

Penn State **Extension**

Circular Grain Bin Arraignments and Foundations

Agricultural and Biological Engineering

abe.psu.edu

No. IP 732-41

This Idea Plan is intended to provide educational information and ideas concerning corn cribs for storing ear corn. The following attached drawings are based on historical plans and may not meet design and construction standards for your area:

Circular Grain Bin Layouts (USDA 6384)
Foundations for Circular Steel Grain Bins
Under 22 Ft. Diameter (USDA 6391)

If you decide to build a facility similar to any of these plans, be sure to check building requirements for your area. Your local building inspector, engineer, building supplier, or building contractor can help you determine what is a safe and legal facility for housing rabbits in your area. In addition to the rules and regulations covering design and construction of buildings, be sure to consider how you will handle the manure and potential nuisance problems for neighbors, including flies, odor, and noise.

The Department of Agricultural and Biological Engineering at Penn State has a variety of educational material available related to agricultural and biological engineering. This material is intended to help Pennsylvania farmers and others develop buildings and facilities for modern, environmentally-compatible farm facilities. The material can be used in conjunction with county extension staff, builders, suppliers, consulting engineers, the Natural Resources Conservation Service, financial management advisors, farm lenders, veterinarians, and others to assemble a facilities plan suitable for local conditions.

Publications are available in the areas of agricultural safety and health, animal housing systems, building and farmstead planning, crops and greenhouses, machinery systems and tractors, residential housing, soil and water resources, and solid waste management. Contact your county Penn State Extension Office for more information on these subjects. You can also obtain an index of publications concerning the above areas by calling, writing, faxing or e-mailing:

Department of Agricultural and Biological Engineering
246 Agricultural Engineering Building
University Park, PA, 16802-1909
Telephone: 814-865-7685
Fax: 814-863-1031
Email: agbioeng@psu.edu

The following handbook concerning grain drying is available from:

MWPS-13 Grain Drying, Handling and Storage Handbook (1998) 88 pages, \$14.00

Midwest Plan Services (MWPS)
122 Davidson Hall
Iowa State University
Ames, IA 50011 USA
Phone: 515-294-4337, Fax: 515-294-9589
Email: mwps@iastate.edu

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College of Agricultural Sciences

