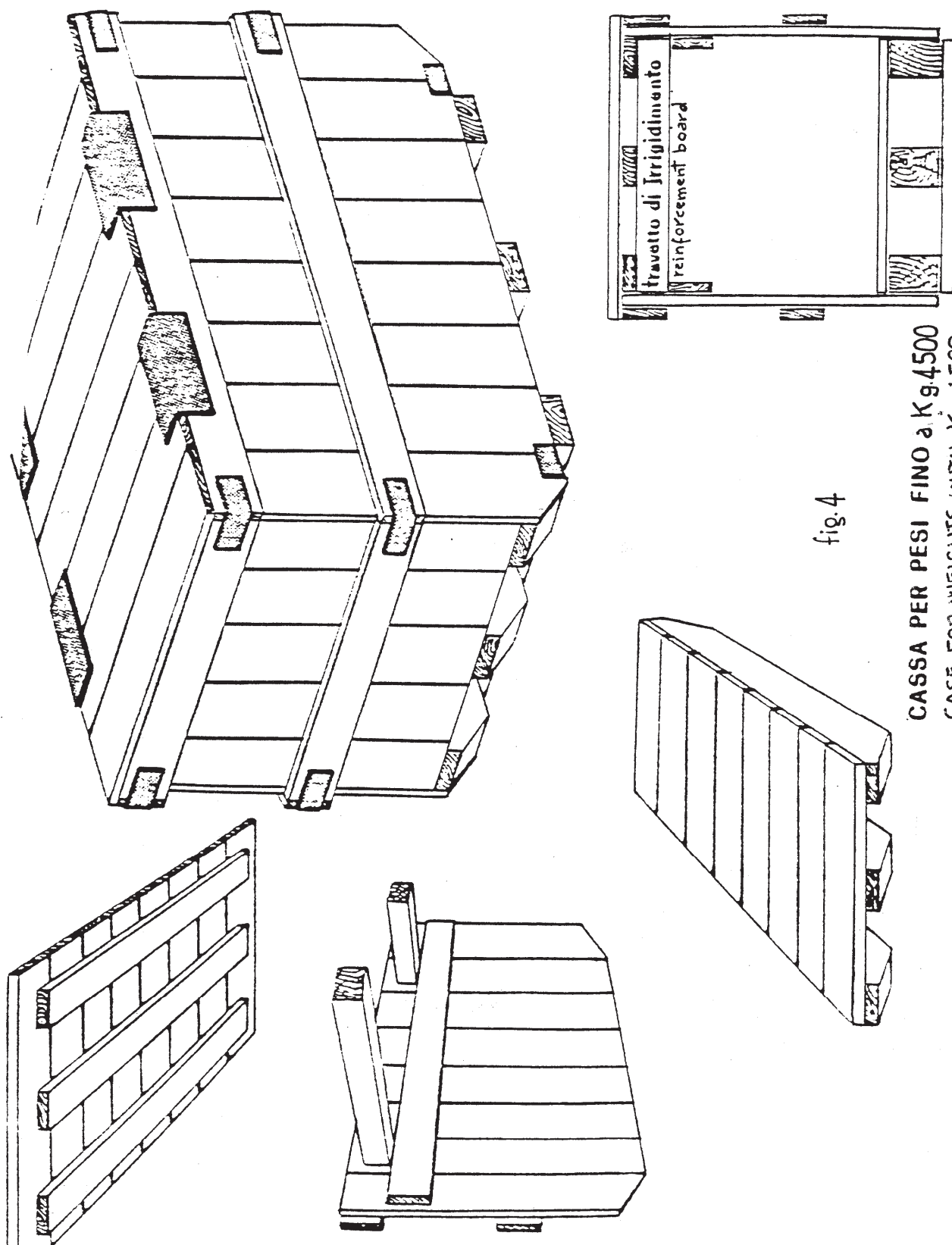


fig. 4

CASSA PER PESI FINO a Kg. 4500
CASE FOR WEIGHTS UNTIL Kg. 4500