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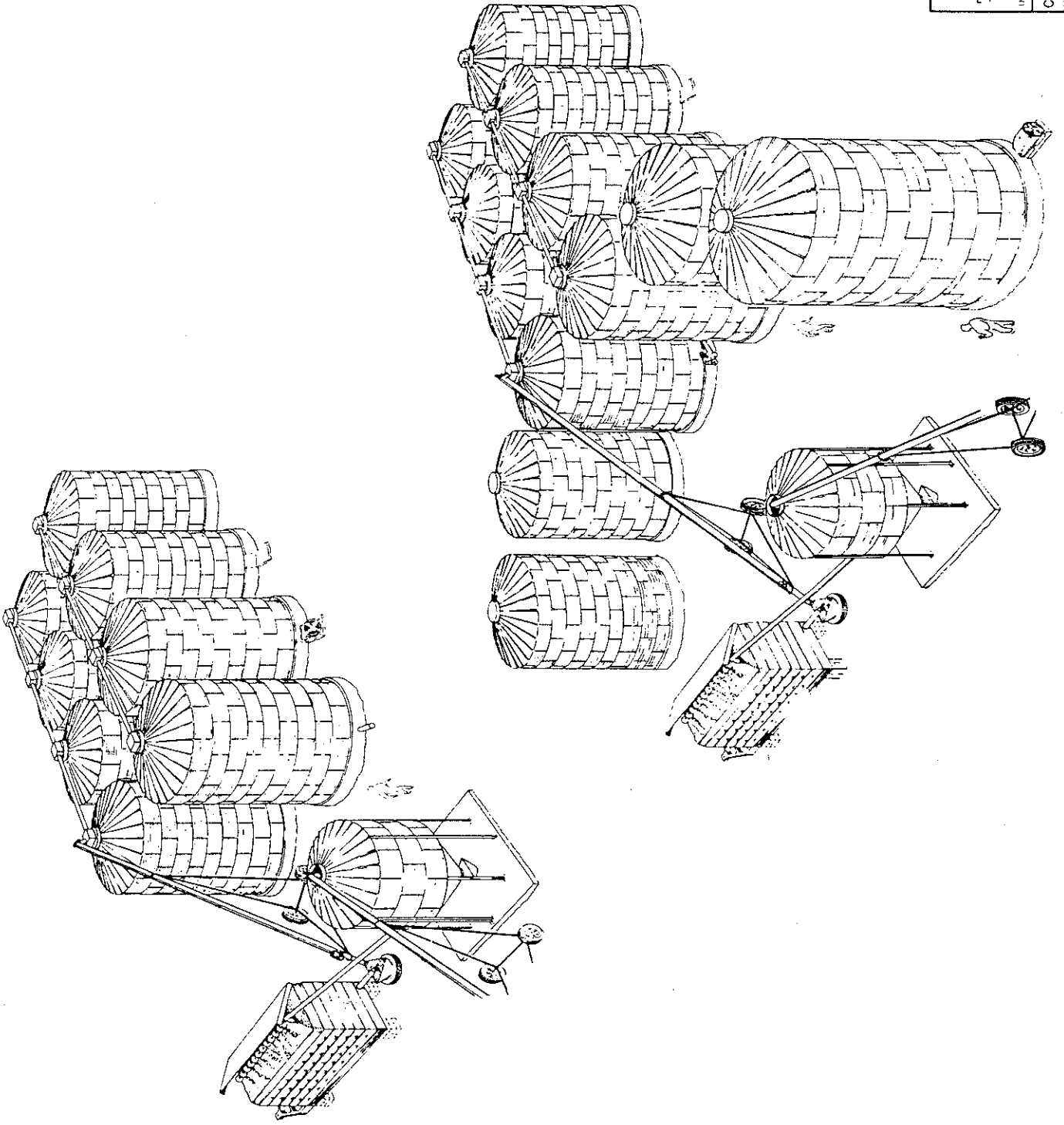
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COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS
The Pennsylvania State
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UNIVERSITY PARK, PENNSYLVANIA 16802-1001

CIRCULAR GRAIN BIN LAYOUTS

CAN. 86 6384 SHEET 1 OF 4

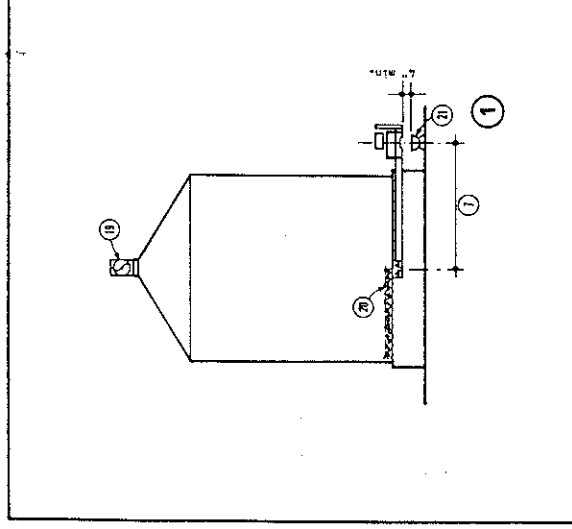
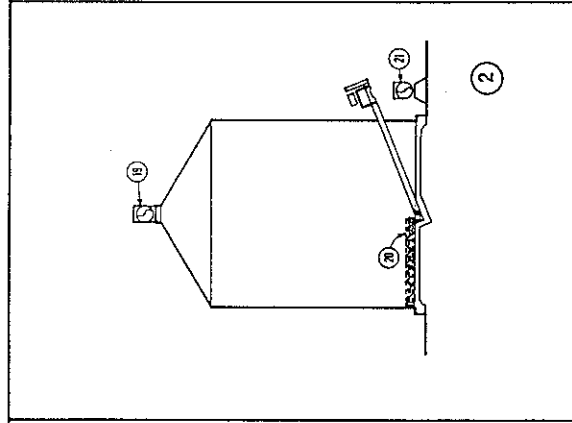
Order # 732-6384