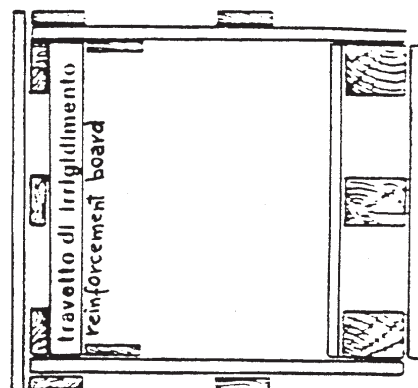
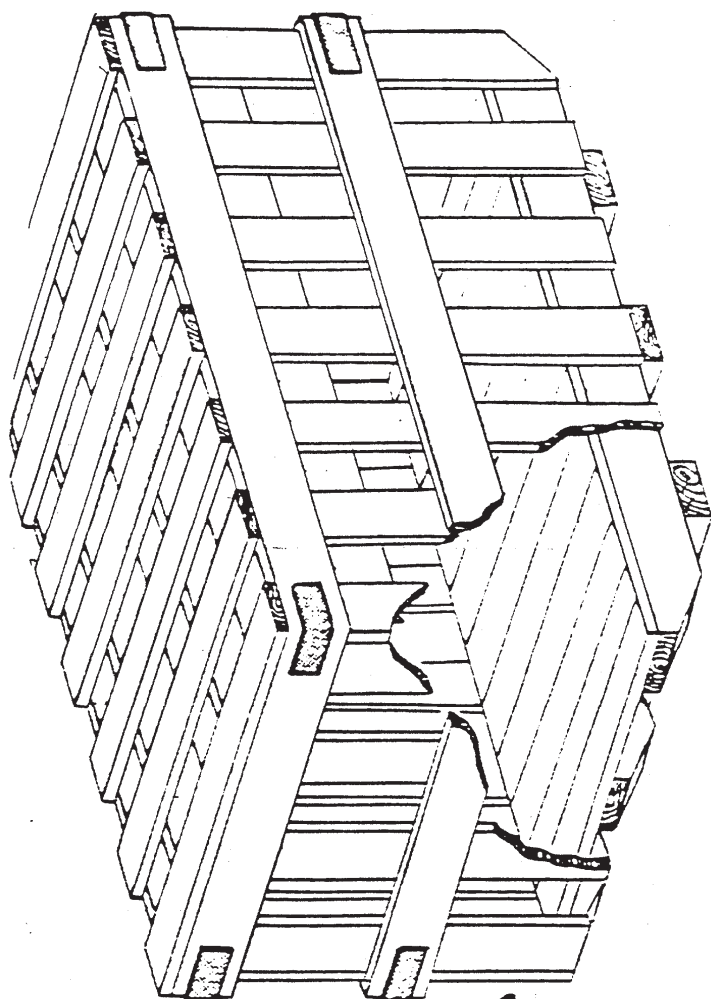
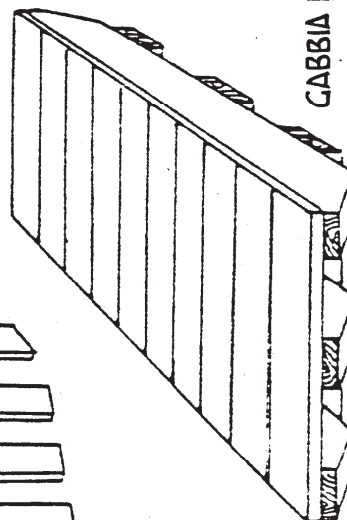