1. UNDERFLOOR BIN UNLOADING SYSTEM
2. INCLINED AUGER BIN UNLOADING SYSTEM
3. GRAIN HANDLING EQUIPMENT DATA
4. DUMP PIT CROSS CONVEYER AND HORIZONTAL AUGER TO LEG
5. DUMP PIT AND INCLINED CROSS CONVEYER TO LEG
6. SWING-AWAY HOPPER TRUCK DUMP AND INCLINED AUGER TO LEG
7. UNLOADING AUGER LENGTH (SEE 23, SHEET 2)
8. WET GRAIN HOLDING BIN
9. SELF CLEANING DEAD END
10. DISTRIBUTOR ACCESS SCAFFOLD
11. TWO-WAY VALVE TO DISTRIBUTOR AND WET GRAIN HOLDING BIN
12. 16'-0" MIN. DRIVEWAY WIDTH
13. 4'-0" MIN. OR AS REQUIRED BY MANUFACTURE'S SPECIFICATIONS
14. RETAINING WALLS AS REQUIRED, TIE BOTH SIDES TOGETHER WITH 3/4" DIA. RODS @ 4'-0" O.C. 1'-0" BELOW SURFACE
15. LEG
16. GRADE LEVEL
17. 2'-0" MIN. OR AS REQUIRED BY MANUFACTURE'S SPECIFICATIONS
18. DUMP PIT CROSS CONVEYER
19. CONVEYOR INTO STORAGE
20. SWEEP AND UNLOADING AUGER
21. CONVEYOR OUT OF STORAGE
22. WET BIN UNLOADING AUGER
23. DRYER UNLOADING AUGER
24. DRYER UNLOADING LEG (COUPS)
25. DISTRIBUTOR-10 HOLE, 45°
26. SPOUTS
27. LEG HEIGHT (SEE 22, SHEET 2)
28. ELEVATOR BOOT ON LEGS, SLIDE GATE TO CLEAN OUT UNDER

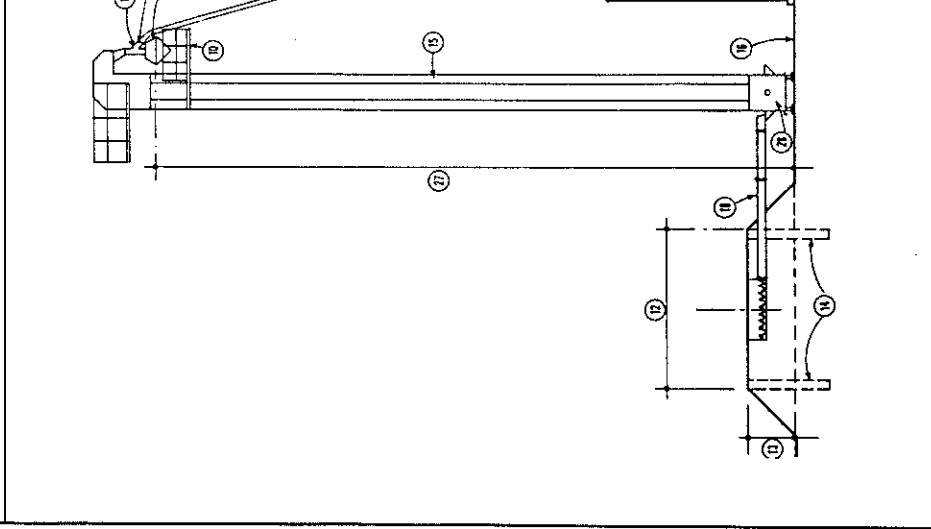
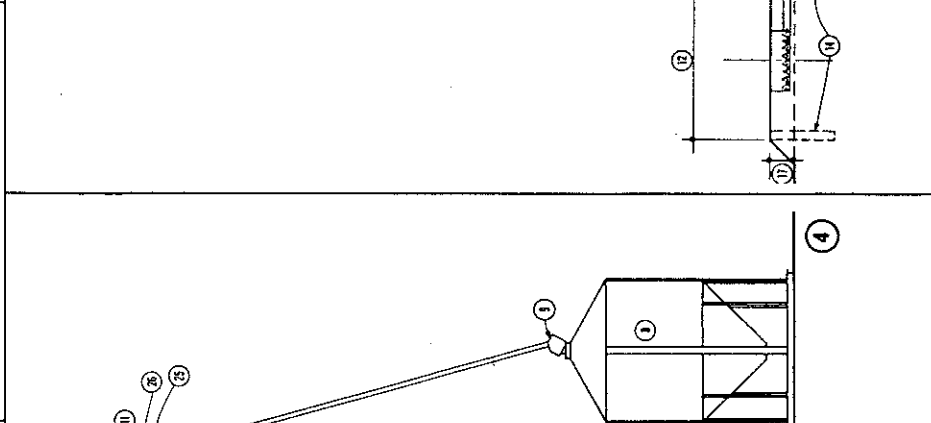
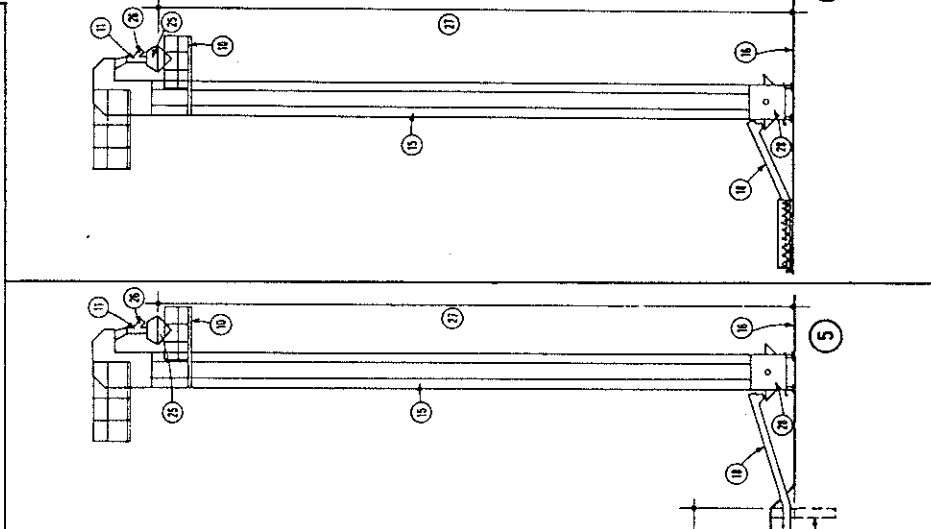
MATCHING LEG CAPACITY TO OTHER GRAIN HANDLING EQUIPMENT SIZES

Length or Height	Equipment Size		Power
	Leg Capacity (BY 1200)	2400-3600	
18	8-12"	17"	
19	8-12"	17"	
20	6"	8"	
21	8-10"	10-12"	
* 22	6-8"	8"	
* 23	6"	8"	
* 24	6"x5"	6"x5"	
25	6"	8"	
26	6"	8"	

* see 15, 16, 17 sheet 4, 3



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5. DUMP PIT AND INCLINED CROSS CONVEYER TO LEG
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28. ELEVATOR BOOT ON LEGS, SLIDE GATE TO CLEAN OUT UNDER

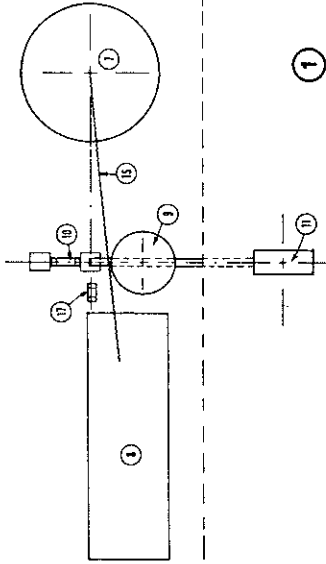


NOTES:
 RECOMMENDED LEG OPTIONS INCLUDE
 -PVC BELTING
 -SPLIT HEAD COVER
 -3' INSPECTION HATCH ON UP SIDE TRUNKING ABOVE BOOT
 MIN. SPOUT SLOPES RECOMMENDED
 -40 DRY GRAIN
 -55 WET GRAIN
 -FLOW RETARDERS ON LONG SPOUTS WHERE BEANS OR PEAS ARE TO BE HANDLED