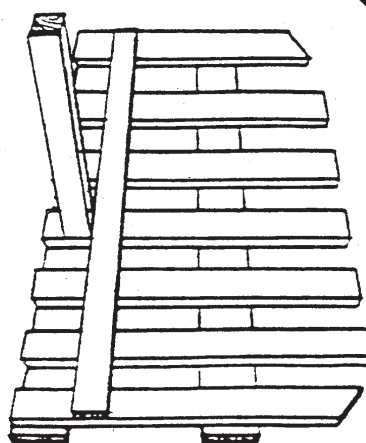
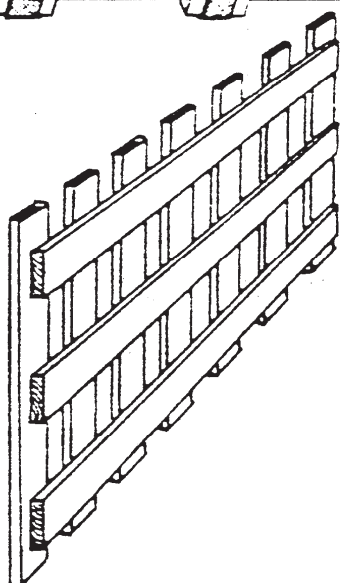
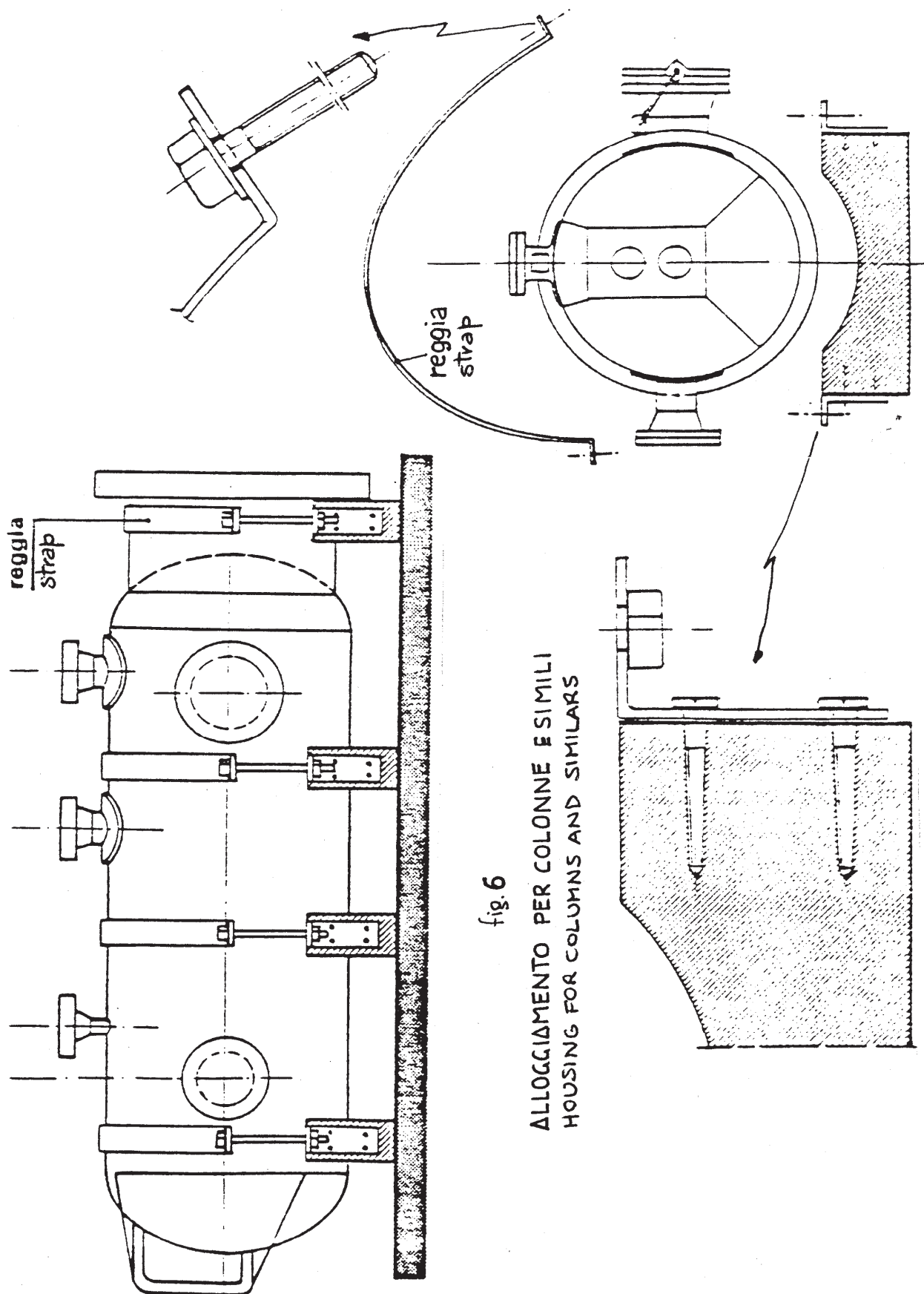