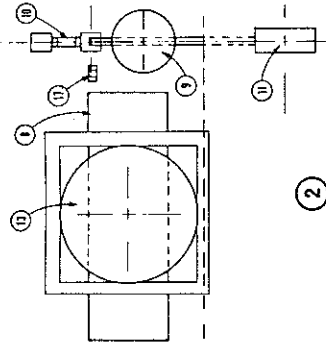
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CIRCULAR GRAIN BIN LAYOUTS

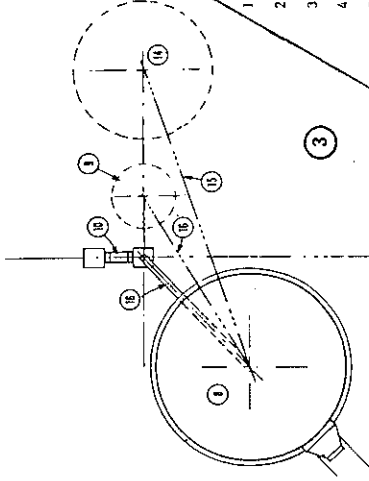
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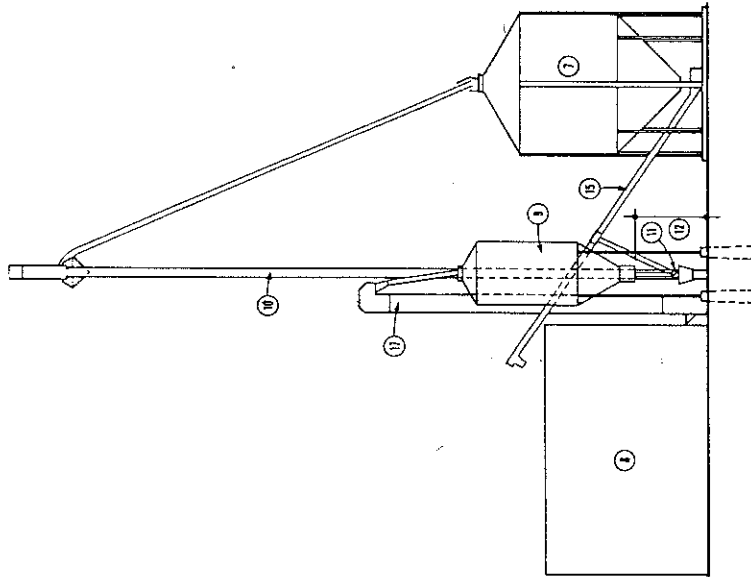
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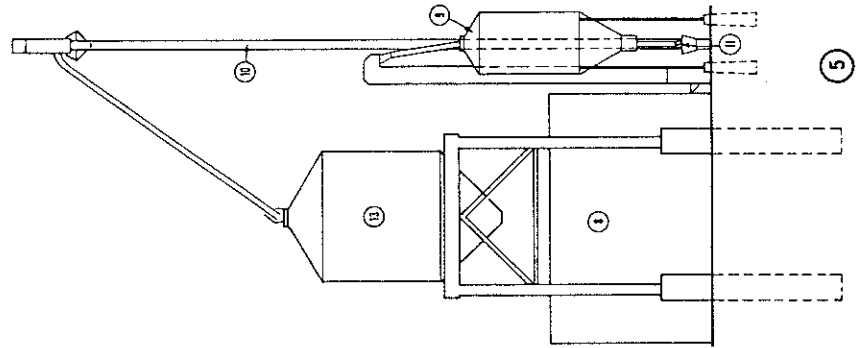
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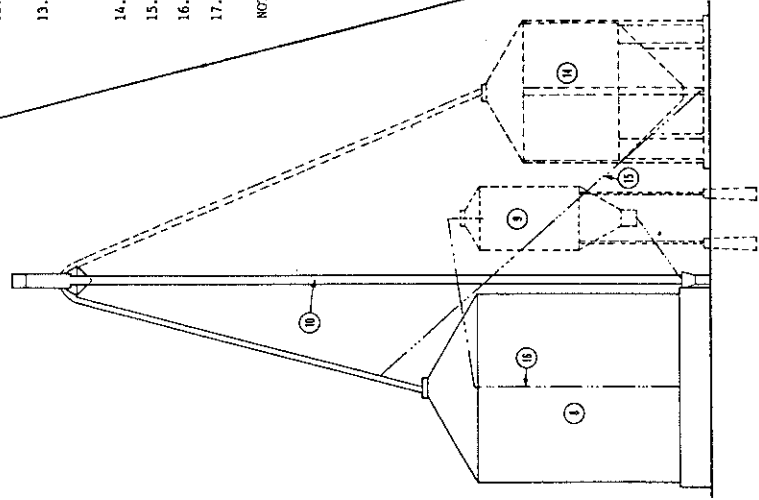
3



4



5



6

1. LAYOUT OF GRAIN DRYING SYSTEM
2. LAYOUT OF GRAIN DRYING SYSTEM WITH OVERHEAD BIN
3. LAYOUT OF GRAIN DRYING SYSTEM
4. PROFILE OF GRAIN DRYING SYSTEM (SEE 1, THIS SHEET)
5. PROFILE OF GRAIN DRYING SYSTEM (SEE 2, THIS SHEET)
6. PROFILE OF GRAIN DRYING SYSTEM (SEE 3, THIS SHEET)
7. WET GRAIN HOLDING BIN
8. GRAIN DRYER (BATCH OR CONTINUOUS FLOW)
9. DRY GRAIN SURGE HOPPER (OPTIONAL FOR BATCH DRYER)
10. LEG
11. DUMP PIT AND CROSS CONVEYER TO LEG
12. 6'-0" OR AS REQUIRED TO GAIN ACCESS TO LEG
13. INSPECTION HATCH
14. WET GRAIN HOLDING BIN, TEMPORARY SEED OR BULK FERTILIZER BIN, QUICK LOAD-OUT BIN. HEIGHT TO AND LOCATION OF DISCHARGE DEPENDENT UPON DRYER AND DRIVEWAY HEIGHT SELECTED
15. OPTIONAL WET GRAIN HOLDING BIN
16. WET BIN UNLOADING AUGER
17. DRYER UNLOADING AUGER (SEE 23, SHEET 3)
18. DRYER UNLOADING LEG (CUPS)

NOTES:

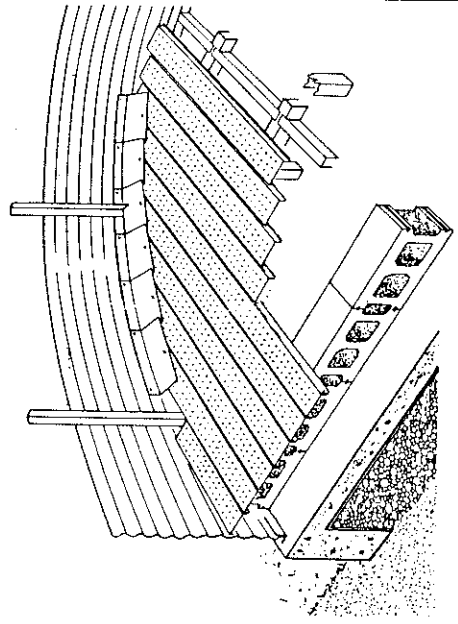
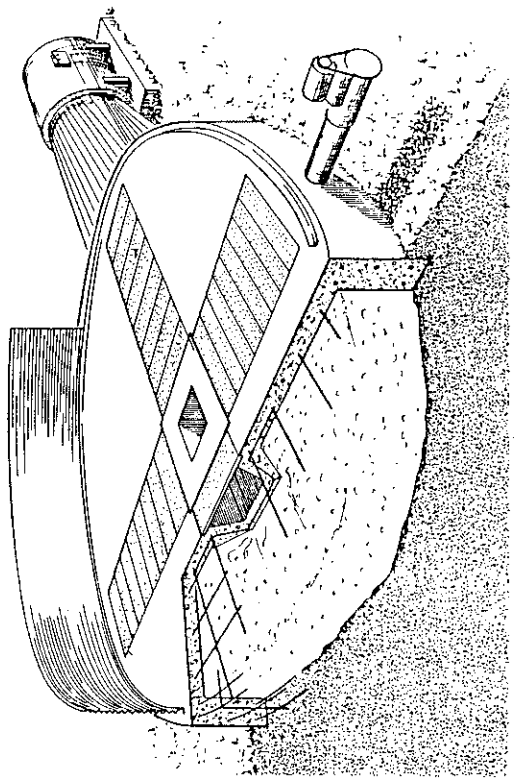
- DRY GRAIN SURGE HOPPER AND DRY GRAIN LEG ARE REQUIRED FOR CONTINUOUS FLOW DRYERS ONLY.
- DRYING RATE SHOULD BE AT LEAST ONE-HALF OF COMBINING RATE, THEN ONE-HALF DRY COMBINING VOLUME IS THE MINIMUM VOLUME OF WET GRAIN SURGE BIN REQUIRED.
- WET GRAIN SURGE HOPPER (14) IS OPTIONAL FOR BIN DRYER.