fig.5

CABBIA PER PESI FINO a Kg. 4500
CRATE FOR WEIGHTS UNTIL Kg. 4500





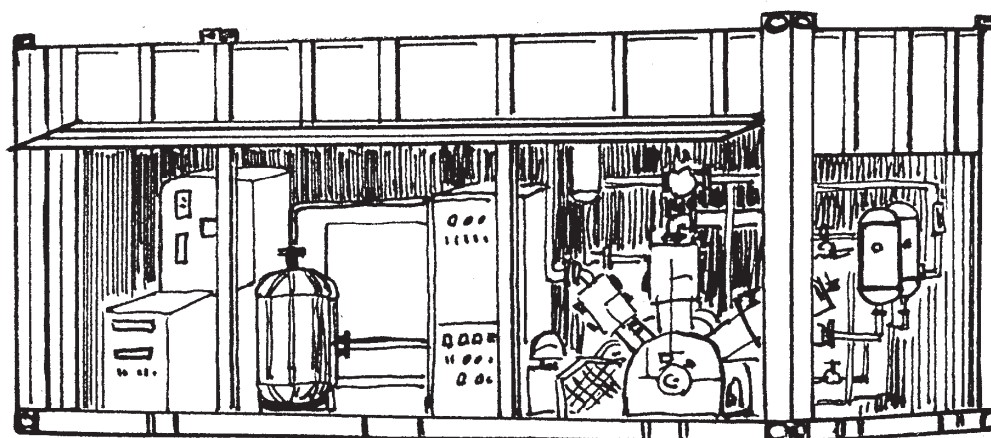
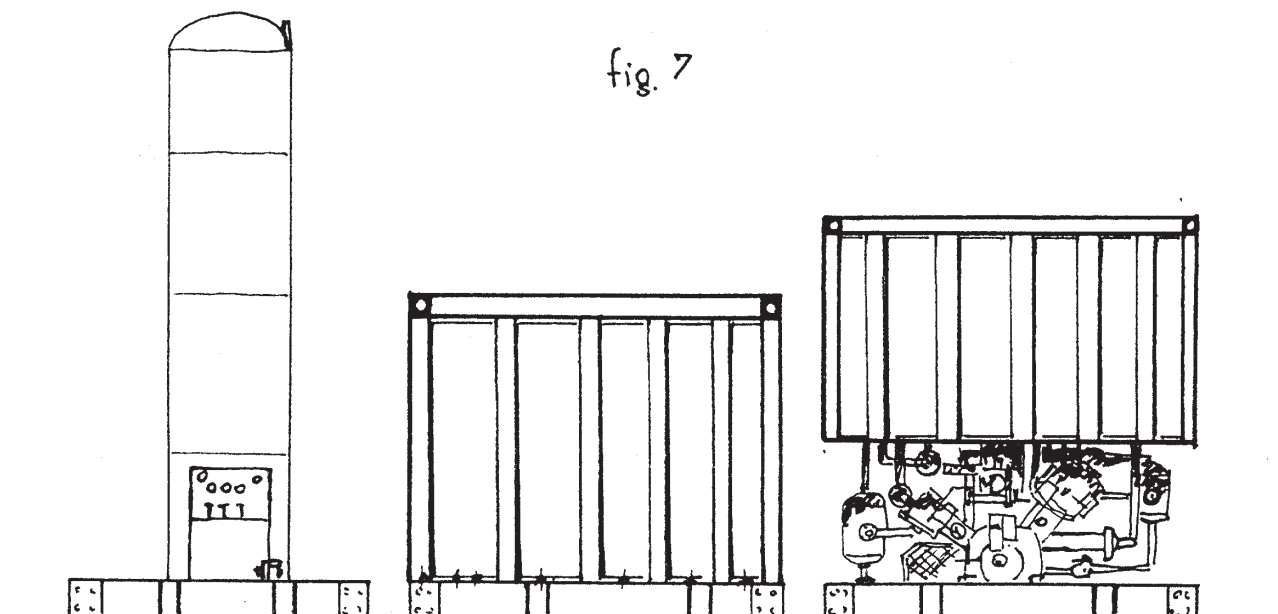


fig. 8