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CIRCULAR GRAIN BIN LAYOUTS

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- 1 reinforced concrete foundation with "X-type" aeration duct
- 2 reinforced concrete foundation with "Y-type" aeration duct
- 3 reinforced concrete foundation with "I-type" aeration duct, for bins not over 18'-0" diam.
- 4 reinforced concrete foundation with "full floor aeration system"; system consists of galv. steel or concrete block supports, perforated plank flooring, and flashing to seal bin; see manufacturer
- 5 aeration duct extension or fan transition
- 6 aeration duct with floor panels or use perforated flooring
- 7 center bin well and unloading auger
- 8 unloading auger trench with removable solid floor
- 9 intermediate bin well (optional); do not use to start emptying a full bin

SPECIFICATIONS

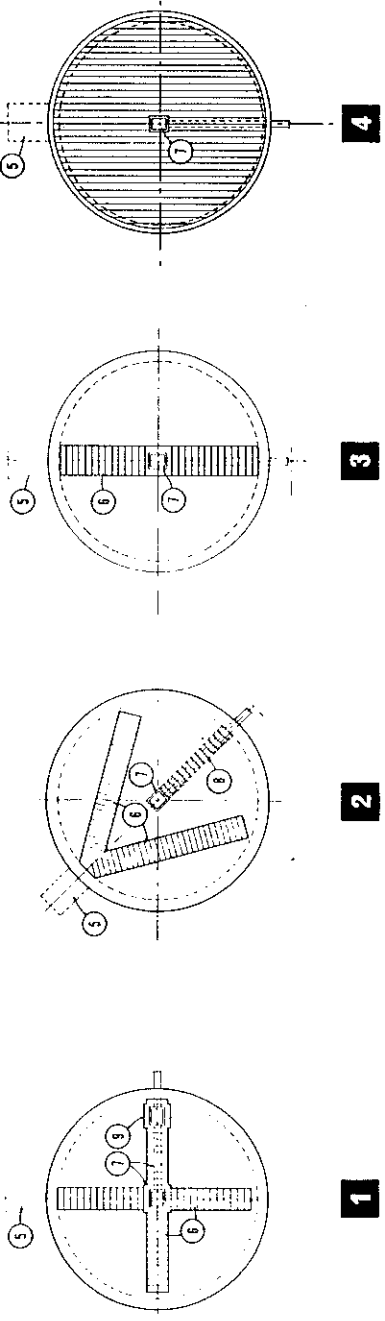
Before constructing foundation consult manufacturer of steel grain bins for details such as: foundation and bin diameter, bin anchorage, under floor and sweep augers, aeration ducts and fan outlets. Also consult local authorities for compliance with codes.

The design of this plan considered a max. bin diameter of 21'-0" with a max. depth of 16'-3" (shallow bin). For greater bin depths and diameters increase the perimeter footing width and circumferential reinforcing.

The minimum soil safe bearing pressure must be larger than 1200 psf. Unless otherwise specified, cast-in-place concrete is to be min. 3000 psi. at 28 days, 68 air-enclosure. The plan user must ensure that the foregoing requirements are met. Consult an engineer if you are not familiar with the details required or if your bin and soil do not fall within these limits.

All reinforcing steel to be min. 60,000 psi deformed bars; provide 2" min. concrete cover over reinforcing steel.

All exposed steel to be galvanized or painted to resist corrosion from moisture.



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FOUNDATIONS FOR CIRCULAR STEEL GRAIN BINS UNDER 22 FT DIAMETER

CANADA '87 639H SHEET 1 OF 2

Order # 732-6391

